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A.C.I. MINERALS PTY. LIMITED

MINERAL EXPLORATION IN E.L. 16/68

BALFOUR, NORTHWEST TASMANIA

1972-73

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by

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SUMMARY

Mineral exploration in E.L. 16/68, Balfour, Tasmania was continued during 1972-73.

Regional geological mapping between The Clump and South Balfour Prospects revealed that an easterly dipping sequence of sandstone and shale in the west is successively overlain by fine grained carbonaceous sediments and fine grained chloritic slaty sediments. These rocks which have been tentatively assigned a Younger Precambrian to Lower Paleozoic age, have been intruded by (?) Cambrian diorite and are unconformably overlain by Tertiary conglomerate and basalt.

Cupriferous mineralization is known to occur at eight prospects covering a distance of 17 kilometres between The Clump Prospect in the north and the south Balfour Prospect in the south and during the 1972-73 field season, surface and sub-surface exploration was carried out at the Waratah, Pierpont Morgan and Murrays Reward Prospects. Surface exploration was also undertaken near Emmetts Creek and south of Specimen Hill.

Diamond drilling at the Waratah Prospect revealed a thin, discordant, slightly cupriferous but sub-economic quartz formation which strikes NNW and dips about the vertical in a sequence of fine grained carbonaceous sediments which strike NNE and dip moderately towards the east.

Two drillholes at the Pierpont Morgan Prospect intersected slightly cupriferous, but sub-economic quartz and quartz-dolomite containing minor amounts of magnetite and pyrite. This mineralized zone strikes NNW and dips about the vertical in an easterly dipping sequence of fine grained chloritic and carbonaceous sediments.

Diamond drilling at the Murrays Reward Prospect proved the existence of a small, low grade, cupriferous quartz-dolomite body which strikes north-west and dips moderately towards the south-west sediments in a sequence of fine grained chloritic and carbonaceous sediments which strike north and dip steeply towards the east. This cupriferous mineralization is believed to have been remobilized and transported from the Murrays Reward sedimentary cupriferous formation and re-deposited in a transverse fault zone.

In the Emmetts Creek area costean geochemistry and sub-surface mapping indicated a discontinous zone of low grade, cupriferous quartz or quartz-dolomite.

South of Specimen Hill costean geochemistry indicated traces of sulphide (Cu, Pb, Zn) mineralization.

It is recommended that:-

(i) One drillhole be planned for the Clump Prospect in order to test a hypothesis regarding the possible association of zones of low core recovery with intervals of massive friable copper sulphides.

(ii) One drillhole be planned for the Central Prospect in order to test for cupriferous mineralization in a suspected transverse fault zone.

(iii) No further exploration be carried out at the Gully Development, Blocks, Pierpont Morgan, Waratah and South Balfour Prospects.

(iv) Preliminary surface investigations be carried out at the Lindsay Prospect.

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NOTE Drillhole reports DDH 09-32 not recieved with this report.

PLANS AND SECTIONS

PLAN A	:	1:20000 showing main geographical features and prospects.
B	:	1:10000 showing Emmetts Creek & Specimen Hill areas.
C	:	1:500 showing geology and sampling, Emmetts Adit.
D	:	1:500 showing geology and sampling, Waratah Adit.
E	:	1:1000 showing drillhole sections, Waratah Prospect.
F	:	1:1000 showing drillhole sections, Pierpont Morgan Prospect.
G	:	1:1000 showing location of drillholes, Murrays Reward Prospect
H	:	1:1000 showing longitudinal projection, Murrays Reward Prospect
I	:	1:1000 showing plan projection, Murrays Reward Prospect
J	:	1:1000 showing drillhole sections, Murrays Reward Prospect

FIGURE 1: showing stereographic projection of poles to bedding planes Waratah Prospect

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A.C.I. MINERALS PTY. LIMITED

MINERAL EXPLORATION IN E.L. 16/68, BALFOUR, TASMANIA.

1972-1973

1. INTRODUCTION

The 1972-73 field season commenced in October, 1972 and the following exploration programme was completed:

(i) Regional geological mapping on a scale 1:10,000 over an area of 6,000 hectares between the Clump and South Balfour Prospects.

(ii) Costean geochemistry at the Pierpont Morgan Prospect south of Specimen Hill and in the vicinity of Emmetts Creek.

(iii) Construction of costeans at the Waratah and Pierpont Morgan Prospects to assist the geological mapping.

(iv) Mapping and sampling of adits at the Waratah Prospect and near Emmetts Creek.

(v) Two drillholes at the Waratah Prospect.

(vi) Two drillholes at the Pierpont Morgan Prospect.

(vii) Five drillholes at Murrays Reward Prospect.

(viii) Literature survey of copper occurrences south of Mt. Frankland.

(ix) Construction of drill sites and access roads, construction of sample preparation and core shed, construction of dam for camp water supply.

(x) Sample preparation and allied support activities.

Personnel employed during the field season included a geologist, field assistant, cook and contract plant operator. In addition, a second geologist was employed for the regional mapping programme and five contract drillers were on site for the duration of the drilling programme. Field work was completed in April, 1973.

Previous investigations and background information concerning E.L. 16/68 are described in earlier reports (Davies, 1969; McIntyre August 1971; McIntyre July 1972).

2. REGIONAL GEOLOGICAL MAPPING

2.1. Introduction

Regional geological mapping on a scale of 1:10,000 was completed over a area of about 6,000 hectares between the Clump Prospect in the north and the South Balfour Prospect near the southern boundary of E.L. 16/68. This area, some 20 kilometres long and 3 kilometres wide, included all the known cupriferous prospects in the Mt. Balfour area of E.L. 16/68.

A description of the regional programme is the subject of an earlier report (McIntyre December 1972) and may be summarised as follows:

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2.2. Stratigraphic

The stratigraphical succession in the area is -

Tertiary	Basalt Conglomerate Unconformity
Cambrian (?)	Diorite
Younger Pre-Cambrian to Lower Paleozoic	Quartzite Siltstone Chloritic siltstone Carbonaceous shale Sandstone

The Sandstone: The oldest rocks in the area consist of thin sandstone beds separated by thicker intervals of carbonaceous shale. These rocks, which have a total thickness of at least 1,500 metres, strike about north and dip towards the east, and occur in the western part of the mapped area.

The sandstone includes white quartz and brown ferriginous sandstone and occurs in beds rarely greater than 10 metres thick although forming subdued ridges commonly greater than 1 kilometre long.

The intervening carbonaceous sediments form the bulk of this formation but are rarely exposed.

The Carbonaceous Shale: This formation, which is about 800 metres thick, overlies the sandstone formation and is essentially identical to the carbonaceous sediments separating the sandstone beds. Lithologies include carbonaceous siltstone and shale, quartzose siltstone and graphitic and carbonaceous shale. The graphitic member of the formation is apparently restricted to zones of shearing or faulting.

The Chloritic siltstone: This formation occurs on the eastern margin of the mapped area and attained a maximum thickness of 500 metres. The main lithologies consist of chloritic siltstone, phyllite and slate.

The Siltstone: This formation is exposed only on the western slopes of Mt. Frankland and consists of a regular alternation of dark grey and pale grey-brown arenaceous siltstone beds up to 5cm thick.

The Quartzite: The upstanding nature of Mt. Frankland reflects the relative hardness of the underlying pink hematitic quartzite and sandstone.

The Diorite: A number of diorite dykes occur south of the Pierpont Morgan Prospect and are commonly defined by a heavy growth of trees in the otherwise sparse vegetation of the button grass plains.

The dykes have intruded sandstone and carbonaceous sediments and occur as irregular elongate bodies, between 20 and 120 metres. thick and up to 1.5 kilometres long. They have undergone prolonged weathering and only a few boulders remain in a red-brown soil.

The Conglomerate: A quartz, quartzite and quartz sandstone pebble conglomerate up to 20 metres thick unconformably overlies a small area of chloritic slate and siltstone between the Murrays Reward and Pierpont Morgan Prospects. The conglomerate is densely solicified in parts.

A similar, but unconsolidated, conglomerate underlies basalt at the Balfour township and contains minor amounts of alluvial cassiterite.

The Basalt: Porphyritic olivine basalt occurs at the Balfour township and near the Clump Prospect. The basalt is probably less than 25 metres thick and occurs as residuals of originally extensive basalt flows.

Rock exposure in E.L. 16/68 is rare but it is apparent that a significant decrease in sediment grainsize occurs from west to east.

2.3 Structure

The rocks in the Balfour area have a regional strike between NNE and NNW and dip steeply towards the east. Graded bedding indicates that the sediments also young towards the east and are therefore right side up, although a few exceptions occur in the vicinity of faults and folds.

Several synclinal folds occur in the basal sandstone formation north of Mt. Balfour. The folds plunge moderately towards the north or south along NNW trenching axes and have commonly been modified by faulting.

At the Clump Prospect gentle folding has occurred with the major axial plane striking northwest, dipping towards the east and plunging gently towards the north (Jackaman April 1972)

Faults are widespread in the area and have probably influenced local drainage patterns to a certain extent. Although not associated with the genesis of the cupriferous mineralization, in areas where they intersect the sedimentary cupriferous formation, they may serve as favourable depositional sites for remobilized cupriferous quartz-dolomite.

Cupriferous and pyritic mineralization was observed in several areas during the course of the regional mapping and these occurrences will be described in section 3 (Mineralization and Geology)

3. MINERALIZATION AND GEOLOGY

3.1 Introduction

Cupriferous mineralization in the Balfour area consists essentially of chalcopyrite, with lesser amounts of secondary copper sulphides, in a pyritic quartz-dolomite gangue. The secondary sulphides, notably covellite and chalcocite, have been observed at several prospects but are rarely of economic significance.

Pyrite is ubiquitous, invariably associated with copper sulphides in the quartz-dolomite and also occurring in variable but generally minor amounts as sedimentary pyrite, in the carbonaceous sediments.

The chalcopyrite occurs as irregular and discontinuous blebs and stringers, commonly concentrated along incipient fractures. Chalcopyrite and pyrite are generally in intimate association.

Magnetite has been observed in minor amounts in drillcore from the Pierpont Morgan and Clump Prospects but does not occur in quantities sufficient to produce a magnetic anomaly.

Trace amounts of other sulphides, notably galena and sphalerite, are associated with the cupriferous sulphides, but rarely occur in visible concentrations.

Silver and gold values are negligible.

The cupriferous quartz and quartz-dolomite commonly outcrops as white, cavernous and apparently barren quartz but pyritic and iron stained outcrops do occur. Dense white, barren quartz occurring at some prospects is believed to be formed by a near surface, secondary cavity-fitting phenomenon which follows the abstraction of dolomite and sulphides by leaching. In areas where the quartz-dolomite is without surface expression, it is believed that dolomite rather than quartz is the major constituent.

The cupriferous mineralization is believed to have originally been deposited as a sedimentary cupriferous silica-carbonate formation which in some areas at least, has undergone later remobilization followed by redeposition in fault zones.

In the specimen Hill area, wolframite, pyrite, cassiterite, arsenopyrite and chalcopyrite occur in thin quartz veins but do not occur in potentially economic concentrations (Jackaman June 1973).

The Broken Hill Pty. Co. Ltd., abandoned exploration in this area in 1966 after six diamond drillholes had failed to locate tin or tungstan orebodies.

During the course of the regional mapping a number of old prospects and minor sulphide occurrences were discovered or re-located. Investigations carried out at these prospects included sampling and mapping of adits, costean geochemistry and sampling of old spoil dumps and mineralized outcrops. The main investigations carried on during 1972-73 were at the Pierpont Morgan and Waratah Prospects, the Emmetts Creek area and in two small areas south of Specimen Hill.

Scattered small outcrops of barren or slightly pyritic quartz occur in many parts of E.L. 16/68 but have no economic significance.

3.2 The Emmetts Creek Area

3.2.1. Introduction

Emmetts Creek rises near the Central Prospect shaft and flows north to the Frankland River along a deep valley (Plan B)

About 700 metres north of the shaft a subdued and apparently discordant ridge is intersected by Emmetts Creek. The ridge is capped with sporadic quartz and ferriginous material and it is along this ridge that a number of costeans were constructed and sampled and that an old adit was inspected.

3.2.2 Geology

The Emmetts Creek ridge has a strike slightly to moderately oblique to that of the enclosing sediments and appears to lie close to a gradational boundary between slaty chloritic siltstone (to the west) and fine grained carbonaceous sediments (to the east). The ridge strikes northwest to NNW within sediments which strike about north and dip steeply towards the east.

The mineralized zone in this area occurs on the surface as quartz outcrops and cobbles and boulders of quartz and ferruginous material which are sporadically distributed along the ridge crest. Deformed and sheared sediments immediately adjacent to the quartz indicates the possibility that the mineralized material occurs along a fault zone or that shearing has occurred parallel to the mineralization.

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On the west bank of Emmetts Creek, some 600 metres north of the intersection of the creek and the ridge, an adit has been driven 113 metres in a westerly direction. Two short drives (⩽ 10 metres) extend north and south about 100 metres from the adit portal but no ore was produced.

Geological mapping of the adit (Plan C) revealed the following lithologies (distances measured from portal).

0 to 48 metres; fine grained carbonaceous sediments and slaty sediments striking about north and dipping and younging towards the east.

48 to 113 metres; carbonaceous and chloritic slate and slaty sediments in which bedding surfaces have been largely obliterated.

Between about 27 and 105 metres, numerous discordant quartz veins and thicker bands (< 5 metres but generally ⩽ 3 metres) strike northwest to NNW and dip steeply west. The quartz is commonly pyritic, limonitic, fractured and cavernous and rare traces of secondary copper minerals (recent carbonate and sulphate?) occur in parts no copper sulphides were observed.

The adit was channel sampled (2.5 metre intervals) between 20 and 113 metres and, in addition, the north drive was sampled and grab samples of limonitic mud were collected from the two drives and from the western end of the adit.

The assay results were as follows (see also Plan C)

SAMPLE NO. BAL.	INTERSECTION METRES	ASSAY VALUE ppm Cu.	SAMPLE NO. BAL.	INTERSECTION METRES	ASSAY VALUE ppm Cu.
2083	20.0 to 22.5	80	2104	72.5 to 75.0	90
2084	22.5 " 25.0	60	2105	75.0 " 77.5	90
2085	25.0 " 27.5	160	2106	77.5 " 80.0	50
2086	27.5 " 30.0	60	2107	80.0 " 82.5	30
2087	30.0 " 32.5	80	2108	82.5 " 85.0	30
2088	32.5 " 35.0	25	2109	85.0 " 87.5	40
2089	35.0 " 37.5	30	2110	87.5 " 90.0	30
2090	37.5 " 40.0	30	2111	90.0 " 92.5	10
2091	40.0 " 42.5	90	2112	92.5 " 95.0	10
2092	42.5 " 45.0	10	2113	95.0 " 97.5	10
2093	45.0 " 47.5	100	2114	97.5 "100.3	10
2094	47.5 " 50.0	330	2115	102.5 "105.0	100
2095	50.0 " 52.5	60	2116	105.0 "107.5	50
2096	52.5 " 55.0	15	2117	107.5 "110.0	230
2097	55.0 " 57.5	60	2118	110.0 "113.0	120
2098	57.5 " 60.0	10	2119	Nth drive 0-3m	90
2099	60.0 " 62.5	180	2120	" " 3-6.2m	60
2100	62.5 " 65.0	270	2121	limonite, 5th drive	1200
2101	65.0 " 67.5	60	2122	limonite, 105-113m	6000
2102	67.5 " 70.0	60	2123	limonite, Nth drive	3300
2103	70.0 " 72.5	40			

The higher grade (say ≥ 100 ppm Cu.) channel sample values are invariably associated with quartz veins and bands whereas the samples from intervals of slate or sediments returned background copper values only.

The limonitic mud from the drives and from the western end of the adit contains significant amounts of copper and it is believed that this copper has been leached from the fractured quartz and co-precipitated and concentrated with limonite in the acidic adit water.

3.2.3. Costean Geochemistry

Six costeans were constructed across the mineralized ridge; two costeans (7 & 8) on the east side of Emmetts Creek and four (9 to 12) on the west side (Plan B). The costeans were approximately 150 metres apart and were sampled over 2.5 metre intervals, the intervals being measured from steel pegs set in cement at the approximate centre of the ridge crest.

The assay values were as follows:-

Costean 7

SAMPLE NO. BAL.	INTERVAL METRES	ASSAY VALUE ppm Cu.
1924	0 to 2.5m E	120
1925	2.5 " 5.0	270
1926	5.0 " 7.5	440
1927	7.5 " 10.0	100
1928	10.0 " 12.5	50
1929	12.5 " 15.0	< 10
1930	15.0 " 17.5	< 10
1931	0.0 to 2.5 W	100
1932	2.5 " 5.0	30
1933	5.0 " 7.5	140
1934	7.5 " 10.0	70
1935	10.0 " 12.5	30
1936	12.5 " 15.0	30
1937	15.0 " 17.5	70

Costean 8

SAMPLE NO. BAL.	INTERVAL METRES	ASSAY VALUE ppm Cu.
1938	0 to 2.5 E	200
1939	2.5 " 5.0	450
1940	5.0 " 7.5	120
1941	7.5 " 10.0	70
1942	10.0 " 12.5	< 10
1943	12.5 " 15.0	< 10
1944	0 to 2.5 W	180
1945	2.5 " 5.0	300
1946	5.0 " 7.5	170
1947	7.5 " 10.0	170
1948	10.0 " 12.5	120
1949	12.5 " 15.0	180

SAMPLE NO. BAL	INTERVAL METRES	ASSAY VALUE ppm Cu.
1950	0 to 2.5 E	80
1951	2.5 " 5.0	130
1952	5.0 " 7.5	100
1953	7.5 " 10.0	30
1954	10.0 " 12.5	< 10
1955	12.5 " 15.0	< 10
1956	0 to 2.5 W	< 10
1957	2.5 " 5.0	< 10
1958	5.0 " 7.5	50
1959	7.5 " 10.0	560
1960	10.0 " 12.5	380
1961	12.5 " 15.0	240
1962	15.0 " 17.5	170

SAMPLE NO. BAL	INTERVAL METRES	ASSAY VALUE ppm Cu.
1963	0 to 2.5 E	< 10
1964	2.5 " 5.0	50
1965	5.0 " 7.5	< 10
1966	7.5 " 10.0	30
1967	10.0 " 12.5	50
1968	12.5 " 15.0	50
1969	0 to 2.5 W	20
1970	2.5 " 5.0	50
1971	5.0 " 7.5	120
1972	7.5 " 10.0	50
1973	10.0 " 12.5	50
1974	12.5 " 15.0	40
1975	15.0 " 17.5	70

Costean 11

SAMPLE NO. BAL	INTERVAL METRES	ASSAY VALUE ppm Cu.
1976	0 to 2.5 E	<10
1977	2.5 " 5.0	<10
1978	5.0 " 7.5	<10
1979	7.5 " 10.0	<10
1980	10.0 " 12.5	<10
1981	12.5 " 15.0	<10
1982	0 to 2.5 W	<10
1983	2.5 " 5.0	20
1984	5.0 " 7.5	<10
1985	7.5 " 10.0	<10
1986	10.0 " 12.5	<10
1987	12.5 " 15.0	<10
1988	15.0 " 17.5	<10

Costean 12

SAMPLE NO. BAL	INTERVAL METRES	ASSAY VALUE ppm Cu.
1989	0 to 2.5 E	50
1990	2.5 " 5.0	50
1991	5.0 " 7.5	100
1992	7.5 " 10.0	30
1993	10.0 " 12.5	50
1994	12.5 " 15.0	40
1995	15.0 " 17.5	50
1996	0 to 2.5 W	70
1997	2.5 " 5.0	50
1998	5.0 " 7.5	140
1999	7.5 " 10.0	100
2000	10.0 " 12.5	70
2001	12.5 " 15.0	80
2002	15.0 " 17.5	40

The mineralized zone, as defined by the anomalous copper values, is at least 600 metres long but the uniformly low values of Costean II and the generally low values of Costeans 10 & 12 indicate that the cupriferous mineralization has a long strike discontinuities which probably coincide with discontinuities in the outcropping quartz. Similarly the scattered high values in individual costeans such as Costean 9 indicate that the mineralization is not confined to a single zone but occurs as several thin quartzose bands separated by sediments, similar to those exposed in the nearby adit. No cupriferous minerals were observed in the costeans.

Minor amounts of brown ferruginous "gossan" occur sporadically along the ridge, particularly on the eastern bank of Emmetts Creek in the vicinity of Costean 8. Two grab samples of this material yielded the following assay values and confirmed the presence of anomalous cupriferous mineralization;

(i) sample Bal 1901, west side Emmetts Creek - 1400 ppm Cu.
(ii) sample Bal 1902, east side Emmetts Creek - 200 ppm Cu.

Recent subsurface exploration of the mineralized ridge has been carried out only at the far southern end where DDH 22 intersected about 6.3 metres of very slightly cupriferous (923 ppm Cu.) fragmentary and cavernous quartz and siltstone including one interval of 3350 ppm Cu. over a thickness of 1.8 metres.

3.3 South of Specimen Hill

3.3.1. Introduction

During the course of the regional mapping quartzose and ferruginous float was observed on two short ridges south of Specimen Hill (area A one kilometre south and area B B one kilometre SSE see Plan B). These potentially cupriferous occurrences were superficially investigated during the early exploration of the area by means of a few shallow pits and trenches and at least one shaft and one adit. No ore was recovered although from area A, Ward (1911) reported picked samples containing pyrite, siderite galena, sphalerite and chalcopyrite and assaying 7.53 per cent Zn, 2.69 per cent Pb, 0.23 per cent Cu, 2 dwt 15 gr Au and 2 oz. 13 dwt 14 gr Ag.

3.3.2 Geology

In area A a poorly defined and discontinous ridge is lightly covered with scattered quartzose and ferruginous float overlying a sequence of fine grained carbonaceous sediments which strike north and dip towards the east. Ward (op cit) reported that a shaft was sunk to a depth of 15.2 metres and that a southwesterly dipping lode was 4.3 metres thick at the bottom of the shaft. The high grade picked sample came from this shaft.

Ward further reported that several other pits, trenches and a shallow shaft along the strike of the lode had revealed lode material apparently devoid of significant indications of sulphide mineralization.

In area B, thin discontinuous quartz occurs in sandstone and carbonaceous shale and silstone. An adit was driven into the western side of this ridge but has since collapsed and no sulphide mineralization appears on the spoil dump.

3.3.3 Costean Geochemistry

Two costeans across the ridge in area A returned the following channel sample assay values;

(i) North costean

SAMPLE NO. BAL	INTERVAL METRES	ASSAY VALUE (ppm)		
		CU	Pb	Zn
2025	0 to 5.0 E	50	350	60
2026	5.0 " 10.0	50	230	50
2027	10.0 " 15.0	40	50	40
2028	15.0 " 20.0	70	900	40
2029	0 " 5.0 W	30	180	60
2030	5.0 " 10.0	80	180	90
2031	10.0 " 15.0	<10	400	100
2032	15.0 " 20.0	280	600	70

(ii) South Costean

SAMPLE NO. BAL	INTERVAL METRES	ASSAY ppm Cu.
2019	0 to 5.0 E	70
2020	5.0 " 10.0	70
2021	10.0 " 15.0	400
2022	0 to 5.0 W	50
2023	5.0 " 10.0	50
2024	10.0 " 15.0	50

Anomalous metal values are indicated in this area but the generally low values and the thin and discontinuous nature of the lode material discourage further exploration in area A.

Two costeans across the ridge in area B returned the following channel sample assay values:-

(i) North Costean

(ii) South Costean

SAMPLE NO. BAL	INTERVAL METRES	ASSAY VALUE ppm Cu.	SAMPLE NO. BAL	INTERVAL METRES	ASSAY VALUE ppm Cu.
2003	0 to 5.0 E	70	2012	0 to 5.0 E	150
2004	5.0 " 10.0	80	2013	5.0 " 10.0	50
2005	10.0 " 15.0	100	2014	10.0 " 15.0	40
2006	15.0 " 20.0	30	2015	0 to 5.0 W	50
2007	0 to 5.0 W	50	2016	5.0 " 10.0	20
2008	5.0 " 10.0	150	2017	10.0 " 15.0	130
2009	10.0 " 15.0	50	2018	15.0 " 20.0	380
2010	15.0 " 20.0	30			
2011	20.0 " 25.0	80			

The few relatively high values reveal the presence of anomalous cupriferous mineralization along the ridge but no further exploration is warranted in this area.

3.4 Pierpont Morgan Prospect

3.4.1 Introduction

This prospect is situated about 4 kilometres south of Balfour (Plan A) and was examined during the early exploration of the area by means of an adit, shaft and several shallow trenches.

The main part of the prospect consists of a prominent ridge about 300 metres long rising up to 25 metres above the surrounding plain. The ridge strikes about NNW and appears to be terminated by a fault at the northern end. Towards the south the ridge gradually decreases in height and eventually merges with the surrounding area.

An adit was driven in to the eastern side of the ridge on a westerly bearing and Ward (op cit) reported that an 8 metre drive towards the south intersected "oxidised and leached lode material with occasional bunches of sulphides". The adit intersected the lode which was reported to be about 9 metres thick and to consist of quartzose material with heavily mineralized bands containing pyrite, chalcopyrite and covellite. The adit was inspected in 1972 but several roof falls, some obviously recent, precluded the possibility of mapping or sampling. A shaft on the western side of the ridge is completely flooded.

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3.4.2. Geology

The ridge owes its prominence to a quartz core; iron stained, cavernous and gossanous in some parts and dense and apparently barren in others. The quartz is several metres thick at the highest point of the ridge but towards either end the height of the ridge decreases in sympathy with a decrease in the thickness of the quartz.

The mineralized quartz occurs within a sequence of fine grained carbonaceous and chloritic sediments and slaty sediments which appear to form a gradational zone between dominantly carbonaceous sediments to the west and dominantly chloritic sediments to the east. Minor amounts of chalcopyrite and secondary copper sulphides occur in pyritic and cavernous quartz on the adit spoil dump.

3.4.3 Costean Geochemistry

A costean was constructed and sampled at the southern end of the ridge in an attempt to determine the southern limits of the cupriferous mineralization in an area where the quartz was not in evidence. The channel sample assay values were:

SAMPLE NO. BAL	INTERVAL METRES	ASSAY VALUE ppm Cu.
2033	0 to 5.0 E	280
2034	5.0 " 10.0	< 10
2035	10.0 " 15.0	< 10
2036	15.0 " 20.0	< 10
2037	0 " 5.0 W	< 10
2038	5.0 " 10.0	< 10
2039	10.0 " 15.0	< 10
2040	15.0 " 20.0	< 10

The relatively high value of sample Bal 2033 probably reflects the presence of thin cupriferous mineralization at depth.

A prominent boundary between western chloritic sediments and eastern carbonaceous and graphitic sediments occurs in heavy bush at the eastern end of the costean. A channel sample (2.5 metre interval) was taken from either side of the contact in order to test for possible differences in the copper content of the two lithologies. The assay values were as follows;

(i) sample Bal 2041 - carbanceous sediment - < 10 ppm Cu.
(ii) sample Bal 2042 - chloritic sediment - 40 ppm Cu.

These two assay values are both at background copper levels and the difference between the two is probably not statistically significant.

About 100 metres south along the track from the costean, a small outcrop of black carbonaceous siltstone contains abundant sedimentary pyrite in the form of thin ($\leqslant$1 cm) discontinuous beds and lenses. A specimen (Bal 1916) of the pyritic siltstone returned an assay value of 75 ppm Cu, indicating that no sedimentary copper occurs with sedimentary pyrite, at least in this area.

A second costean in this area was constructed across a quartz outcrop about 1 kilometre south of the Pierpont Morgan ridge. This quartz occurs as scattered boulders and discontinuous bands close to a contact between eastern carbonaceous sediments and western chloritic sediments. The costean channel samples assay values were as follows:-

SAMPLE NO. BAL	INTERVAL METRES	ASSAY VALUE ppm Cu.
	eastern end costean	
2044	0 to 5.0 E	10
2045	5.0 " 10.0	10
2046	10.0 " 15.0	10
	western end costean	
2047	5.0 to 10.0 E	20
2048	10.0 " 15.0	10
2049	15.0 " 20.0	10
2050	20.0 " 25.0	10
2051	25.0 " 30.0	10
2052	30.0 " 35.0	10
2053	35.0 " 40.0	10
2054	40.0 " 45.0	20
2055	45.0 " 50.0	20
2056	50.0 " 55.0	30

The uniformly low values signify the absence of cupriferous mineralization or the unusually complete leaching of sulphides. The discontinuous nature of the quartz and the low assay values combine to preclude further exploration in this area.

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3.5 The Waratah Prospect

3.5.1 Introduction

The Waratah Prospect is situated about 7 kilometres south of the Balfour township (Plan A) and takes its name from the nearby Waratah Creek. The prospect consists of a ridge about 300 metres long, rising up to 25 metres above the surrounding plain and is, in many respects, similar to the Pierpont Morgan Prospect. The ridge forms part of a subdued and apparently discontinuous ridge several kilometres long.

During the early exploration of the Balfour area this prospect was investigated by means of several shallow trenches and pits and by an adit which was driven towards the southwest from the eastern side of the ridge. No cupriferous ore was produced although minor amounts of semi friable and cavernous, pyritic quartz on the adit spoil dump contain traces of chalcopyrite and friable secondary copper sulphides.

3.5.2 Geology

The geology of the Waratah Prospect consists basically of a thin, discontinuous and discordant quartz formation occurring wholly within a sequence of fine grained carbonaceous sediments which are themselves, locally bounded to the east and west by discrete formations of relatively hard quartz sandstone which form prominent strike ridges.

Although the sediments along the crest of the mineralized ridge are commonly sub-parallel to the mineralized quartz, stereographic projection of sediment bedding planes and air photo interpretation reveal that the mineralization is discordant to the enclosing sediments and it is considered that the mineralization in this area is associated with a transverse fault zone.

The strike of the mineralized ridge is about N 20°W and an examination of the aerial photographs indicates that at least the southern end of the ridge terminates indefinitely against the prominent sandstone strike ridge to the east.

Stereographic projection of 131 poles to sediment bedding planes (Fig. 1) on the mineralized ridge yields an average bedding plane striking about N 28° E and dipping 42° towards the east.

The Waratah adit was driven from the eastern side of the ridge on a bearing of 240°. A roof fall has completely blocked the adit about 43 metres from the portal. It is estimated from the volume of material on the spoil dump, that the adit was initially much longer and/or that the mineralized quartz was also investigated by driving along strike.

The accessible part of the adit reveals an easterly dipping sequence of carbonaceous shale and siltstone containing a soft and friable igneous dyke between 25.0 and 27.5 metres from the portal. X-ray diffraction analysis of the dyke, which was too soft and friable for routine thin section preparation revealed the presence of chlorite, α-quartz, talc and magnesite. The mineralized quartz lode is not now accessible from the adit.

3.5.3 Adit and Spoil Dump Geochemistry

Channel samples of the adit walls were collected over intervals of 2.5 metres between 10.0 and 47.0 metres. In addition, bulk samples were collected from the spoil dump and grab samples of limonitic mud were taken from the adit.

The adit channel sample assay values were as follows:- (see Plan D)

SAMPLE NO. BAL	INTERVAL METRES	ASSAY VALUE ppm Cu.
2063	10.0 to 12.5	35
2064	12.5 " 15.0	10
2065	15.0 " 17.5	20
2066	17.5 " 20.0	35
2067	20.0 " 22.5	20
2068	22.5 " 25.0	10
2069	25.0 " 27.5	50
2070	27.5 " 30.0	10
2071	30.0 " 32.5	25
2072	32.5 " 35.0	25
2073	35.0 " 37.5	20
2074	37.5 " 40.0	20
2075	40.0 " 42.5	20
2076	42.5 " 45.0	20
2077	45.0 " 47.0	20

The background coppper values confirm that the accessible part of the adit is some distance from the mineralized quartz and that the enclosing sediments do not contribute to the overall copper content of the mineralized ridge.

Two grab samples (Bal 2078, 2079) of limonitic mud from the adit returned assay values of 540 and 400 ppm Cu. indicating that a minor amount of copper has been leached from the quartz and precipitated with the limonite.

Six bulk samples from the adit spoil dump (see Plan D for sample location) yielded the following assay values;

SAMPLE NO. BAL	2057	2058	2059	2060	2061	2062
ASSAY VALUE ppm Cu.	1250	550	80	35	35	180

Samples Bal 2057 and 2058 were collected from a small sub-dump of sediments and pyritic and cupriferous quartz and the assay values confirm the anomalous copper content. This small quartzose dump had obviously been kept apart from the main dump because of its copper content and the small volume present indicates that the cupriferous quartz was very thin where intersected by the adit.

The copper on the adit dump consists of chalcopyrite and soft and friable covellite and chalcocite within pyritic and slightly to moderately cavernous quartz. It was noted that the friable sulphides were very readily washed from the quartz during cutting with a diamond saw and that only traces of sulphides remained in the resulting cavity. It is considered most probable that the rotation of the diamond bit and the turbulence of the drilling fluid would create a similar effect and therefore drillhole intersections of cavernous and apparently barren quartz or quartz dolomite in the Balfour area may actually be cupriferous and should not immediately be rejected as being non-mineralized.

The core sample assay values were as follows:-

SAMPLE NO. BAL	INTERSECTION METRES	INTERVAL METRES	ASSAY VALUE ppm Cu.
2144	140.32 to 142.93	2.61	< 5
2145	142.93 " 145.54	2.61	< 5

DDH 30

A thin pyritic quartz formation was intersected between 135.90 and 138.96 metres, this interval containing 36 ppm Cu. over a true thickness of 1.6 metres.

The quartz is fragmentary and cavernous and dips about the vertical or steeply east in a sequence of carbonaceous sediments. A fault zone occurs immediately adjacent to the quartz between 132.90 and 135.90 metres.

The core sample assay values were as follows:

SAMPLE NO. BAL	INTERSECTION METRES	INTERVAL METRES	ASSAY VALUE ppm Cu.
2146	66.38 to 66.68	0.30	14
2147	74.86 " 75.18	0.32	36
2148	129.94 to 132.90	2.96	20
2149	132.90 " 135.90	3.00	49
2150	135.90 " 138.96	3.06	36
2151	138.96 " 141.71	2.75	14

The two samples Bal 2146 and 2147 were assayed in order to compare the copper content of barren carbonaceous sediments with those carbonaceous sediments containing abundant sedimentary pyrite. Sample Bal 2146 (14 ppm Cu) contained rare pyrite whereas sample Bal 2147 (36 ppm Cu) contained about 10 per cent sedimentary pyrite but although the pyritic sediments yielded a higher copper assay it is considered that the difference between the copper contents of the two samples is probably not statistically significant and there is therefore no genetic relationship between the deposition of the sedimentary pyrite and the origin of the nearby copper sulphides.

Similarly, low core recovery from known mineralized intervals may be caused by the presence of massive but friable secondary sulphides which are too weak to be effectively cored.

4 THE DRILLING PROGRAMME

4.1 Introduction

The 1973 drilling programme was carried out under contract by Longyear (Australia) Pty. Ltd. with the aid of a Longyear "38" drill rig The rig worked two ten hour shifts, seven days per week and was operated by a runner and helper with a foreman runner on standby. The drillholes were taken to a depth of between 45 and 75 metres with a tricone bit before core drilling commenced. This procedure reduced the cost of each hole by an average of $730.

The drilling programme commenced on 4th February 1973 (DDH 29) and was halted after the completion of DDH 37 on 3rd April 1973. During this period nine drillholes, totalling 1660.17 metres, were completed in 109 shifts at an average drilling rate of 15.2 metres per shift. Drilling costs averaged about $27.75 per metre inclusive of assay, core storage and mobilization costs. Technical information concerning the drilling programme is presented in an earlier report (McIntyre May 1973) and in the individual drillhole reports.

The drilling programme included drilling at the Waratah Prospect (2 holes) Pierpont Morgan Prospect (2 holes) and Murrays Reward Prospect (5 holes).

4.2 Waratah Prospect Drillholes

Two drillholes about 105 metres apart, were drilled on the western side of the Waratah Prospect. The drillhole cross sections are shown on Plan E.

DDH 29

This drillhole intersected slightly pyritic quartz between 140.32 and 145.54 metres, this interval containing less than 5 ppm Cu. over a true thickness of 3.0 metres. The quartz, which dips about the vertical in a sequence of carbonaceous sediments, is slightly cavernous, and is associated with a fault zone between 145.54 and 148.03 metres.

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4.2.1 Conclusion

A slightly cupriferous and discordant quartz formation strikes NNW and dips about the vertical in carbonaceous sediments which strike NNE and dip moderately towards the east. The cupriferous formation is probably associated with a transverse fault zone. Even allowing for the possible loss of friable sulphides, the low assay values and the thin and apparently discontinuous nature of the quartz formation do not justify further exploration at this prospect.

4.3 Pierpont Morgan Prospect Drillholes

Two drillholes about 100 metres apart were completed at this prospect. The drillhole cross sections are shown on Plan F.

DDH 31

A quartz-dolomite formation, containing common pyrite and magnetite, was intersected between 103.27 and 111.93 metres, This interval containing an average of 37 ppm Cu. over a true thickness of 5.9 metres. The quartz-dolomite dips about the vertical or steeply west in a sequence of fine grained, chloritic and carbonaceous slaty sediments. A fault zone occurs immediately adjacent to the quartz-dolomite between 111.93 and 114.15 metres.

The core sample assay values were as follows:-

SAMPLE NO. BAL	INTERSECTION METRES	INTERVAL METRES	ASSAY VALUE ppm Cu.
2152	101.14 to 103.27	2.13	19
2153	103.27 " 106.30	3.03	39
2154	106.30 " 108.95	2.65	22
2155	108.95 " 111.93	2.98	50
2156	111.93 " 114.15	2.22	113

These assay values confirm the absence of appreciable cupriferous mineralization.

DDH 32

Slightly cupriferous quartz-dolomite was intersected between 137.28 and 142.02 metres. This interval containing an average of 190 ppm Cu. over a true thickness of 2.9 metres. The quartz-dolomite dips about the vertical within a sequence of slaty carbonaceous and chloritic sediments.

The core sample assay values were as follows:-

SAMPLE NO. BAL	INTERSECTION METRES	INTERVAL METRES	ASSAY VALUE ppm Cu.
2157	135.00 to 137.28	2.28	10
2158	137.28 " 139.58	2.30	24
2159	139.58 " 142.02	2.44	348
2160	142.02 " 142.63	0.61	34
2161	142.63 " 144.79	2.16	25
2162	144.79 " 147.27	2.48	60
2163	147.27 " 149.32	2.05	244
2164	149.32 " 150.24	0.92	2675

Sample 2164 containing 2675 ppm Cu. occurs away from the quartz-dolomite in an interval of quartzose and chloritic sediments.

4.3.1 Conclusion

At the Pierpont Morgan Prospect slightly cupriferous quartz-dolomite strikes about NNW and dips about the vertical within a sequence of slaty chloritic and carbonaceous sediments. Diamond drilling has indicated that the cupriferous mineralization at this prospect is sub-economic and confirmed Wards report of "occasional bunches of sulphides".

No further exploration is warranted at this prospect.

4.4 Murrays Reward Prospect Drillholes

During the 1973 drilling programme five drillholes were completed at this prospect in a continuation of the 1971-72 drilling programme.

The location of the drillholes (DHH 33 to DDH 37) are shown on Plan G.

DDH 33

Cupriferous quartz-dolomite was intersected between 118.11 and 124.35 metres, this interval containing 1.31 per cent Cu. over a true thickness of 5.4 metres (Plan J). This cupriferous formation is a northwestern extension of the mineralized zone intersected by DDH 16 and 17 during the 1971-72 field season, and apparently occurs as a discordant body obliquely intersecting a sequence of slaty chloritic siltstone and slaty carbonaceous sediments.

The core sample assay values (assaying by Spectrometer Services) were as follows:-

SAMPLE NO. BAL	INTERSECTION METRES	INTERVAL METRES	ASSAY VALUE*				
			Cu.	Pb	Zn	Ag	Au
2165	103.48 to 105.15	1.67	395	63	39	< 0.1	< 0.05
2166	105.15 " 110.03	4.88	220	27	36	< 0.1	< 0.05
2167	110.03 " 113.08	3.05	129	14	71	< 0.1	< 0.05
2168	113.08 " 115.51	2.43	505	11	42	< 0.1	< 0.05
2169	115.51 " 118.11	2.60	570	12	55	< 0.1	< 0.05
2170	118.11 " 119.02	0.91	2.3%	16	100	3.08	< 0.05
2171	119.02 " 120.03	1.01	2440	22	60	< 0.1	< 0.05
2172	120.03 " 122.67	2.64	9820	17	60	0.16	< 0.05
2173	122.67 " 124.35	1.68	2.0%	13	60	< 0.1	< 0.05
2174	124.35 " 126.01	1.66	146	13	31	< 0.1	< 0.05

* NOTE: Cu expressed in ppm unless otherwise stated
Pb, Zn expressed in ppm
Ag, Au expressed in dwt/ton.

Duplicates of the cupriferous samples Bal 2170 to 2173 inclusive were assayed by the A.C.I. Technical Centre with the following results.

SAMPLE NO. BAL.	2170	2171	2172	2173
ASSAY VALUE % Cu	2.2	0.37	1.0	1.8

Combination of the Spectrometer Services and the A.C.I. Technical Centre assay value for the cupriferous samples Bal 2170 to 2173 yields an average assay of 1.31 per cent Cu. for the interval 118.11 to 124.35 metres, thereby confirming the presence of potentially economic cupriferous mineralization. Lead, zinc, silver and gold values are, however, negligible.

This drillhole was continued past the mineralized zone in an unsuccessful attempt to prove the existence of a suspected cupriferous zone beneath the main Murrays Reward - Central Prospects ridge.

DDH 34

This drillhole was situated about 61 metres northwest of DDH 33 and proved a further extension of the cupriferous mineralization intersected by DDH 16, 17 and 33.¢

Cupriferous quartz-dolomite was intersected between 136.20 and 139.42 metres, this interval containing 0.26 per cent Cu. over a true thickness of 3.0 metres (Plan J).

The core sample assay values were as follows:-

SAMPLE NO. BAL	INTERSECTION METRES	INTERVAL METRES	ASSAY VALUE ppm or % Cu.
2175	117.34 to 121.15	3.81	300
2176	134.67 " 136.20	1.53	1350
2177	136.20 " 139.42	3.22	0.26%
2178	139.42 " 143.90	4.48	240
2179	143.90 " 144.56	0.66	40
2180	144.56 " 147.65	3.09	390

Sample Bal 2175 was a sludge sample collected from a zone of zero core recovery. The remaining samples were core samples from the vicinity of the cupriferous zone.

DDH 35

This drillhole was situated about 64 metres north of DDH 34 and was abandoned without intersecting a significant formation of cupriferous quartz-dolomite (Plan J).

The absence of a major mineralized zone may be interpreted in two ways;

(i) The mineralization has been displaced by a fault possibly represented by the interval 160.15 to 163.52 metres.

(ii) The thickness and grade of the mineralization had gradually decreased northwest along strike (compare grade and thickness of the cupriferous intersections of DDH 16, 33 and 34) and is represented by the interval 143.64 to 147.50 metres. This interval consists of brecciated and fragmentary siltstone containing irregular and discontinuous veins and bands of pyritic quartz and quartz-dolomite. This second interpretation is favoured.

DDH 36

This drillhole was situated so as to pass beneath DDH 33 in order to test the grade and thickness of the mineralized zone of greater depth.

An anomalously thick zone of sub-economic cupriferous mineralization was intersected between 189.32 and 221.78 metres. This interval containing an average of 2960 ppm Cu. over a true thickness of about 32.2 metres (Plan J). The bulk of the copper is associated with veins and thicker bands of quartz and quartz-dolomite but between 208.09 and 215.93 metres, several short (< 10 cm) intervals of massive chalcopyrite occur in a sedimentary sequence which contains only minor amounts of quartz or dolomite.

The core samples were initially assayed by Spectrometer Services and duplicate samples were assayed by the A.C.I. Technical Centre. The assay results were as follows:-

(i) Spectrometer Services Assay Values

SAMPLE NO. BAL	INTERSECTION METRES	INTERVAL METRES	ASSAY VALUE *				
			Cu.	Pb	Zn	Ag	Au
2181	189.31 to 191.90	2.59	2650	31	24	0.6	<0.05
2182	191.90 " 194.32	2.42	437	34	14	<0.1	<0.05
2183	194.32 " 195.85	1.53	267	54	19	<0.1	<0.05
2184	195.85 " 198.60	2.75	1500	20	52	<0.1	<0.05
2185	198.60 " 202.40	3.80	1460	36	88	<0.1	<0.05
2186	202.40 " 204.90	2.50	4600	100	64	<0.1	<0.05
2187	204.90 " 206.81	1.91	2670	36	48	<0.1	<0.05
2188	206.81 " 208.09	1.28	557	26	25	<0.1	<0.05
2189	208.09 " 211.72	3.63	1055	23	100	<0.1	<0.05
2190	211.72 " 215.93	4.21	7460	32	99	0.29	<0.05
2191	215.93 " 218.87	2.94	2440	36	40	0.26	<0.05
2192	218.87 " 221.78	2.91	1790	52	80	<0.1	<0.05
2193	221.78 " 225.74	3.96	199	N.A.	N.A.	N.A.	N.A.

* NOTE: Cu, Pb, Zn expressed in ppm
Ag, Au expressed in dwt/ton.

(ii) A.C.I. Technical Centre Assay Values

SAMPLE NO. BAL	ASSAY VALUE*			SAMPLE NO. BAL	ASSAY VALUE		
	Cu.	Pb	Zn		Cu.	Pb	Zn
2181	0.23	60	80	2187	0.22	130	115
2182	0.05	60	100	2188	0.06	115	105
2183	0.03	60	100	2189	0.26	120	290
2184	0.64	30	100	2190	0.58	130	225
2185	0.44	60	113	2191	0.19	150	140
2186	0.34	90	130	2192	0.49	90	125

* NOTE: Cu. expressed in per cent
Pb, Zn expressed in ppm

The results of the two laboratories have been combined to give the following average values.

(i) interval 189.32 to 195.85 metres;

slaty chloritic and carbonaceous sediments containing about 25 per cent (by volume) cupriferous quartz-dolomite veins and bands. Average assay value; 1220 ppm Cu, 48 ppm Pb, 56 ppm Zn.

(ii) interval 195.85 to 198.60 metres;

cupriferous quartz containing 3950 ppm Cu, 25 ppm Pb, 76 ppm Zn.

(iii) interval 198.60 to 208.09 metres;

cupriferous quartz-dolomite. Average assay value; 2795 ppm Cu. 70 ppm Pb, 86 ppm Zn.

(iv) interval 208.09 to 215.93 metres;

carbonaceous sediments containing cupriferous quartz-dolomite veins and bands and several thin (<10 cm) bands of massive chalcopyrite. Average assay value; 4411 ppm Cu. 76 ppm Pb, 178 ppm Zn.

(v) interval 215.93 to 221.78 metres;

cupriferous quartz-dolomite. Average assay value; 2754 ppm Cu, 82 ppm Pb. 96 ppm Zn;

Silver and gold values are negligible although a crude positive correlation may exist between copper and silver values.

The main mineralized interval bounded by cupriferous quartz and quartz-dolomite between 195.85 and 221.78 metres contains an average of 3400 ppm Cu. over a true thickness of 25.5 metres. Although the grade of this interval is sub-economic, the thickness is significantly greater than that of the mineralized zone of DDH 33 intersected some 65 metres above the DDH 36 intersection.

DDH 37

This drillhole which was situated so as to pass between and beneath DDH 33 and 34 intersected sub-economic cupriferous quartz-dolomite between 204.90 and 210.04 metres (Plan J). This interval containing an average of 2340 ppm Cu. over a true thickness of 5.0 metres

The core sample assay values were as follows:-

SAMPLE NO. BAL	INTERSECTION METRES	INTERVAL METRES	ASSAY VALUE ppm Cu.
2194	202.70 to 204.90	2.20	643
2195	204.90 " 207.51	2.61	975
2196	207.51 " 210.04	2.53	3750
2197	210.04 " 212.00	1.96	750

4.4.1 Conclusion

Diamond drilling at Murrays Reward Prospect during 1973 confirmed the existence of a sub-economic cupriferous quartz-dolomite body, the presence of which had been suspected after the drilling of DDH 16 and 17 and from the results of the underground mapping (McIntyre December 1971). This mineralized body, as defined by DDH 16, 17, 24, 33, 34, 35, 36 & 37 has a strike length of about 220 metres and a down dip depth of at least 220 metres (Plans H & I). The mean thickness is about 7 metres although this figure is reduced to a probably more realistic value of about 4 metres if the anomalously thick intersection of DDH 36 is excluded.

The average grade of the mineralization is about 0.8 per cent Cu, This figure calculated without weighting the assays for the individual drillhole zones of influence.

The grade and thickness of the mineralization decrease significantly along strike from the relatively high grade (2.49 per cent Cu) and thick (8.1 metres) intersection of DDH 16 to the 3.0 metre interval of 0.26 per cent Cu. of DDH 34. Still further north along strike the DDH 35 intersection consists only of irregular and discontinous veins of barren quartz and quartz-dolomite in brecciated siltstone.

The down dip variations in grade and thickness are less obvious because of fewer deep intersections but a down dip decrease in grade is suspected.

The solution of a three point problem indicates that the mineralization strikes about N 40°W and dips about 55° towards the southwest although it is suspected that the dip actually varies between 50° and 60° and that the strike swings somewhat to the

north at the northwestern end. The chloritic and carbonaceous sediments enclosing the mineralization strike about north and dip steeply towards the east. The cupriferous body is therefore noticeably discordant and it is believed that the mineralization is associated with a transverse fault which formed a favourable depositional site for dolomite, quartz and iron and copper sulphides which were mobilized and transported from the primary Murrays Reward cupriferous formation during or after faulting.

The fault zone along which the mineralization is concentrated is devoid of surface expression but the detailed I.P. survey carried out in this area does reveal a series of I.P. anomalies coinciding with the strike of the mineralization. The significant along strike decrease in both grade and thickness of this mineralized zone is reflected by a concimtant change in the associated I.P. anomalies. Definite anomalies at the southern end (highest grade and thickest intersection) of the mineralized zone are replaced by probable anomalies further north (intermediate grade and thickness) which, in turn, are replaced by possible anomalies in the vicinity of DDH 35 (negligible mineralization).

While discussing the results of the IP survey it is pertinent to point out that this significant (albeit sub-economic) body of cupriferous and pyrite mineralization is defined by all three orders (possible, probable definite) of I.P. anomalies whereas apparently lower grade cupriferous mineralization in this and other areas is commonly defined by definite anomalies. It is possible that pyrite and graphitic material are the major contributors to I.P. anomalies in the Balfour area and that cupriferous ore bodies could be overlooked because of the lack of surface expression and because of an apparently insignificant I.P. response.

Although the drilling programme in this area failed to locate a cupriferous orebody it did focus attention on the significance of cross-faulting as a possible mechanism for the secondary mobilization and concentration of cupriferous quartz-dolomite.

5. RESUME OF OTHER PROSPECTS

5.1 The Clump Prospect

No field work was carried out on this prospect during the 1972-73 field season.

The previous drillholes at the Clump Prospect (DDH 1,2,3,4,6,9, 27 & 28) failed to locate a cupriferous ore body even though in some cases, mineralized intersections were of potentially economic grade or thickness.

The major difficulty in evaluating this prospect has been the generally unsatisfactory core recovery from the mineralized zone. The loss of soft and friable sulphides from cupriferous quartz experienced during diamond saw cutting of Waratah Prospect rocks leads to a hypothesis that the zones of low core recovery at the Clump Prospect may actually be zones of soft and friable, massive secondary copper sulphides which disintegrate under the turbulent action of the drilling fluid and the rotating diamond bit and drill-string.

5.2 The Gully and Development Prospects

No field work was carried out on these prospects during the 1972-73 field season.

In view of the thin, low grade and apparently discontinuous nature of the mineralization, no further exploration is contemplated at these two prospects.

5.3 The Blocks Prospect

No field work was carried out at the Blocks Prospect during the 1972-73 field season and no further exploration is contemplated.

5.4 The Central Prospect

No field work was carried out on the Central Prospect during the 1972-73 field season although several drillholes (DDH 33 to 37) can be regarded as being on the periphery of this area.

During the 1971-72 drilling programme two drillholes (DDH 21 & 22) on this prospect revealed anomalous cupriferous mineralization.DDH 21 intersected about 10.2 metres averaging 0.62 per cent Cu. and DDH 22 some 300 metres north of DDH 21 intersected 6.3 metres averaging 923 ppm CU. DDH 21 was situated about 140 metres north of the old Central Prospect shaft and no

diamond drilling has been carried out beneath the Central workings from which more than 200 tons of high grade ore was mined.

A cross fault is believed to intersect the Central ridge in the vicinity of the old shaft and by analogy with the Murrays Reward cross fault several hundred metres south a similar concentration of possibly economic, cupriferous quartz-dolomite may exist in this area. A definite I.P. anomaly coincides with the position of the suspected cross fault although carbonaceous and graphitic sediments also occur in this area and could be the sole cause of the anomaly.

A single drillhole in to the anomalous zone would ensure that a hidden orebody in this area would not be overlooked.

5.5 South Balfour Prospect

The South Balfour Prospect was briefly examined during the course of the regional geological mapping. A shaft and several adits intersected minor intervals of cupriferous and pyritic quartz but no ore was mined from this remote area, some 10 kilometres south of Balfour.

The South Balfour cupriferous mineralization appears to be identical to that at all other prospects with the exception that in this area the mineralization is not associated with a prominent quartzose ridge. The lack of this ridge may indicate a short strike length or a thin mineralized zone and no further exploration is warranted in this area.

5.6 Lindsay Prospect

A zone of cupriferous mineralization between the Lindsay River and Doherty's Pimple can be traced on the surface for about 2 kilometres (McIntyre Feb. 1973). This area, to be known as the Lindsay Prospect, is situated about 8 kilometres south east of Mt. Frankland and the report by Ward (op cit) indicates potentially economic cupriferous mineralization which strikes about northwest and dips about the vertical or steeply west in easterly dipping carbonaceous sediments.

The cupriferous mineralization in this area appears to be identical with that occurring at other prospects in the Balfour area, that is cavernous quartz containing pyrite, chalcopyrite and covellite near the surface, and dolomite quartz containing pyrite and chalcopyriteat depth. An occurrence of stibnite was also recorded.

During the early exploration of the Balfour field, the Lindsay Prospect was investigated by means of trenches pits and adits but no ore was recovered.

A preliminary investigation of the area is justified on the basis of apparent grade (massive covellite; pyrite(?) containing 8.5 per cent Cu.) thickness (ranging from 1 to greater than 4 metres) and along strike continuity (2 kilometres).

6. CONCLUSIONS AND RECOMMENDATIONS

Mineral exploration in E.L. 16/68 has been singularly unsuccessful in locating a cupriferous orebody although cupriferous mineralization is known to occur sporadically along a distance of 17 kilometres between the Clump and South Balfour Prospects and is reported to extend several kilometres south into the adjoining Exploration Licence area (E.L. 2/73 held by Esso Mineral Enterprises Aust. Inc.).

The cupriferous mineralization in the Balfour area has been tested by 37 drillholes in eight prospects without proving an orebody although thin or discontinuous high grade intervals and thick intervals of weakly cupriferous mineralization have been intersected.

Only at Murrays Reward Prospect has a significant body of potentially economic cupriferous mineralization been outlined by diamond drilling and it is believed that this body is associated with a fault zone intersecting a primary zone of low grade sedimentary mineralization.

Evaluation of several prospects, particularly the Clump Prospect, has been hampered by low core recovery. It is possible that zones of low core recovery represent intervals of friable and massive sulphides which are readily washed from the core by the turbulence of the drilling fluids. It is believed that controlled diamond drilling utilizing a triple tube core barrel and skilled use of drilling muds would effect a significant increase in core recovery from these zones.

Although the possible existence of soft and friable sulphides may be considered to up-grade the economic potential of the Clump Prospect the discouraging results of DDH 4, 27 & 28 do little to justify further exploration in this area.

The two deep drillholes (DDH 27 and 28) indicated a significant down dip decrease in both grade and thickness of the mineralized zone and DDH 4 indicated that the grade and thickness of the mineralization varied consideraly along strike and that discontinuities probably occur.

However, in order to test the hypothesis concerning the loss of sulphides, it is recommended that a controlled diamond drillhole be drilled in the vicinity of DDH 6 or DDH 9 at the Clump Prospect. Both of these early drillholes intersected significant thicknesses of apparently low grade cupriferous mineralization in which considerable core loss occurred.

If core recovery from this cupriferous zone can be significantly improved and if soft, massive secondary sulphides are recovered then a renewed drilling programme would be justified at the Clump Prospect.

The low grade, thin and apparently discontinuous cupriferous mineralization at the Gully Development, Blocks, Pierpont Morgan and Waratah Prospects does not justify further expenditure and it is recommended that no further exploration be carried out in these areas.

The adjoining Central and Murrays Reward Prospects have provided the most encouraging drilling results in E.L. 16/68. Sub-economic, cupriferous quartz-dolomite has been shown to exist, perhaps discontinously along a strike length in excess of 1000 metres (DDH 22 to DDH 23) but the most promising results are considered to be the proving of cupriferous mineralization in a transverse fault zone near the old workings at MurraysReward. Although the size and grade of this fault controlled body has proved to be insufficient to support mining operations, other transverse faults are believed to occur in the Central and Murrays Reward Prospects

and these may be associated with economic concentrations of cupriferous quartz-dolomite.

Transverse faults are suspected at the Central Prospect in the vicinity of the old shaft and at the southern end of Murrays Reward adjacent to the intersection of the main ridge and Tin Creek.

Although a small quantity of high grade ore was mined from the Central Prospect and the water issuing from the shaft is known to be cupriferous no drilling has been carried out in this area. The nearest drillholes being DDH 21 and DDH 18 which are 140 metres north and 160 metres south respectively.

It is therefore recommended that at least one drillhole be planned to intersect the suspected transverse fault in the vicinity of the central Prospect shaft.

Cupriferous mineralization is known to occur along a strike length of 2 kilometres at the Lindsay Prospect south east of Mt. Frankland and it is recommended that preliminary surface investigations be carried out in this area

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A.C.I. MINERALS PTY. LIMITED

TASMANIAN EXPLORATION, E. L. 16/68, BALFOUR

REPORT ON DDH 33, MURRAYS REWARD PROSPECT

CC & M | D.S.M.E.
Registrar
11 JUL 1973 | E & I.L.

SUMMARY

DDH 33 at Murrays Reward Prospect was completed at a depth of 254.16 metres.

A cupriferous quartz and quartz-dolomite formation was intersected between 118.11 and 124.35 metres. This interval averaging 1.31 per cent Cu over a true thickness of 5.4 metres. Lead, zinc, silver and gold values were negligible.

The copper occurs as chalcopyrite with lessor chalcocite and bornite and is believed to be concentrated in a transverse fault, striking about northwest and dipping about 55° towards the southwest.

Drilling costs totalled $7,370.00 at an average cost of $29.00 per metre.

DDH 33, MURRAYS REWARD PROSPECT.

Grid reference:	10258N 9858E
Elevation:	1201.2 metres
Angle:	64.5°
Bearing:	N69° E true
Date drilled:	25.2.73 to 7.3.73
Drilling rate:	11.5 metres per shift.

1. OPERATIONAL DETAILS.

1.1. Drilling details:

DDH 33 at Murrays Reward Prospect was sited so as to test a suspected northwestern extension of the cupriferous fault zone initially intersected by DDH 16, some 115 metres to the southeast. Drilling commenced on February 25th, 1973.

NW casing was seated at 3.05 metres and the drill hole progressed to 21.34 metres with the use of a tricone bit. It was initially planned to drill at least 50 metres with the tricone but no spare bits were available on site.

The hole was cased with 21.34 metres of NW casing and drilling continued to about 50 meters with NQWL coring equipment.

At about 47.2 metres the hole collapsed and NW casing was reamed down to 49.38 metres. The hole was then drilled to 52.43 metres and casing reamed down to 50.90 metres but at this depth the rods became bogged and the casing could not be reamed further.

continued..

1.1. cont. The drill hole was then cemented between about 47.2 and 52.4 metres but the cement failed to set due to movement of water up the hole.

The hole was then washed out, rods and casing pulled and a $4\frac{1}{4}$ inch tricone bit was used to continue the hole to a depth of 76.20 metres.

NQWL coring equipment was then reintroduced and the hole advanced without incident to 184.73 metres.

At this depth the hole was cased with BW casing and drilling continued with BQWL coring equipment.

DDH 33 was completed at a depth of 254.16 metres on March 7th, 1973.

1.2 Drilling conditions:

Drill runs and core recovery are tabulated in Appendix A.

Core recovery was satisfactory (97 per cent) and drill runs averaged 1.25 metres. Seven runs of 3.05 metres were recorded.

The difficulties encountered at about 47.2 metres were compounded by the unstable nature of the chloritic siltstone. When bogged at this depth, the rods were able to be turned by hand but as soon as water was pumped down the hole the rods seized fast and no progress could be made.

Below about 140 metres progress was relatively slow due to abundance of quartz and quartzitic sediments.

Below about 230 metres rapid flattening of the drill hole caused difficulties in retrieving the inner tube by not allowing the overshot to reach the core barrel.

The drilling rate averaged 11.5 metres per shift.

1.3 Drill hole deviation:

The results of the drill hole surveys were as follows:

Collar		64.5° at N69°E true
30.5	metres	62° acid tube
61.0	"	60° " "
91.4	"	55° " "
91.4	"	57° at N76° E true - Tropari
121.9	"	51° acid tube
152.4	"	46° " "
152.4	"	48° at N78°E true - Tropari
182.9	"	43.5° acid tube
213.4	"	39° " "
243.8	"	30° " "

continued..

1.4 Drilling costs:

Drilling costs directly attributable to DDH 33 totalled $7,370.00 made up as follows:

Tricone drilling	$ 535.58
NQ diamond drilling	3,908.80
BQ diamond drilling	1,841.49
Running casing	234.41
Reaming casing	291.17
Recovering casing	35.00
Surveys	140.00
Cementing	140.00
Additives	138.50
Moving	104.81
TOTAL	$7,369.76

The average drilling cost was $29.00 per metre.

Additional costs not included in above were; core boxes ($185) and assays (about $105).

2. GEOLOGY.

The complete drill log is presented in Appendix A and may be summarised as follows:

Tricone Drilling:
0 to 21.34 metres; slaty chloritic siltstone.
52.42 to 76.20 metres; slaty chloritic siltstone.

Diamond Drilling:
21.34 to 52.42 metres; moderately fissile slaty chloritic siltstone. Rare thin (≤ 2mm) pyritic quartz veins. At about 36.1 and 40.0 metres minor chalcopyrite occurs in thin (≤8cm) quartz veins.
76.20 to 82.15 metres; similar to the interval 21.34 to 52.42 metres. Traces of chalcopyrite at 81.5 metres.
82.15 to 105.15 metres; slaty carbonaceous siltstone and carbonaceous slate. Few pyritic and dolomitic quartz veins, rarely containing minor chalcopyrite.
105.15 to 110.03 metres; similar to the interval 82.15 to 105.15 metres, but contains pale grey "porphyroblasts". Common pyritic quartz veins some of which contain traces of chalcopyrite.
110.03 to 118.11 metres; slaty carbonaceous siltstone containing common pyritic quartz-dolomite veins most of which are slightly chalcopyritic.
118.11 to 124.35 metres; pyritic and cupriferous quartz and quartz-dolomite, talcose and chloritic in parts.
124.35 to 139.88 metres; carbonaceous and chloritic slaty siltstone. Few pyritic quartz and quartz-dolomite veins.
139.88 to 142.30 metres; fragmentary quartz and quartzite.
142.30 to 145.32 metres; siltstone.
145.32 to 148.20 metres; quartz with minor pyrite.
148.20 to 157.30 metres; similar to the interval 142.30 to 145.32 metres.
157.30 to 174.40 metres; quartzose siltstone and slaty carbonaceous siltstone and shale. At about 167.6 metres is a 25cm band of quartz-dolomite containing minor pyrite and chalcopyrite.

continued..

2. Geology cont.

174.40 to 180.00 metres; similar to the interval 145.32 to 148.20 metres.
180.00 to 184.30 metres; similar to the interval 157.30 to 174.40 metres.
184.30 to 184.85 metres; fragmentary quartz
184.85 to 188.30 metres; quartzite and siltstone
188.30 to 190.00 metres; slaty pyritic chloritic siltstone.
190.00 to 192.18 metres; similar to the interval 174.40 to 180.00 metres.
192.18 to 197.44 metres; similar to the interval 188.30 to 190.00 metres.
197.44 to 199.11 metres; similar to the interval 190.00 to 192.18 metres.
199.11 to 204.91 metres; slaty carbonaceous siltstone with few quartz and quartz-dolomite veins.
204.91 to 208.40 metres; similar to the interval 174.40 to 180.00 metres.
208.40 to 216.75 metres; carbonaceous siltstone
216.75 to 232.75 metres; siltstone and quartzite with common quartz veins.
232.75 to 244.41 metres; chloritic and carbonaceous slaty siltstone.
244.41 to 254.16 metres; carbonaceous and quartzose siltstone and shale.

3. SAMPLES AND ASSAYS.

Ten core samples were assayed (by Spectrometer Services, Melbourne) for copper, lead, zinc, gold and silver, with the following results:

Sample No. Bal	Intersection meters			Interval meters	Assay value *				
					Cu	Pb	Zn	Au	Ag
2165	103.48	to	105.15	1.67	395	63	39	<0.05	<0.1
2166	105.15	to	110.03	4.88	220	27	36	"	"
2167	110.03	"	113.08	3.05	129	14	71	"	"
2168	113.08	"	115.51	2.43	505	11	42	"	"
2169	115.51	"	118.11	2.60	570	12	55	"	"
2170	118.11	"	119.02	0.91	2.30	16	100	"	3.08
2171	119.02	"	120.03	1.01	2440	22	60	"	<0.01
2172	120.03	"	122.67	2.64	9820	17	60	"	0.16
2173	122.67	"	124.35	1.68	2.00	13	60	"	<0.01
2174	124.35	"	126.01	1.66	146	13	31	"	"

* Note: Au and Ag in dwt per ton
Pb and Zn in ppm
Cu in ppm except for 2170 and 2173 which are given in per cent.

In addition, duplicates of the four samples (BAL 2170 to 2173 inclusive) from the main mineralized zone were assayed (for copper only) by the ACI Technical Centre with the following results:

Sample No. Bal	Intersection metres	Interval metres	Assay value per cent Cu
2170	118.11 to 119.02	0.91	2.2
2171	119.02 " 120.03	1.01	0.37
2172	120.03 " 122.67	2.64	1.0
2173	122.67 " 124.35	1.68	1.8

The main cupriferous zone between 118.11 and 124.35 metres contains an average (combined ACI and Spectrometre Service values) of 1.31 per cent Cu over a true thickness of about 5.4 metres.

Negligible amounts of lead (16 ppm Pb), zinc (66ppm Zn), gold (< 0.05 dwt/ton) and silver (≥ 0.1 dwt/ton) were also recorded.

The copper occurs mainly as blebs and stringers of chalcopyrite with minor amounts of chalcocite and bornite.

No lead, zinc, silver or gold minerals were observed in the core, and except perhaps in the case of silver there appears to be no significant correlation between copper content and content of these other elements.

4. CONCLUSION.

DDH 33 at Murrays Reward Prospect intersected a potentially economic cupriferous quartz and quartz-dolomite zone containing 1.31 per cent Cu over a true thickness of 5.4 metres.

This mineralisation which was intersected about 115 metres vertically below ground level, is believed to form part of a mineralised transverse fault zone striking about northwest and dipping 50° to 60° towards the southwest.

M.H. McIntyre
April 26th, 1973

APPENDIX A.

DDH 33 DRILL RUNS & CORE RECOVERY.

INTERSECTION METRES			INTERVAL METRES	CORE RECOVERY	
				METRES	PER CENT
21.34	to	23.62	2.28	2.28	100
23.62	"	24.38	0.76	0.76	100
24.38	"	26.00	1.62	1.62	100
26.00	"	26.82	0.82	0.82	100
26.82	"	27.50	0.68	0.68	100
27.50	"	28.34	0.84	0.84	100
28.34	"	30.55	2.21	1.76	80
30.55	"	32.00	1.45	1.45	100
32.00	"	33.22	1.22	1.22	100
33.22	"	34.52	1.30	1.30	100
34.52	"	36.12	1.60	1.10	69
36.12	"	37.80	1.68	0.77	46
37.80	"	38.86	1.06	1.06	100
38.86	"	39.93	1.07	0.92	86
39.93	"	40.99	1.06	0.99	93
40.99	"	42.36	1.37	0.61	45
42.36	"	44.19	1.83	1.83	100
44.19	"	45.10	0.91	0.84	92
45.10	"	45.72	0.62	0.62	100
45.72	"	46.63	0.91	0.91	100
46.63	"	47.24	0.61	0.61	100
47.24	"	48.15	0.91	0.91	100
48.15	"	49.22	1.07	1.07	100
49.22	"	49.83	0.61	0.61	100
49.83	"	50.29	0.46	0.46	100
50.29	"	51.51	1.22	1.07	88
51.51	"	52.12	0.61	0.54	88
52.12	"	52.42	0.30	0.23	77
78.33	"	78.63	0.30	0.23	77
78.63	"	79.09	0.46	0.46	100
79.09	"	80.01	0.92	0.92	100
80.01	"	81.38	1.37	1.37	100
81.38	"	83.36	1.98	1.98	100
83.36	"	83.82	0.46	0.46	100
83.82	"	84.88	1.06	1.06	100
84.88	"	85.64	0.76	0.76	100
85.64	"	86.79	1.15	1.15	100
86.79	"	87.17	0.38	0.38	100
87.17	"	87.93	0.76	0.76	100
87.93	"	88.84	0.91	0.91	100
88.84	"	89.60	0.76	0.76	100
89.60	"	90.21	0.61	0.61	100
90.21	"	91.14	0.93	0.93	100
91.14	"	92.20	1.06	1.06	100
92.20	"	93.72	1.52	1.52	100
93.72	"	94.48	0.76	0.76	100
94.48	"	95.70	1.22	1.22	100
95.70	"	96.31	0.61	0.61	100
96.31	"	97.83	1.52	1.52	100
97.83	"	98.91	1.08	1.08	100
98.91	"	100.43	1.52	1.52	100
100.43	"	103.48	3.05	3.05	100
103.48	"	105.15	1.67	1.67	100
105.15	"	106.98	1.83	1.83	100
106.98	"	110.03	3.05	3.05	100
110.03	"	113.08	3.05	3.05	100
113.08	"	115.06	1.98	1.98	100
115.06	"	116.28	1.22	1.22	100
116.28	"	117.34	1.06	1.06	100
117.34	"	119.02	1.68	1.68	100
119.02	"	121.15	2.13	2.13	100
121.15	"	123.89	2.74	2.74	100
123.89	"	126.01	2.12	2.12	100

continued..

INTERSECTION METRES			INTERVAL METRES	CORE RECOVERY	
				METRES	PER CENT
126.01	to	127.07	1.06	1.06	100
127.07	"	128.61	1.54	1.54	100
128.61	"	130.59	1.98	1.98	100
130.59	"	131.20	0.61	0.61	100
131.20	"	132.10	0.90	0.90	100
132.10	"	133.47	1.37	1.37	100
133.47	"	135.00	1.53	1.53	100
135.00	"	136.06	1.06	1.06	100
136.06	"	136.67	0.61	0.61	100
136.67	"	137.75	1.08	1.08	100
137.75	"	138.81	1.06	1.06	100
138.81	"	139.88	1.07	1.07	100
139.88	"	141.10	1.22	0.77	63
141.10	"	141.40	0.30	0.23	77
141.40	"	141.56	0.16	0.16	100
141.56	"	143.23	1.67	1.67	100
143.23	"	144.15	0.92	0.92	100
144.15	"	145.67	1.52	1.52	100
145.67	"	146.43	0.76	0.76	100
146.43	"	147.34	0.91	0.91	100
147.34	"	147.95	0.61	0.61	100
147.95	"	149.63	1.68	1.68	100
149.63	"	151.15	1.52	1.52	100
151.15	"	152.40	1.25	0.64	51
152.40	"	152.86	0.46	0.31	67
152.86	"	153.92	1.06	1.06	100
153.92	"	154.76	0.84	0.84	100
154.76	"	155.37	0.61	0.61	100
155.37	"	156.51	1.14	1.14	100
156.51	"	157.73	1.22	1.22	100
157.73	"	158.95	1.22	1.22	100
158.95	"	159.71	0.76	0.76	100
159.71	"	160.94	1.23	1.23	100
160.94	"	161.85	0.91	0.91	100
161.85	"	163.22	1.37	1.37	100
163.22	"	164.13	0.91	0.91	100
164.13	"	164.74	0.61	0.61	100
164.74	"	166.41	1.67	1.67	100
166.41	"	168.25	1.84	1.84	100
168.25	"	169.16	0.91	0.91	100
169.16	"	170.08	0.92	0.82	89
170.08	"	170.38	0.30	0.30	100
170.38	"	171.30	0.92	0.92	100
171.30	"	172.21	0.91	0.91	100
172.21	"	174.04	1.83	1.83	100
174.04	"	175.10	1.06	1.06	100
175.10	"	175.83	0.73	0.73	100
175.83	"	177.05	1.22	1.22	100
177.05	"	178.27	1.22	1.22	100
178.27	"	179.37	1.10	1.10	100
179.37	"	179.67	0.30	0.30	100
179.67	"	179.87	0.20	0.20	100
179.87	"	180.17	0.30	0.30	100
180.17	"	180.89	0.72	0.72	100
180.89	"	181.50	0.61	0.61	100
181.50	"	181.95	0.45	0.45	100
181.95	"	182.57	0.62	0.62	100
182.57	"	182.90	0.33	0.33	100
182.90	"	184.73	1.83	1.83	100
184.73	"	186.71	1.98	0.61	31
186.71	"	186.86	0.15	0.10	67
186.86	"	187.16	0.30	0.30	100
187.16	"	187.32	0.16	0.08	50
187.32	"	187.77	0.45	0.45	100
187.77	"	188.38	0.61	0.61	100

continued..

INTERSECTION METRES			INTERVAL METRES	CORE RECOVERY	
				METRES	PER CENT
188.38	to	189.61	1.23	1.23	100
189.61	"	191.74	2.13	2.13	100
191.74	"	192.35	0.61	0.61	100
192.35	"	192.95	0.60	0.60	100
192.95	"	193.86	0.91	0.91	100
193.86	"	194.78	0.92	0.92	100
194.78	"	195.77	0.99	0.99	100
195.77	"	197.37	1.60	1.60	100
197.37	"	198.43	1.06	1.06	100
198.43	"	200.88	2.45	2.45	100
200.88	"	203.01	2.13	2.13	100
203.01	"	204.85	1.84	1.84	100
204.85	"	205.76	0.91	0.91	100
205.76	"	208.88	3.12	3.12	100
208.88	"	211.55	2.67	2.67	100
211.55	"	214.16	2.61	2.61	100
214.16	"	215.38	1.22	1.22	100
215.38	"	217.51	2.13	2.13	100
217.51	"	218.89	1.38	1.38	100
218.89	"	220.11	1.22	1.22	100
220.11	"	221.33	1.22	1.22	100
221.33	"	222.54	1.21	1.21	100
222.54	"	224.06	1.52	1.52	100
224.06	"	227.11	3.05	3.05	100
227.11	"	229.86	2.75	2.75	100
229.86	"	231.99	2.13	2.13	100
231.99	"	234.12	2.13	2.13	100
234.12	"	237.02	2.90	2.90	100
237.02	"	239.30	2.28	2.28	100
239.30	"	242.35	3.05	3.05	100
242.35	"	244.41	2.06	2.06	100
244.41	"	245.47	1.06	1.06	100
245.47	"	246.08	0.61	0.61	100
246.08	"	247.91	1.83	1.83	100
247.91	"	249.06	1.15	1.15	100
249.06	"	252.11	3.05	3.05	100
252.11	"	254.16	2.05	2.05	100

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APPENDIX B

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DDH 33 DRILL LOG

INTERSECTION METRES	DESCRIPTION
0 to 21.34	Tricone drilling, no core.
21.34 to 52.42	Pale to medium grey-green slaty chloritic siltstone. Moderately to highly fissile. Moderately fragmentary. Rare thin, slightly pyritic quartz veins ($\leqslant$ 2mm). Few minor pink bands. At 36.12 metres is a thin ($\leqslant$ 4cm) pyritic quartz vein containing chalcopyrite, bornite, and chalcocite. At about 40.0 metres is an 8cm pyritic quartz vein containing chalcopyrite. Very fragmentary at base of interval. Bedding dips: 0 to 5° at 21.5m, 0 to 5° at 25.9m, 5° at 26.3m, 0 to 5° at 33.3m, 5° at 38.4m, 25° at 42.6m, 15° to 20° at 44.5m, 10° to 15° at 48.1m.
52.42 to 76.20	Tricone drilling, no core.
76.20 to 82.15	Medium grey-green slaty chloritic siltstone, similar to the interval 21.34 to 52.42 metres but darker coloured and less fissile. At 81.47 metres is a thin ($\leqslant$ 2mm) quartzose-pyrite-chalcopyrite "vein", parallel to the bedding. Bedding dips: 40° at 80.1m, 75° at 81.5m.
82.15 to 105.15	Pale to medium grey-green slaty carbonaceous siltstone and carbonaceous slate. Moderately fissile parting parallel to bedding. Rare disseminated sedimentary pyrite ($\leqslant$ 1cm). Rare thin ($\leqslant$ 2mm) pyritic quartz veins. Minor shear zone at 82.15 metres. Few thin ($\leqslant$ 2mm) quartz-dolomite and dolomite veins and stringers, some parallel to the bedding. Rare pyritic and chloritic quartz-dolomite veins ($\leqslant$ 2cm). Thin pyritic (and rarely chalcopyritic) quartz veins ($\leqslant$ 1cm) become more common towards the base of the interval.

INTERSECTION METRES	DESCRIPTION
	Bedding dips: 60° to 65° at 83.9m, 60° at 85.5m, 60° at 86.7m, 60° at 87.6m, 60° at 90.3m, 60° at 92.4m, 60° at 94.2m, 60° to 65° at 96.1m, 60° to 65° at 96.7m, 60° to 65° at 99.0m, 65° at 100.1m, 60° at 101.5m, 65° to 70° at 103.4m.
105.15 to 110.03	Medium grey (and faintly green) carbonaceous slate and slaty carbonaceous siltstone with numerous small (< 1mm) pale grey "porphyroblasts" which resemble micro-boudinage structures in parts. Porphyroblasts commonly elongated parallel to cleavage. Common pyritic and chloritic quartz veins, few of which are straight and parallel to the cleavage, the others generally thinner (≤ 1cm), irregular and discontinuous. The veins are commonly highly pyritic (> 25 per cent pyrite) and contain traces of chalcopyrite occurring as irregular blebs (≤ 2mm) and stringers. The chalcopyrite is invariably associated with the quartz veins. $S_o = S_1 = 55°$ to 60° at 106.3m, S = 70° at 109.3m.
110.03 to 118.11	Hard, compact, medium to dark grey-green slaty carbonaceous siltstone, slightly chloritic, containing common pyritic quartz-dolomite veins and segregations which are generally slightly chalcopyritic. The veins are commonly about 2cm thick with a few thicker bands (≤ 15cm) containing fragments and disrupted bands of the enclosing siltstone. The original bedding is generally poorly preserved. Few pale grey porphyroblasts in parts. Veins commonly consist of quartz core surrounded by dolomite which, in turn, is surrounded by coarse sub-hedral to enhedral pyrite. Chalcopyrite occurs in veins at; 110.53m, 110.79m, 111.95m, 112.66m, 114.56m, 115.06m, 115.25m, 115.70m, 115.75m, 117.50m. At about 115.5 metres is a 3cm quartz vein containing 35 per cent chalcopyrite. This vein is associated with a minor fault indicated by slickensided siltstone and quartz.

Few micro and minor faults.

Bedding dips: 65° to 70° at 112.5m,

118.11 to 124.35 CUPRIFEROUS QUARTZ AND QUARTZ-DOLOMITE

Cupriferous (chalcopyrite, bornite and chalcocite) and pyritic quartz and quartz dolomite sub-divided as follows:

118.11 to 119.02 metres; dark green slaty chloritic siltstone containing common pyritic and chalcopyritic quartz and quartz-dolomite.

In particular the top 36cm contains abundant chalcopyrite (slightly tarnished) blebs and stringers in quartz. The remainder of the unit contains lesser amounts of slightly cupriferous quartz-dolomite.

S_1 dips 65°.

119.02 to 120.03 metres; slightly cupriferous (chalcopyrite) and pyritic quartz-dolomite. Mottled pale-yellow (dolomite) and white (quartz).

The basal 40cm consists of dark green chloritic slaty siltstone with minor amounts of cupriferous (disseminated chalcopyrite) quartz-dolomite.

Chloritic siltstone band near base dips 30°.

120.03 to 122.67 metres; cupriferous (chalcopyrite, bornite, chalcocite) and pyritic quartz-dolomite. Chalcopyrite is common as irregular blebs ($\leq$5mm) and stringers (commonly along incipient fractures) and larger blebs ($\leq$3cm). Bornite is relatively common over a 5cm band at about 121.15 metres. Minor chalcocite is disseminated and generally associated with chalcopyrite.

Between about 121.76 and 122.24 metres is mottled dark green, white and pale yellow-brown material consisting of slaty talcose and chloritic siltstone containing common pyrite and lesser chalcopyrite associated with irregular veins and segregations of quartz-dolomite.

An S plane (cleavage ?) dips 60° to 65°.

122.67 to 124.35 metres; similar to the interval 121.76 to 122.24 metres (above).

White pyritic talc containing chalcopyritic quartz; dark green slaty chloritic siltstone occurring as bands and as fragments in the talc.

Chalcopyrite is commonly parallel to the foliation in the talc and is concentrated in the interval 122.67 to 123.05 metres.

Foliation in the talc dips about 60°.

124.35 to 139.88 — Pale and medium grey-green slaty siltstone, carbonaceous and chloritic. Moderately fissile (S_o parallel to S_1) in the upper half of the interval.

Few slightly pyritic quartz veins ($\leq$2cm). Few irregular quartz-dolomite veins and segregations.

At about 124.6 metres is a 7cm band of pyritic and slightly chalcopyritic quartz-dolomite similar to the sub-zone 122.67 to 124.35 metres.

Bedding dips; 50° to 55° at 125.0m, 50° at 126.9m, 45° at 128.6m, 35° to 40° at129.6m, 45° at 134.1m, 45° to 50° at 137.4m.

139.88 to 142.30 — Fragmentary, medium grey-green and white quartz and quartzite.

142.30 to 145.32 — Medium to dark grey-green siltstone with common irregular quartz veins ($\leq$3cm), rarely with pyrite and dolomite. Minor disseminated pyrite.

Original bedding rarely preserved.

145.32 to 148.20 — White and medium grey-green quartz, rare cavities (after dolomite?).

Minor pyrite. Few secondary pyritic quartz veins.

148.20 to 157.30 — Similar to the interval 142.30 to 145.32 metres.

Quartz fragments between 151.15 and 152.70 metres. Few barren quartz ($\pm$dolomite) bands ($\leq$ 17cm).

157.30 to 174.40 — Pale grey quartzose (and arenaceous) siltstone and medium to dark grey slaty carbonaceous siltstone and shale. Graded beds common.

At about 167.6 metres is a 25cm band of quartz-dolomite containing minor disseminated pyrite and chalcopyrite.

At about 170.1 metres is a 25cm band of barren white quartz-dolomite.

Few pyritic quartz veins ($\leq$2cm).

INTERSECTION METRES	DESCRIPTION
	Bedding dips; 35° at 159.8m, 35° at 161.3m, 40° at 163.4m, 35° at 166.2m, 35° at 168.9m, 50° at 171.9m, 45° at 174.2m.
174.40 to 180.00	Pale grey and white quartz. Minor pyrite, most of which occurs as irregular stringers along incipient fractures which are also commonly lined with chlorite. Lesser amounts of disseminated pyrite ($\leqslant$ 1mm).
	Rare cavities lined with enhedral quartz.
	Rare thin bands ($<$ 2cm) of slightly talcose chlorite.
180.00 to 184.30	Similar to the interval 157.30 to 174.40 metres.
	Bedding dips; 50° at 181.4m, 40° at 183.6m.
184.30 to 184.85	Fragmentary quartz.
184.85 to 188.30	Hard, dark grey quartzite and recrystallised siltstone containing minor disseminated enhedral pyrite.
	Bedding dips 40° to 45° at 188.2m.
188.30 to 190.00	Pale and medium grey-green slaty pyritic chloritic siltstone.
	Moderately fissile. Phyllitic in parts. S_o parallel to S_1.
	Few short ($\leqslant$ 15cm) hard recrystallised siltstone bands.
	Bedding dips; 35° at 189.5m, 60° at 189.9m.
190.00 to 192.18	White and grey quartz similar to the interval 174.40 to 180.00 metres.
	Minor disseminated pyrite.
192.18 to 197.44	Similar to the interval 188.30 to 190.00 metres.
	Elongate pyrite blebs, commonly parallel to bedding.
	Bedding dips; 40° at 193.0m, 45° at 195.7m, 45° at 197.3m.
197.44 to 199.11	Similar to the interval 190.00 to 192.18 metres.
199.11 to 204.91	Pale and dark grey slaty carbonaceous siltstone. Moderately fissile.
	Few quartz and quartz-dolomite veins ($\leqslant$ 15mm). A quartz-dolomite vein at 201.16 metres has a central discontinuous core of quartz surrounded by yellow-brown dolomite.
	Hard quartzose and recrystallised interval between 201.8 and 203.2 metres.

	Bedding dips; 50° at 199.2m, 50° at 200.9m, 50° at 203.6m.
204.91 to 208.40	Similar to the interval 174.40 to 180.00 metres.
	Bedding dips; 35° at 211.5m, 35° to 40° at 214.1m, 40° at 216.4m.
208.40 to 216.75	Carbonaceous siltstone with few quartzitic and recrystallised intervals. Graded bedding preserved in parts.
	Rare pyritic quartz veins.
	Bedding dips; 45° at 209.8m, 35° at 211.5m, 35° to 40° at 214.1m, 40° at 216.4m.
216.75 to 232.75	Hard, pale to dark grey-green recrystallised siltstone and quartzite. Few softer, non-recrystallised intervals.
	Common quartz veins (≤ 1cm), some containing dolomite. A few thicker quartzose bands (≤ 20cm) notably at 220.5m and 222.5m.
	Bedding dips; 40° at 219.0m, 40° at 221.2m, 40° at 223.9m, 40° at 225.6m, 50° at 229.0m, 45° at 231.7m.
232.75 to 244.41	Pale to medium grey-green slaty siltstone, chloritic and carbonaceous. Minor pyrite, commonly elongated and aligned parallel to bedding.
	Bedding dips; 50° at 234.2m, 50° at 236.5m, 50° at 237.2m, 60° at 239.2m, 45° at 241.8m, 50° at 243.0m.
	Phyllitic (chlorite) in parts.
244.41 to 254.16	Carbonaceous and quartzose siltstone and shale. Few minor quartz and quartz-dolomite veins. Minor disseminated pyrite.
	Bedding dips; 45° at 244.5, 40° at 250.4m.
	DDH 33 COMPLETED AT 254.16 METRES.

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A.C.I. MINERALS PTY. LIMITED

TASMANIAN EXPLORATION, E.L. 16/68, BALFOUR

REPORT ON DDH 34, MURRAYS REWARD PROSPECT

SUMMARY

DDH 34 at Murrays Reward Prospect was completed at a depth of 173.28 metres.

A cupriferous and pyritic quartz-dolomite formation was intersected between 136.20 and 139.42 metres, this interval containing 0.26 per cent Cu over a true thickness of 3.0 metres.

The quartz-dolomite formation is a northwestern extension of the cupriferous fault zone intersected by DDH 16 and DDH 33 but DDH 34 reveals that the grade and thickness of this mineralised zone decrease significantly along strike towards the northwest.

The mineralised zone strikes about northwest and dips about 55° towards the southwest in an easterly dipping sequence of fine grained chloritic and carbonaceous sediments.

Drilling costs for DDH 34 totalled $4,653 at an average cost of $26.90 per metre.

DDH 34, MURRAYS REWARD PROSPECT

Grid reference:	10314N 9836E
R.L.:	1202.7 metres
Angle:	65°
Bearing:	N43° E true
Date drilled:	8.3.73 to 12.3.73
Drilling rate:	19.2 metres per shift

1. OPERATIONAL DETAILS

1.1. Drilling details:

DDH 34, some 61 metres northwest of DDH 33 at Murrays Reward Prospect, was commenced on March 8th, 1973 and advanced to 24.99 metres with the use of a tricone bit.

At this depth the hole was cased with NW casing and drilling was continued with NQWL coring equipment.

At 123.73 metres the rods became bogged, and although mud was used in an attempt to stabilise the hole, no progress could be made and the drillhole was cased with 123.12 metres of BW casing.

Drilling then continued with BQWL coring equipment and the hole was completed on March 12th, 1973 at a depth of 173.28 metres.

1.2. Drilling conditions:

Drill runs and core recovery are tabulated in Appendix A.

continued...

Overall core recovery (97 per cent) was satisfactory although core recovery in the mineralised zone averaged only 88 per cent. The majority of the core loss occurred between 117.33 and 121.15 metres.

Progress was rapid, the drilling rate averaging 19.2 metres per shift with one shift of 39.62 metres and another of 33.53 metres.

Drill runs averaged about 1.09 metres with five runs of 3.05 metres being recorded.

1.3. Drillhole deviation:

The results of the drillhole surveys were as follows:

Collar	65° at N43°E true
30.5 metres	62.5° acid tube
61.0 metres	60° acid tube
91.4 metres	57° acid tube
121.9 metres	53° acid tube
152.4 metres	53° at N57°E true - Tropari

1.4. Drilling costs:

Drilling costs attributable to DDH 34 totalled $4,653 made up as follows:

Tricone drilling	$ 287.38
NQ diamond drilling	2,765.28
BQ diamond drilling	1,308.57
Running casing	148.11
Recovering casing	35.00
Surveys	70.00
Additives	39.00
TOTAL	$4,653.34

The average cost was $26.90 per metre.

Additional costs not included above were: core boxes (about $135) and assays (about $12.)

2. GEOLOGY

The complete drill log is presented in Appendix B and maybe summarised as follows:

Tricone drilling:
0 to 24.99 metres; slaty chloritic siltstone.

Diamond Drilling:
24.99 to 135.50 metres; slaty chloritic siltstone containing rare thin (≤3mm) pyrite - chalcopyrite-arsenopyrite- wolframite quartz veins. Moderately to highly fissi e. A fault zone ocurrs between about 117.3 and 121.2 metres.
135.50 to 136.20 metres; brecciated and fragmentary slaty chloritic siltstone. Probable fault zone.
136.20 to 139.42 metres; Pyritic and dolomitic quartz containing minor disseminated chalcopyrite.

continued....

139.42 to 143.90 metres; slaty chloritic siltstone with a few pyritic quartz veins containing rare chalcopyrite.
143.90 to 144.56 metres; pyritic and chloritic quartzose dolomite.
144.56 to 147.65 metres; slightly pyritic quartz and quartz-dolomite containing rare chalcopyrite.
147.65 to 148.05 metres; fine grained chloritic sediments.
148.05 to 150.85 metres; quartz.
150.85 to 151.56 metres; similar to the interval 147.65 to 148.05 metres.
151.56 to 152.06 metres; similar to the interval 148.05 to 150.85 metres.
152.06 to 153.19 metres; similar to the interval 147.65 to 148.05 metres.
153.19 to 156.10 metres; slightly pyritic quartz containing rare chalcopyrite.
156.10 to 163.46 metres; fine grained pyritic and chloritic sediments.
163.46 to 173.28 metres; quartzitic siltstone.

3. SAMPLES AND ASSAYS

Six samples were assayed for copper with the following results:

Sample No. Bal	Intersection Metres			Interval Metres	Assay Value
2175	117.34	to	121.15	3.81	300 p.p.m.
2176	134.67	to	136.20	1.53	1350 p.p.m.
2177	136.20	to	139.42	3.22	0.26%
2178	139.42	to	143.90	4.48	240 p.p.m.
2179	143.90	to	144.56	0.66	40 p.p.m.
2180	144.56	to	147.65	3.09	390 p.p.m.

Sample BAL 2175 was a sludge sample collected from an interval of zero core recovery, while the remaining five samples were core samples from the vicinity of the mineralised zone.

The assay values, particularly sample BAL 2177, confirm the existence of anomalous but sub-economic cupriferous mineralisation northwest of DDH 33, i.e. a continuation of the mineralised fault zone intersected by DDH 16, DDH 33 and partially intersected by DDH 17.

However, a comparison of the assay values and drill logs of DDH 16, DDH 33 and DDH 34 indicates that;

a) the grade and thickness of the mineralised fault vary sympathetically i.e. low grades are associated with thin intersections and higher grades with thicker intersections.

b) a significant decrease in both grade and thickness of the mineralised fault occurs with increasing distance northwest along strike from the intersection of the fault with The Murrays Reward mineralised zone.

continued....

DDH 16, adjacent to the intersection of the fault and the mineralised zone averaged 2.49 per cent Cu over a true thickness of 8.1 metres; DDH 33 averaged 1.31 per cent Cu over a true thickness of 5.4 metres and DDH 34, some 180 metres northwest of DDH 16, averaged 0.26 per cent Cu over a true thickness of 3.0 metres.
It is therefore suggested that the cupriferous quartz-dolomite in the main Murrays Reward mineralised zone (in the vicinity of the old workings) was remobilised during or after faulting and subsequently, deposited in the transverse fault which strikes about northwest and dips about 50^{o} to 60^{o} towards the southwest.

The variation of grade and thickness of the cupriferous mineralisation in the fault zone is therefore, a function of the distance from the intersection of the fault and the Murrays Reward mineralised zone.

4. CONCLUSION

DDH 34 at Murrays Reward Prospect proved a northern extension of the cupriferous fault zone but also indicated a significant decrease in both grade and thickness of this zone towards the north.

M.H. McIntyre
April 27th, 1973

APPENDIX A

DDH 34 DRILL RUNS AND CORE RECOVERY

Intersection Metres			Interval Metres	Core Recovery	
				Metres	Per Cent
24.99	to	26.66	1.67	1.67	100
26.66	to	28.04	1.38	1.38	100
28.04	to	29.71	1.67	1.67	100
29.71	to	32.76	3.05	3.05	100
32.76	to	34.44	1.68	1.68	100
34.44	to	35.81	1.37	1.37	100
35.81	to	36.72	0.91	0.91	100
36.72	to	37.95	1.23	1.23	100
37.95	to	39.47	1.52	1.52	100
39.47	to	41.15	1.68	1.68	100
41.15	to	42.06	0.91	0.91	100
42.06	to	43.28	1.22	1.22	100
43.28	to	44.04	0.76	0.76	100
44.04	to	45.87	1.83	1.83	100
45.87	to	47.39	1.52	1.52	100
47.39	to	48.31	0.92	0.92	100
48.31	to	49.07	0.76	0.76	100
49.07	to	50.90	1.83	1.83	100
50.90	to	51.35	0.45	0.45	100
51.35	to	51.81	0.46	0.46	100
51.81	to	53.64	1.83	1.83	100
53.64	to	55.01	1.37	1.37	100
55.01	to	55.62	0.61	0.61	100
55.62	to	56.84	1.22	1.22	100
56.84	to	57.60	0.76	0.76	100
57.60	to	58.06	0.46	0.46	100
58.06	to	58.82	0.76	0.76	100
58.82	to	59.58	0.76	0.76	100
59.58	to	60.34	0.76	0.76	100
60.34	to	61.33	0.99	0.99	100
61.33	to	62.18	0.85	0.85	100
62.18	to	63.09	0.91	0.91	100
63.09	to	64.08	0.99	0.99	100
64.08	to	64.92	0.84	0.84	100
64.92	to	65.68	0.76	0.76	100
65.68	to	66.29	0.61	0.61	100
66.29	to	67.35	1.06	1.06	100
67.35	to	68.27	0.92	0.92	100
68.27	to	69.26	0.99	0.99	100
69.26	to	69.94	0.68	0.68	100
69.94	to	70.63	0.69	0.69	100
70.63	to	71.62	0.99	0.99	100
71.62	to	72.84	1.22	1.22	100
72.84	to	73.90	1.06	1.06	100
73.90	to	75.89	1.99	1.99	100
75.89	to	77.26	1.37	1.37	100
77.26	to	78.79	1.53	1.53	100
78.79	to	79.70	0.91	0.91	100
79.70	to	80.46	0.76	0.76	100
80.46	to	81.69	1.23	1.23	100
81.69	to	82.91	1.22	1.22	100
82.91	to	83.97	1.06	1.06	100
83.97	to	84.89	0.92	0.92	100
84.89	to	85.79	0.90	0.90	100
85.79	to	86.56	0.77	0.77	100
86.56	to	87.33	0.77	0.77	100
87.33	to	87.94	0.61	0.61	100

Intersection Metres		Interval Metres	Core Recovery	
			Metres	Per Cent
87.94 to	89.30	1.36	1.36	100
89.30 to	90.36	1.06	1.06	100
90.36 to	91.44	1.08	1.08	100
91.44 to	92.35	0.91	0.91	100
92.35 to	93.42	1.07	1.07	100
93.42 to	94.03	0.61	0.61	100
94.03 to	94.79	0.76	0.76	100
94.79 to	97.23	2.44	2.44	100
97.23 to	97.99	0.76	0.76	100
97.99 to	99.21	1.22	1.22	100
99.21 to	102.25	3.04	3.04	100
102.25 to	103.01	0.76	0.76	100
103.01 to	104.84	1.83	1.83	100
104.84 to	106.07	1.23	1.23	100
106.07 to	107.13	1.06	1.06	100
107.13 to	109.12	1.99	1.99	100
109.12 to	110.74	1.62	1.62	100
110.74 to	112.01	1.27	1.27	100
112.01 to	113.08	1.07	1.07	100
113.08 to	113.99	0.91	0.91	100
113.99 to	114.75	0.76	0.76	100
114.75 to	115.21	0.46	0.46	100
115.21 to	115.67	0.46	0.46	100
115.67 to	116.27	0.60	0.60	100
116.27 to	116.88	0.61	0.61	100
116.88 to	117.33	0.45	0.45	100
117.33 to	121.15	3.82	Nil	0
121.15 to	121.45	0.30	0.30	100
121.45 to	122.06	0.61	0.61	100
122.06 to	122.67	0.61	0.61	100
122.67 to	123.43	0.76	0.76	100
123.43 to	123.89	0.46	0.46	100
123.89 to	124.49	0.60	0.52	87
124.49 to	124.79	0.30	0.30	100
124.79 to	125.55	0.76	0.76	100
125.55 to	125.86	0.31	0.31	100
125.86 to	126.47	0.61	0.46	75
126.47 to	127.00	0.53	0.53	100
127.00 to	127.47	0.47	0.47	100
127.47 to	128.61	1.14	1.14	100
128.61 to	129.67	1.06	1.06	100
129.67 to	130.28	0.61	0.61	100
130.28 to	131.19	0.91	0.91	100
131.19 to	131.65	0.46	0.46	100
131.65 to	132.26	0.61	0.61	100
132.26 to	133.17	0.91	0.91	100
133.17 to	134.08	0.91	0.91	100
134.08 to	134.67	0.59	0.59	100
134.67 to	135.30	0.63	0.63	100
135.30 to	136.68	1.38	1.38	100
136.68 to	137.44	0.76	0.76	100
137.44 to	138.05	0.61	0.53	87
138.05 to	139.42	1.37	1.07	78
139.42 to	140.34	0.92	0.92	100
140.34 to	141.10	0.76	0.76	100
141.10 to	142.01	0.91	0.91	100
142.01 to	142.62	0.61	0.53	87
142.62 to	143.69	1.07	0.92	86
143.69 to	144.91	1.22	1.22	100
144.91 to	146.28	1.37	1.37	100
146.28 to	147.04	0.76	0.76	100
147.04 to	147.65	0.61	0.61	100

Intersection Metres			Interval Metres	Core Recovery	
				Metres	Per Cent
147.65	to	148.41	0.76	0.76	100
148.41	to	148.71	0.30	0.30	100
148.71	to	149.93	1.22	1.22	100
149.93	to	153.01	3.08	3.08	100
153.01	to	154.99	1.98	1.98	100
154.99	to	157.73	2.74	2.74	100
157.73	to	158.73	1.00	1.00	100
158.73	to	161.84	3.11	3.11	100
161.84	to	163.06	1.22	1.22	100
163.06	to	165.50	2.44	2.44	100
165.50	to	165.95	0.45	0.45	100
165.95	to	166.41	0.46	0.46	100
166.41	to	167.33	0.92	0.92	100
167.33	to	167.63	0.30	0.30	100
167.63	to	169.01	1.38	1.38	100
169.01	to	170.23	1.22	1.22	100
170.23	to	173.28	3.05	3.05	100

APPENDIX B

DDH 34 DRILL LOG

Intersection Metres	Description
0 to 24.99	Tricone drilling, no core.
24.99 to 135.50	Pale to medium green and grey-green slaty chloritic siltstone. Between 24.99 and 26.9 metres there are a few thin ($\leqslant$ 3mm) pyrite-chalcopyrite-arsenopyrite- (wolframite?) quartz veins, a few of which have enhedral crystalline quartz surrounding a sulphide core. Similar veins occur at 51.0 metres ($\leqslant$1cm), 59.6 metres ($\leqslant$ 5mm). At about 66.3 metres is a thin ($\leqslant$ 2cm) pyrite wolframite quartz vein. Rare thin ($<$ 2mm) yellow-brown dolomite "veins" and disseminated blebs. Moderately to highly fissile, S_o parallel or sub-parallel to S_1. Few microfaults and minor shear zones about 89.6 metres. Few pink bands. Between about 117.3 and 121.2 metres no core was recovered and this interval represents a fault zone. On both sides of this interval are fragmentary and microfaulted sediments. Bedding dips: 0 to 10° at 28.0m, 0 to 10° at 32.8m, 0 to 10° at 37.0m, 0 to 10° at 41.0m, 5° at 44.0m, 10° at 46.0m, 5° at 49.1m, 10° to 15° at 55.7m, 10° to 15° at 58.0m, 0 to 5° at 62.5m, 0 to 5° at 66.0m, 0 to 5° at 70.0m, 10° at 72.8m, 10° at 76.0m, 0 to 5° at 78.0m, 15° at 81.4m, 0 to 5° at 82.3m, 0 to 5° at 86.0m, 25° at 87.0m, 0 to 5° at 90.5m, 5° at 91.5m, 0 to 5° at 94.8m, 10° at 98.3m, 0 to 5° at 106.0m, 0 to 5° at 112.0m, 10° at 116.6m, 10° at 125.5m, 30° at 132.5m.
135.50 to 136.20	Fragmentary, chloritic slaty siltstone similar to the previous interval (24.99 to 135.50 metres). Brecciated near base.
136.20 to 139.42	CUPRIFEROUS QUARTZ Pyritic and dolomitic quartz containing disseminated blebs and stringers of chalcopyrite.

Intersection Metres	Description
	Traces of hematite (?) yield a dark red colouration in parts. Minor thin chloritic films along incipient fractures.
139.42 to 143.90	Medium to dark green, slaty pyritic and chloritic siltstone containing a few irregular pyritic quartz veins with rare chalcopyrite. At about 142.66 metres is a 3cm pyritic quartz vein. Bedding dips 35°.
143.90 to 144.56	Pyritic and chloritic quartzose dolomite.
144.56 to 147.65	Slightly pyritic quartz and quartz-dolomite. Minor chlorite. Rare chalcopyrite.
147.65 to 148.05	Medium to dark green chloritic fine grained sediments containing common irregular and discontinuous pyritic quartz veins and segregations. Minor dolomite.
148.05 to 150.85	White quartz containing minor pyrite and dolomite and a few short intervals of chloritic sediments.
150.85 to 151.56	Similar to the interval 147.65 to 148.05 metres.
151.56 to 152.06	Similar to the interval 148.05 to 150.85 metres.
152.06 to 153.19	Fine grained chloritic sediments with few intervals ($\leqslant$12cm) of slightly pyritic quartz-dolomite.
153.19 to 156.10	Slightly pyritic white quartz containing minor dolomite and rare chalcopyrite. Common incipient fractures defined by thin ($\leqslant$ 2mm) films of green chloritic material.
156.10 to 163.46	Fine grained, medium green pyritic and chloritic sediments containing common veins and thicker bands ($\leqslant$12cm) of pyritic quartz which in some cases acts as a cement for sediment fragments. Bedding dips 5° to 10°.
163.46 to 173.28	Pale to medium grey (with slight green tinge at top of unit) quartzitic siltstone. Between about 169.45 and 170.00 metres is slightly pyritic quartz-dolomite.

APPENDIX B continued

Intersection Metres	Description
	Bedding planes are generally irregular due to slump structures.
	Common quartz veins ($\leq$ 5mm) almost exclusively barren but one bleb of chalcopyrite noted at 172.84 metres.
	Bedding dips: 10^{o} to 20^{o}.
	DDH 34 COMPLETED AT 173.28 METRES

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A.C.I. MINERALS PTY. LIMITED

TASMANIAN EXPLORATION, E.L. 16/68, BALFOUR

REPORT ON DDH 35, CENTRAL PROSPECT

A.O. | CG | CC & M | D.S.M.E. | Registrar
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ANSWERED
DEPT OF MINES
REF. No.

SUMMARY

DDH 35 at the Central Prospect was abandoned at a depth of 182.9 metres without intersecting cupriferous mineralisation.

The absence of cupriferous mineralisation and the presence of several fault zones indicates either; (1) offsetting, by faulting, of the Murrays Reward - Central Prospects mineralised falut zone, or (2) gradual decrease in both grade and thickness of the mineralisation and eventual termination along strike to the north.

This second interpretation is favoured.

No sample assaying was carried out.

The drillhole intersected an easterly dipping sequence of fine grained chloritic and carbonaceous sediments.

Drilling costs for DDH 35 totalled $4482 at an average cost of $24.50 per metre.

DDH 35, CENTRAL PROSPECT

Grid reference	10324N, 9859E
Elevation	1202.7 metres
Angle	65°
Bearing	N42°E true
Date drilled	13.3.73 to 15.3.73
Drilling rate	30.5 metres per shift

1. OPERATIONAL DETAILS

1.1. Drilling Details

DDH 35 commenced on March 13th, 1973 and was drilled to 45.72 metres with a tricone bit.

At this depth the drillhole was cased with NW casing and drilling continued with NQWL coring equipment.

Rapid progress was made and the hole was completed on March 15th, 1973 at a depth of 182.9 metres.

1.2. Drilling Conditions

Drill runs and core recovery are tabulated in Appendix A.

Core recovery (97 per cent) was satisfactory, most of the core loss occurring in fault zones at about 145 and 160 metres.

Drill runs averaged 1.19 metres.

Extremely rapid progress was made with this drillhole which was completed in six shifts at an average drilling rate of 30.5 metres per shift.

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1.3. Drillhole Deviation

The results of the drillhole surveys were as follows:

Collar	65° at N42°E true
30.5 metres	64.5° acid tube
61.0 metres	61.5° acid tube
91.4 metres	61.5° acid tube
121.9 metres	57.5° acid tube
152.4 metres	53.5° acid tube
182.9 metres	50° at N61°E true - Tropari

1.4. Drilling Costs

Drilling costs directly attributable to DDH 35 totalled $4,482 made up as follows:

tricone drilling	$ 543.47
NQ diamond drilling	3,840.48
Running casing	45.72
Surveys	52.50
TOTAL	$4,482.17

The average drilling cost was $24.50 per metre.

Additional costs not listed above include; core boxes (about $135)

2. GEOLOGY

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

Tricone drilling
0 to 45.72 metres; slaty chloritic siltstone.
Diamond drilling
45.72 to 60.80 metres; slaty chloritic siltstone.
60.80 to 62.00 metres; arsenaceous quartzose siltstone with rare pyritic quartz veins containing traces of chalcopyrite.
62.00 to 160.15 metres; slaty chloritic siltstone. A fault zone between 143.64 and 147.50 metres consists of fragmentary siltstone with minor pyritic quartz and quartz-dolomite veins and segregations.
160.15 to 163.52 metres; fault zone consisting of sheared and brecciated carbonaceous, graphitic and chloritic sediments.
163.52 to 169.62 metres; chloritic slate.
169.62 to 182.90 metres; chloritic quartzose siltstone and carbonaceous siltstone.

3. SAMPLES AND ASSAYS

No samples were collected for assay.

4. CONCLUSION

DDH 35, which was collared about 64 metres north of DDH 34, failed to intersect the northwestern extension of the cupriferous fault zone present to the southeast.

Two interpretations are possible:
(1) the cupriferous fault zone has been offset by a fault possibly represented by the interval 160.15 to 163.52 metres.

(2) the thickness and grade of the cupriferous fault zone has gradually decreased north along strike and is represented by the interval 143.64 to 147.50 metres. This interval consists of brecciated and fragmentary chloritic siltstone containing irregular and discontinuous veins and segregations of pyritic quartz and quartz-dolomite.

This second interpretation is favoured and is supported by the significant decrease in both grade and thickness of the cupriferous fault zone with increasing distance along strike from DDH 16 (see Report on DDH 34).

M.H. McIntyre

April 30th, 1973

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APPENDIX A

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DDH 35 DRILL RUNS AND CORE RECOVERY

Intersection Metres			Interval Metres	Core Recovery	
				Metres	Per Cent
45.72	to	46.78	1.06	1.06	100
46.78	to	48.92	2.14	2.14	100
48.92	to	50.52	1.60	1.60	100
50.52	to	51.66	1.14	1.14	100
51.66	to	52.27	0.61	0.61	100
52.27	to	52.88	0.61	0.61	100
52.88	to	55.86	2.98	2.98	100
55.86	to	57.30	1.44	1.44	100
57.30	to	58.97	1.67	1.67	100
58.97	to	59.89	0.92	0.92	100
59.89	to	60.81	0.92	0.92	100
60.81	to	61.72	0.91	0.91	100
61.72	to	61.87	0.15	0.15	100
61.87	to	63.70	1.83	1.83	100
63.70	to	65.38	1.68	1.68	100
65.38	to	66.60	1.22	1.22	100
66.60	to	67.51	0.91	0.91	100
67.51	to	68.43	0.92	0.92	100
68.43	to	69.95	1.52	1.52	100
69.95	to	70.71	0.76	0.76	100
70.71	to	72.54	1.83	1.83	100
72.54	to	73.76	1.22	1.22	100
73.76	to	74.37	0.61	0.61	100
74.37	to	75.51	1.14	1.14	100
75.51	to	77.42	1.91	1.91	100
77.42	to	78.48	1.06	1.06	100
78.48	to	80.16	1.68	1.68	100
80.16	to	81.38	1.22	1.22	100
81.38	to	82.44	1.06	1.06	100
82.44	to	83.51	1.07	1.07	100
83.51	to	83.82	0.31	0.31	100
83.82	to	85.64	1.82	1.82	100
85.64	to	87.77	2.13	2.13	100
87.77	to	88.84	1.07	1.07	100
88.84	to	90.37	1.53	1.53	100
90.37	to	91.13	0.76	0.76	100
91.13	to	92.35	1.22	1.22	100
92.35	to	93.72	1.37	1.37	100
93.72	to	95.39	1.67	1.67	100
95.39	to	96.31	0.92	0.92	100
96.31	to	97.23	0.92	0.92	100
97.23	to	99.36	2.13	2.13	100
99.36	to	99.97	0.61	0.61	100
99.97	to	100.88	0.91	0.91	100
100.88	to	103.47	2.59	2.59	100
103.47	to	104.54	1.07	1.07	100
104.54	to	105.60	1.06	1.06	100
105.60	to	106.82	1.22	1.22	100
106.82	to	108.20	1.38	1.38	100
108.20	to	109.11	0.91	0.91	100
109.11	to	110.18	1.07	1.07	100
110.18	to	111.09	0.91	0.91	100
111.09	to	112.32	1.23	1.23	100
122.32	to	113.38	1.06	1.06	100
113.38	to	115.06	1.68	1.68	100
115.06	to	116.43	1.37	1.37	100
116.43	to	118.41	1.98	1.98	100
118.41	to	119.17	0.76	0.76	100
119.17	to	120.24	1.07	1.07	100

Intersection Metres			Interval Metres	Core Recovery	
				Metres	Per Cent
120.24	to	121.15	0.91	0.91	100
121.15	to	122.37	1.22	1.22	100
122.37	to	123.28	0.91	0.91	100
123.28	to	124.79	1.51	1.51	100
124.79	to	126.77	1.98	1.98	100
126.77	to	128.00	1.23	1.23	100
128.00	to	128.91	0.91	0.91	100
128.91	to	129.83	0.92	0.92	100
129.83	to	130.51	0.68	0.68	100
130.51	to	132.10	1.59	1.59	100
132.10	to	132.71	0.61	0.61	100
132.71	to	133.16	0.45	0.45	100
133.16	to	134.08	0.92	0.92	100
134.08	to	134.99	0.91	0.91	100
134.99	to	136.22	1.23	1.23	100
136.22	to	137.74	1.52	1.52	100
137.74	to	138.35	0.61	0.61	100
138.35	to	139.11	0.76	0.76	100
139.11	to	140.03	0.92	0.92	100
140.03	to	141.55	1.52	1.52	100
141.55	to	143.39	1.84	1.84	100
143.39	to	144.15	0.76	0.61	80
144.15	to	145.52	1.37	1.07	78
145.52	to	146.89	1.37	0.76	55
146.89	to	147.50	0.61	0.61	100
147.50	to	148.72	1.22	1.22	100
148.72	to	149.94	1.22	0.61	50
149.94	to	150.39	0.45	0.45	100
150.39	to	150.54	0.15	0.15	100
150.54	to	151.45	0.91	0.91	100
151.45	to	153.01	1.56	1.56	100
153.01	to	154.53	1.52	1.52	100
154.53	to	155.75	1.22	1.22	100
155.75	to	156.36	0.61	0.61	100
156.36	to	157.42	1.06	1.06	100
157.42	to	158.34	0.92	0.77	84
158.34	to	159.25	0.91	0.91	100
159.25	to	162.30	3.05	0.92	30
162.30	to	163.52	1.22	1.22	100
163.52	to	164.13	0.61	0.61	100
164.13	to	164.74	0.61	0.30	50
164.74	to	165.65	0.91	0.91	100
165.65	to	167.17	1.52	1.52	100
167.17	to	168.47	1.30	1.30	100
168.47	to	169.62	1.15	1.15	100
169.62	to	171.53	1.91	1.91	100
171.53	to	172.59	1.06	1.06	100
172.59	to	173.74	1.15	1.15	100
173.74	to	174.04	0.30	0.30	100
174.04	to	175.19	1.15	1.15	100
175.19	to	176.33	1.14	1.14	100
176.33	to	177.23	0.90	0.90	100
177.23	to	178.45	1.22	1.22	100
178.45	to	180.28	1.83	1.83	100
180.28	to	181.50	1.22	1.22	100
181.50	to	182.90	1.40	1.40	100

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APPENDIX B

DDH 35 DRILL LOG

Intersection Metres	Description
0 to 45.72	Tricone drilling, no core.
45.72 to 60.80	Pale to medium green slaty chloritic siltstone. Bedding dips; 5° at 49.0m, 10° at 53.4m, 10° at 57.8m.
60.80 to 62.00	Medium grey arenaceous quartzose siltstone. Rare enhedral quartz veins containing minor pyrite and chalcopyrite.
62.00 to 160.15	Similar to the interval 45.72 to 60.80 metres. Few pink bands and microfaults. Generally finely bedded but laminated in parts. Moderately fissile in parts. At 113.00 metres is a thin (≤1cm) pyritic quartz-dolomite vein. Between about 143.64 and 147.50 metres the core is extremely fragmentary and yellow-brown, slightly pyritic quartz-dolomite and dolomite first appears. The dolomite and quartz-dolomite occur as irregular and discontinuous veins (≤1cm) and irregular blebs. This interval (143.64 to 147.50 metres) represents a fault zone. Below about 147.50 metres, microfaults appear to be more common and disseminated pyrite (bleds ≤1cm) are more common. A fault plane at 147.9 metres dips about 10°. Bedding dips: 10° at 64.0m, 10° at 68.1m, 15° at 70.4m, 5° at 74.4m, 10° at 80.4m, 10° at 86.0m, 10° to 15° at 89.3m, 15° at 90.5m, 30° at 92.0m, 25° at 92.5m, 15° at 94.8m, 0° to 5° at 99.0m, 20° at 104.5m, 10° to 15° at 108.3m, 20° at 115.4m, 10° at 117.3m, 15° to 20° at 122.6m, 20° at 128.5m, 0° to 5° at 131.0m, 0° to 5° at 133.5m, 0° to 5° at 138.4m, 0° to 5° at 141.6m, 30° at 150.7m, 25° at 153.1m, 45° to 50° at 158.4m.
160.15 to 163.52	Fault zone. Sheared and brecciated carbonaceous, graphitic and chloritic sediments. Very fragmentary.

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Intersection Metres	Description
163.52 to 169.62	Medium green and grey-green chloritic slate with few dark grey (carbonaceous) bands. The original bedding is poorly preserved. Minor disseminated pyrite. Few quartz and quartz-dolomite veins and segregations, generally irregular and discontinuous.
169.62 to 182.90	Pale and medium grey-green chloritic quartzose siltstone and dark grey carbonaceous siltstone. Laminated and bedded, generally beds $\leq$10cm. Bedding planes extremely irregular in parts due to faulting and slump structures. Bedding units generally have variable thickness. Minor fault zone (20cm) consisting of brecciated sediments at about 173.4 metres. Few microfaults. Few irregular and discontinuous quartz and quartz-dolomite veins and segregations. Minor disseminated pyrite occurs in the pale chloritic quartzose units. Bedding dips: 50^{o} at 173.6m.

DDH 35 COMPLETED AT 182.90 METRES.

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11 JUL 1973

ANSWER BALFOUR

DEPT. OF MINES

A.C.I. MINERALS PTY. LIMITED

TASMANIAN EXPLORATION, E.L. 16/68

REPORT ON DDH 36, MURRAYS REWARD PROSPECT

SUMMARY

DDH 36 at Murrays Reward Prospect was completed at a depth of 237.78 metres.

Low grade cupriferous mineralisation was intersected between 189.32 and 221.78 metres, this interval averaging 2960 ppmCu, 65 ppm Pb, 103 ppm Zn, < 0.05 dwt Au and $\leqslant 0.1$ dwt Ag, over a true thickness of about 32.2 metres.

The bulk of the mineralization occurs in quartz between 195.85 and 198.60 metres (3950 ppm Cu over a true thickness of 2.7 metres), and in quartz dolomite between 198.60 and 208.09 metres (2795 ppm Cu over a true thickness of 9.4 metres) and between 215.93 and 221.78 metres (2755 ppm Cu over a true thickness of 5.8 metres).

Several short intervals of cupriferous quartz-dolomite and massive chalcopyrite occur in sediments between 208.09 and 215.93 metres, this interval averaging 4410 ppm Cu over a true thickness of 7.8 metres.

Drilling costs for DDH 36 totalled $5939 at an average cost of $25.00 per metre.

DDH 36, MURRAYS REWARD PROSPECT

Grid reference	10227 N, 9785 E
R.L.	1201.2 metres
Angle	67°
Bearing	N 47°E true
Date drilled	16.3.73 to 25.3.73
Drilling rate	13.2 metres per shift

1. OPERATIONAL DETAILS

1.1 Drilling details:

DDH 36 at Murrays Reward Prospect was sited so as to pass beneath DDH 33 in order to make a deeper intersection of the mineralized zone in this area.

Drilling commenced on March 16th, 1973.

No problems were encountered with tricone drilling and the hole rapidly advanced to 76.2 metres at which depth NW casing was seated and drilling continued with NQWL coring equipment.

At 96.62 metres the hole collapsed and the rods became bogged. An unsuccessful attempt was made to free the rods by jarring.

The NW casing was then pulled, a casing shoe attached and the casing was reamed to the bottom of the hole and drilling continued.

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1.1. cont. Slow progress was made below about 200 metres and the hole was completed on March 25th 1973 at a depth of 237.78 metres.

After completion of the drillhole the rod string parted at a depth of 147.8 metres and several hours were spent fishing for the remaining rods and the core barrel.

All rods and casing were eventually recovered.

1.2. Drilling Conditions

Drill runs and core recovery are tabulated in Appendix A.

Although core recovery was relatively low (90 per cent) the majority of the core loss occured away from the mineralized zone, mainly in the interval 88.08 to 111.25 metres, recovery in this zone being only 54 per cent.

Only minor core loss (core recovery 97 per cent) occured in the mineralized zone.

Progress was relatively slow, particularly below about 200 metres, due to hard and broken ground and rapid flattening of the drillhole. The average drilling rate was 13.2 metres per shift.

Drill runs were generally short and averaged 1.04 metres.

1.3. Drill hole deviation:

The results of the drill hole surveys were as follows:

Collar		67° at N 47°E true
30.5	metres	65° acid tube
61.0	"	63° " "
91.4	"	63° " "
121.9	"	60° at N 65°E true - Tropari
121.9	"	55° acid tube
152.4	"	50° " "
182.9	"	42.5° " "
213.4	"	38° " "

1.4. Drilling Costs

Drilling costs attributable to DDH 36 totalled $5939, made up as follows:

Tricone drilling	$ 954.51
NQ diamond drilling	4,523.12
Running casing	76.20
Reaming casing	201.14
Recovering casing	87.50
Surveys	96.25
TOTAL	$ 5,938.72

The average cost was $25.00 per metre.

Additional costs not listed above included; core boxes (about $145) and assays (about $165).

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1.4. cont.

2. Geology

The complete drill log is presented in Appendix B and may be summarised as follows;

Tricone Drilling:
0 to 76.20 metres; carbonaceous and chloritic slaty siltstone.

Diamond Drilling:
76.20 to 93.26 metres; slaty carbonaceous siltstone. Thin (< 3cm) cupriferous and pyritic quartz veins occur at 76.2, 76.8, 81.4 and 81.5 metres.
93.26 to 157.90 metres; slaty chloritic siltstone.
157.90 to 172.20 metres; slaty chloritic and carbonaceous siltstone.
172.20 to 173.07 metres; fault zone consisting of fragmentary carbonaceous siltstone with rare pyritic quartz veins.
173.07 to 189.32 metres; similar to the interval 157.90 to 172.20 metres. At about 187.8 metres traces of chalcopyrite occur in pyritic quartz.
189.32 to 195.85 metres; similar to the interval 173.07 to 189.32 metres but contains 25 per cent quartz-dolomite veins and bands many of which contain minor chalcopyrite.
195.85 to 198.60 metres; cupriferous quartz in talcose chloritic siltstone.
198.60 to 208.09 metres; cupriferous quartz-dolomite. Few thin intervals of pyritic and chloritic talc.
208.09 to 215.93 metres; carbonaceous siltstone containing common pyritic quartz-dolomite veins and bands. At about 210.9 metres is a 15 cm band of pyritic quartz-dolomite containing common disseminated chalcopyrite. At about 211.5 metres is a 30cm band of pyritic quartz-dolomite containing rare chalcopyrite. At about 212.25 metres is a 4mm quartz vein containing minor chalcopyrite. Between 215.3 and 215.8 metres massive chalcopyrite with minor bornite is concentrated in two main bands (8cm and 6cm thick).
215.93 to 221.78 metres; pyritic quartz-dolomite containing minor disseminated chalcopyrite.
221.78 to 225.74 metres; pyritic quartz containing minor dolomite and rare chalcopyrite.
225.74 to 226.81 metres; chloritic siltstone containing common quartz veins.
226.81 to 228.76 metres; slightly pyritic quartz containing a few bands and fragments of chloritic siltstone and minor dolomite.
228.76 to 234.12 metres; chloritic siltstone containing common quartz veins.
234.12 to 237.78 metres; carbonaceous siltstone.

3. SAMPLES AND ASSAYS

A total of 13 core samples were assayed for copper, lead, zinc, gold and silver, by Spectrometer Services (Melbourne).

In addition, duplicates of 12 samples were assayed for copper, lead and zinc by the A.C.I. Technical Centre.

The assay results were;

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(1) Spectrometer Services

Sample No. Bal	Intersection metres	Interval Metres	Assay Value *			
			Cu	Pb Zn	Au	Ag
2181	189.31 to 191.90	2.59	2650	31 24	< 0.05	0.6
2182	191.90 to 194.32	2.42	437	34 14	"	< 0.1
2183	194.32 to 195.85	1.53	267	54 19	"	"
2184	195.85 to 198.60	2.75	1500	20 52	"	"
2185	198.60 to 202.40	3.80	1460	36 88	"	"
2186	202.40 to 204.90	2.50	4600	100 64	"	"
2187	204.90 to 206.81	1.91	2670	36 48	"	"
2188	206.81 to 208.09	1.28	557	26 25	"	"
2189	208.09 to 211.72	3.63	1055	23 100	"	"
2190	211.72 to 215.93	4.21	7460	32 99	"	0.29
2191	215.93 to 218.87	2.94	2440	36 40	"	0.26
2192	218.87 to 221.78	2.91	1790	52 80	"	< 0.1
2193	221.78 to 225.74	3.96	199	- -	-	-

(2) A.C.I. Technical Centre

Sample No. Bal	Intersection Metres	Interval Metres	Assay Value **		
			Cu	Pb	Zn
2181	189.31 to 191.90	2.59	0.23	60	80
2182	191.90 to 194.32	2.42	0.05	60	100
2183	194.32 to 195.85	1.53	0.03	60	100
2184	195.85 to 198.60	2.75	0.64	30	100
2185	198.60 to 202.40	3.80	0.44	60	113
2186	202.40 to 204.90	2.50	0.34	90	130
2187	204.90 to 206.81	1.91	0.22	130	115
2188	206.81 to 208.09	1.28	0.06	115	105
2189	208.09 to 211.72	3.63	0.26	120	290
2190	211.72 to 215.93	4.21	0.58	130	225
2191	215.93 to 218.87	2.94	0.19	150	140
2192	218.87 to 221.78	2.91	0.49	90	125

The assay results from the two laboratories have been combined to yield the following average values.

(1) Interval 189.32 to 221.78 metres
2960 p.p.m. Cu, 65 ppm Pb, 103 ppm Zn, < 0.05 dwt/ton Au, ⩽ 0.1 dwt/ton Ag over a true thickness of about 32.2 metres.

(2) Lithological unit 189.32 to 195.85 metres
1220 ppm Cu, 48 ppm Pb, 56 ppm Zn, < 0.05 dwt/ton Au, ⩽ 0.1 dwt/ton Ag over a true thickness of 6.5 metres.

(3) Lithological unit 195.85 to 198.60 metres
3950 ppm Cu, 25 ppm Pb, 76 ppm Zn, < 0.05 dwt/ton Au, < 0.1 dwt/ton Ag over a true thickness of 2.7 metres.

(4) Lithological unit 198.60 to 208.09 metres
2795 ppm Cu, 70 ppm Pb, 86 ppm Zn, < 0.05 dwt/ton Au, < 0.1 dwt/ton Ag over a true thickness of 9.4 metres.

(5) Lithological unit 208.09 to 215.93 metres
4411 ppm Cu, 76 ppm Pb, 178 ppm Zn, < 0.05 dwt/ton Au, ⩽ 0.1 dwt/ton Ag over a true thickness of 7.8 metres.

(6) Lithological unit 2.5.93 to 221.78 metres
2754 ppm Cu, 82 ppm Pb, 96 ppm Zn, < 0.05 dwt/ton Au, ⩽ 0.1 dwt/ton Ag over a true thickness of 5.8 metres.

* Note (1) Cu, Pb, Zn in ppm
(2) Au, Ag in dwt/ton

** Note (1) Cu in per cent
(2) Pb, Zn in ppm

continued...

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Anomalous but sub-economic quantities of copper occur in all five of the sub-units between 189.32 and 221.78 metres. Core recovery in this interval was 97 per cent so that little likelihood exists that the assay values have been biased due to core loss.

The copper occurs in two forms:-

(1) disseminated blebs and stringers of chalcopyrite in quartz and quartz-dolomite

(2) thin ($\leqslant$ 8 cm) massive bands of tarnished chalcopyrite with lesser bornite and with only minor quartz or dolomite in sediments. This occurrence of cupriferous mineralisation is unusual in the Balfour area, chalcopyrite almost invariably being intimately associated with abundant quartz and/or dolomite.

No lead, zinc, gold or silver minerals were observed during logging of the core and only trace amounts were detected by assay.

4. CONCLUSION

DDH 36 proved a down-dip extension of the cupriferous zone intersected by DDH 33 about 60 metres vertically above but also indicated a down-dip decrease in grade.

M.H. McIntyre
April 30th, 1973

APPENDIX A

DDH 36 DRILL RUNS AND CORE RECOVERY

Intersection Metres			Interval Metres	Ore Recovery	
				Metres	Per Cent
76.20	to	76.81	0.61	0.61	100
76.81	to	77.26	0.45	0.45	100
77.26	to	77.80	0.54	0.54	100
77.80	to	78.64	0.84	0.84	100
78.64	to	79.40	0.76	0.76	100
79.40	to	80.01	0.61	0.61	100
80.01	to	81.23	1.22	1.22	100
81.23	to	81.84	0.61	0.61	100
81.84	to	82.60	0.76	0.76	100
82.60	to	83.82	1.22	1.22	100
83.82	to	84.63	0.81	0.81	100
84.63	to	85.34	0.71	0.71	100
85.34	to	86.56	1.22	1.22	100
86.56	to	87.17	0.61	0.61	100
87.17	to	88.08	0.91	0.91	100
88.08	to	85.69	0.61	0.38	62
85.69	to	89.45	0.76	0.76	100
89.45	to	90.06	0.61	0.53	87
90.06	to	91.13	1.07	0.77	72
91.13	to	93.26	2.13	0.45	21
93.26	to	93.87	0.61	0.46	75
93.87	to	94.49	0.62	0.54	87
94.49	to	95.40	0.91	0.53	58
95.40	to	96.01	0.61	0.53	87
96.01	to	96.77	0.76	0.53	70
96.77	to	97.38	0.61	0.61	100
97.38	to	99.82	2.44	0.30	12
99.82	to	100.88	1.06	0.10	9
100.88	to	102.10	1.22	0.16	13
102.10	to	102.86	0.76	0.11	14
102.86	to	103.62	0.76	0.15	20
103.62	to	103.93	0.31	0.06	20
103.93	to	104.54	0.61	0.41	67
104.54	to	105.91	1.37	0.15	11
105.91	to	107.43	1.52	1.52	100
107.43	to	108.05	0.61	0.41	67
108.05	to	109.27	1.22	1.07	88
109.27	to	110.03	0.76	0.76	100
110.03	to	111.25	1.22	1.16	95
111.25	to	112.47	1.22	1.22	100
112.47	to	113.99	1.22	1.22	100
113.99	to	114.76	0.77	0.77	100
114.76	to	116.28	1.52	1.52	100
116.28	to	117.81	1.53	1.53	100
117.81	to	119.02	1.21	1.21	100
119.02	to	119.63	0.61	0.46	75
119.63	to	120.85	1.22	1.22	100
120.85	to	121.46	0.61	0.61	100
121.46	to	122.35	0.89	0.81	91
122.35	to	122.80	0.45	0.45	100
122.80	to	123.41	0.61	0.61	100
123.41	to	124.33	0.92	0.92	100
124.33	to	125.24	0.91	0.91	100
125.24	to	126.32	1.08	1.08	100
126.32	to	127.08	0.76	0.76	100
127.08	to	127.84	0.76	0.76	100
127.84	to	128.60	0.76	0.76	100
128.60	to	129.75	1.15	1.15	100
129.75	to	130.44	0.69	0.69	100

Intersection Metres			Interval Metres	Ore Recovery	
				Metres	Per Cent
130.44	to	131.12	0.68	0.68	100
131.12	to	131.61	0.49	0.49	100
131.61	to	132.75	1.14	1.14	100
132.75	to	133.28	0.53	0.53	100
133.28	to	133.83	0.55	0.55	100
133.83	to	134.85	1.02	1.02	100
134.85	to	135.76	0.91	0.91	100
135.76	to	137.36	1.60	1.60	100
137.36	to	138.05	0.69	0.39	57
138.05	to	139.27	1.22	0.84	69
139.27	to	140.49	1.22	0.84	69
140.49	to	141.25	0.76	0.76	100
141.25	to	141.96	0.71	0.71	100
141.96	to	143.23	1.27	1.27	100
143.23	to	144.69	1.46	1.46	100
144.69	to	145.69	1.00	1.00	100
145.69	to	147.19	1.50	1.50	100
147.19	to	148.71	1.52	1.52	100
148.71	to	150.24	1.53	1.53	100
150.24	to	151.46	1.22	1.22	100
151.46	to	152.68	1.22	1.22	100
152.68	to	154.20	1.52	1.52	100
154.20	to	154.99	0.79	0.79	100
154.99	to	156.36	1.37	1.37	100
156.36	to	157.88	1.52	1.52	100
157.88	to	159.26	1.38	1.38	100
159.26	to	160.93	1.67	0.15	9
160.93	to	161.54	0.61	0.61	100
161.54	to	162.15	0.61	0.31	50
162.15	to	162.60	0.45	0.45	100
162.60	to	164.20	1.60	1.60	100
164.20	to	165.19	0.99	0.99	100
165.19	to	166.21	1.02	1.02	100
166.21	to	167.07	0.86	0.86	100
167.07	to	168.24	1.17	1.17	100
168.24	to	169.31	1.07	1.07	100
169.31	to	170.37	1.06	1.06	100
170.37	to	171.29	0.92	0.92	100
171.29	to	172.20	0.91	0.91	100
172.20	to	173.07	0.87	0.87	100
173.07	to	174.03	0.96	0.96	100
174.03	to	174.69	0.66	0.66	100
174.69	to	175.25	0.56	0.56	100
175.25	to	176.18	0.93	0.93	100
176.18	to	177.40	1.22	1.22	100
177.40	to	178.92	1.52	1.52	100
178.92	to	180.44	1.52	1.52	100
180.44	to	182.27	1.83	1.83	100
182.27	to	183.64	1.37	1.37	100
183.64	to	184.73	1.09	1.09	100
184.73	to	186.25	1.52	1.52	100
186.25	to	187.88	1.63	1.63	100
187.88	to	189.48	1.60	1.60	100
189.48	to	191.03	1.55	1.55	100
191.03	to	192.90	1.87	1.62	87
192.90	to	194.32	1.42	1.42	100
194.32	to	194.98	0.66	0.66	100
194.98	to	195.85	0.87	0.87	100
195.85	to	197.37	1.52	1.52	100
197.37	to	197.83	0.46	0.46	100
197.83	to	198.74	0.91	0.91	100
198.74	to	199.51	0.77	0.77	100

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Intersection Metres			Interval Metres	Ore Recovery	
				Metres	Per Cent
199.51	to	201.03	1.52	1.52	100
201.03	to	202.40	1.37	1.37	100
202.40	to	203.32	0.92	0.92	100
203.32	to	204.84	1.52	1.37	90
204.84	to	204.99	0.15	0.15	100
204.99	to	206.07	1.08	0.63	58
206.07	to	206.37	0.30	0.23	77
206.37	to	206.98	0.61	0.51	84
206.98	to	207.89	0.91	0.91	100
207.89	to	209.50	1.61	1.61	100
209.50	to	211.09	1.59	1.59	100
211.09	to	212.61	1.52	1.52	100
212.61	to	214.14	1.53	1.53	100
214.14	to	215.73	1.59	1.59	100
215.73	to	216.74	1.01	1.01	100
216.74	to	218.28	1.54	1.54	100
218.28	to	219.34	1.06	1.06	100
219.34	to	220.72	1.38	1.38	100
220.72	to	221.33	0.61	0.61	100
221.33	to	222.39	1.06	1.06	100
222.39	to	223.15	0.76	0.76	100
223.15	to	224.98	1.83	1.83	100
224.98	to	226.35	1.37	1.37	100
226.35	to	226.81	0.46	0.46	100
226.81	to	227.72	0.91	0.91	100
227.72	to	227.87	0.15	0.15	100
227.87	to	229.40	1.53	1.53	100
229.40	to	229.86	0.46	0.46	100
229.86	to	231.53	1.67	1.21	72
231.53	to	233.20	1.67	1.67	100
233.20	to	233.81	0.61	0.61	100
233.81	to	234.12	0.31	0.31	100
234.12	to	235.35	1.23	1.23	100
235.35	to	236.26	0.91	0.76	84
236.26	to	237.78	1.52	1.52	100

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DDH 36 DRILL LOG

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INTERSECTION METRES	DESCRIPTION
0 to 76.20	Tricone drilling, no core.
76.20 to 93.26	Medium grey slaty carbonaceous siltstone with a faint grey-green (chloritic?) tinge in parts. At about 76.2 metres is a 3cm quartz-dolomite vein containing pyrite, chalcopyrite and ? chalcocite. At about 76.8 metres is a slightly cavernous quartz-dolomite vein (1cm) containing pyrite and ? chalcocite. At about 81.38 metres is a thin (2mm) discordant dolomite vein containing pyrite, chalcopyrite and ? chalcocite. At about 81.5 metres is a 2cm quartz vein containing pyrite, chalcopyrite and ? chalcocite. Moderately to highly fragmentary in parts particularly between 91.1 and 94.5 metres, this interval representing a fault zone. Bedding dips; 5° to 10° at 77.8m, 0° to 5° at 83.2m, 5° at 86.9m, 15° at 90.1m.
93.26 to 157.90	Pale to medium green and grey-green slaty chloritic siltstone containing rare irregular and discontinuous quartz-dolomite blebs and veins. Moderately fissile. Few microfaults. At about 117.9 metres is a 15cm band of pyritic quartz-dolomite. Minor disseminated pyrite and pyritic quartz-dolomite blebs. Bedding dips; 20° at 96.9m, 35° to 40° at 106.2m, 40° at 109.6m, 30° to 35° at 114.1m, 40° at 117.1m, 20° to 25° at 120.2m, 45° at 124.4m, 45° at 125.0m, 40° to 45° at 127.8m, 40° to 45° at 129.6m, 60° at 131.0m, 40° to 45° at 132.0m, 50° at 134.5m, 55° at 135.5m, 55° at 138.3m, 40° at 143.3m, 40° to 45° at 145.8m, 50° at 147.6m, 50° at 150.4m, 50° at 153.5m.
157.90 to 172.20	Pale to medium grey and grey-green slaty chloritic carbonaceous siltstone. The upper boundary of this unit is arbitrary due to the gradational nature of the contact. At about 158.2 metres is a yellow-orange dolomite vein ($\leqslant$1cm) consisting of central dolomite with thin ($\lesssim$1mm) pyrite margins.

Intersection Metres	Description
	At about 162.35 metres is a 20 cm interval containing barren quartz dolomite. Few quartz dolomite veins ($\leqslant$ 3 mm). Rare disseminated pyrite. Rare joint planes lined with enhedral pyrite. Moderately fissile. Bedding dips: 55° at 156.0m, 60° at 158.2m, 60° at 163.9m, 60° at 165.2m, 60° at 168.2m, 55° at 170.3m.
172.20 to 173.07	Dark grey fragmentary carbonaceous siltstone with rare pyritic quartz veins. Probably represents a fault zone.
173.07 to 189.32	Similar to the interval 157.90 to 172.20 metres. At about 187.78 metres traces of chalcopyrite occur in pyritic quartz. Bedding dips: 55° at 174.0, 50° at 175.1m, 45° to 50° at 177.9 m, 50° to 55° at 179.9m, 60° at 184.8m, 55° at 187.2m.
189.32 to 195.85	Similar to the interval 173.07 to 189.32 metres but contains numerous quartz-dolomite veins and bands ($\leqslant$ 20cm and generally 3 to 10cm) which make up 25 per cent of the interval. The quartz dolomite veins are mottled white (quartz) and cream-yellow (dolomite) and contain minor pyrite and chalcopyrite. Veins dip 50° to 70°. Many of the veins consist of segregated quartz and dolomite bands arranged normal to the plane of the vein and contain fragments or disrupted bands of the enclosing sediments. Chalcopyrite occurs as disseminated blebs ($\leqslant$ 3 cm but generally $<$1 cm) and as irregular and discontinuous stringers and in some cases is concentrated along the vein margins and intrudes the vein. Most of the veins are well defined with relatively straight boundaries but a few are irregular indicating fault fitting. Bedding dips: 55° to 60° at 178.3m, 45° at 191.1m.

Intersection Metres	Description
195.85 to 198.60	CUPRIFEROUS QUARTZ Irregular and discontinuous veins bands and segregations of cupriferous white quartz occurring in dark green talcose chloritic siltstone. The unit is very fragmentary and the quartz is moderately cavernous in parts and contains minor amounts of yellow brown dolomite. Chalcopyrite occurs as disseminated blebs ($\leqslant$ 1 cm) many of which are joined by thin ($\leqslant$ 1mm) stringers along incipient fracture planes particularly between 196.35 and 198.85 metres. Minor pyrite. The quartz in the chloritic sediments is very irregularly distributed and commonly has diffuse boundaries. The unit is fragmentary in parts particularly over the basal 30cm. The chalcopyrite is commonly slightly tarnished. Rare bornite.
198.60 to 208.09	CUPRIFEROUS QUARTZ DOLOMITE Massive white and pale yellow brown pyritic and cupriferous quartz dolomite. Moderately fragmentary. Common disseminated chalcopyrite occurring as irregular blebs ($\leqslant$ 2cm) and as irregular stringers and blebs along incipient fractures. The chalcopyrite is commonly slightly tarnished. Rare bornite. Minor disseminated pyrite commonly associated with the chalcopyrite. Only traces of chalcopyrite occur below 206.1 metres. Few minor intervals ($\leqslant$ 3 cm) of slightly pyritic (enhedral crystals) and chloritic talc. Two thicker bands of talc occur towards base of the unit at 204.9 to 205.25 metres and 206.1 to 206.8 metres. The finely foliated talc dips 35°.
208.09 to 215.93	Dark grey to black and dark grey-green carbonaceous siltstone containing common pyritic quartz-dolomite veins and bands ($\leqslant$ 30cm). Many of the quartz dolomite bands are associated with fragments of carbonaceous sediments and appear to represent fault zone fillings. At the top of the unit is a 20 cm band of white pyritic talc. The base of which

INTERSECTION METRES	DESCRIPTION

contains sediment fragments.

The carbonaceous siltstone contains numerous medium grey "porphyroblasts" some of which are lensoid to discular ($\ll$ 2mm) and have a preferred orientation dipping about 55°. Many of the "porphyroblasts" are concentrated in bands.

The siltstone contains many regular and irregular veins and veinlets of medium grey to grey-green chloritic quartz.

The dolomite in the upper half of the unit is dominantly milky white to pale cream whereas that in the lower half is yellow-brown and commonly occurs as irregular and discontinuous veins and blebs.

At about 210.9 metres is a 15cm band of mottled cream and grey-white pyritic quartz-dolomite containing 4 per cent Cu occurring as disseminated chalcopyrite.

At about 211.5 metres is a 30cm band of pyritic quartz-dolomite containing rare chalcopyrite.

At about 212.25 metres is a 4mm quartz vein containing minor chalcopyrite.

Between 215.3 and 215.8 metres massive tarnished chalcopyrite and bornite occur in dark green pyritic sediments. This chalcopyrite is associated with only minor amounts of quartz or dolomite and includes an 8cm band containing 30 to 35 per cent (by volume) chalcopyrite/bornite and a 6cm band containing 20 to 25 per cent chalcopyrite/bornite.

215.93 to 221.78 CUPRIFEROUS QUARTZ-DOLOMITE

Mottled milky white and yellow-brown pyritic quartz-dolomite containing minor disseminated chalcopyrite occurring as irregular blebs and discontinuous stringers along incipient fractures.

Moderately fragmentary.

Few medium to dark green chloritic sediment fragments and irregular bands ($\ll$ 5cm).

Minor leaching along quartz veins.

INTERSECTION METRES	DESCRIPTION
221.78 to 225.74	CUPRIFEROUS QUARTZ Milky white, pale grey and pale grey-green quartz containing minor pyrite and dolomite and rare chalcopyrite. Common incipient fratures lined with pyrite. The dolomite is pale yellow and occurs as relatively straight veins ($\leqslant$ 5mm), as irregular and discontinuous veins and as larger irregular blebs and segregations ($\leqslant$ 4cm).
225.74 to 226.81	Medium to dark green chloritic siltstone containing common white quartz veins and bands ($\leqslant$ 4cm). Minor pyrite.
226.81 to 228.76	Milky white quartz containing a few bands and fragments of chloritic siltstone, minor amounts of pyrite and very minor yellow dolomite. The pyrite and chloritic material are commonly concentrated along incipient fracture planes.
228.76 to 234.12	Medium to dark green and grey-green chloritic siltstone containing common quartz veins and bands particularly between about 230.06 and 230.63 metres, this quartzose band containing minor pyrite and common irregular, discontinuous and diffuse stringers and fragments of chloritic material. Minor disseminated pyrite. At about 231.1 metres is a 15cm quartz-dolomite band.
234.12 to 237.78	Medium to dark grey carbonaceous siltstone containing a few pyritic quartz veins. Variable bedding, 65° to 70° at base.
	DDH 36 COMPLETED AT 237.78 METRES.

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TASMANIAN EXPLORATION, E.L. 16/68 BALFOUR

REPORT ON DDH 37, MURRAYS REWARD PROSPECT

SUMMARY

DDH 37 at Murrays Reward Prospect was completed at a depth of 222.77 metres.

Sub-economic cupriferous quartz-dolomite was intersected between 204.90 and 210.04 metres, this interval averaging 2340 ppm Cu over a true thickness of 5.0 metres.

The mineralization strikes about northwest and dips moderately towards the southwest in an easterly dipping sequence of fine grained carbonaceous and chloritic sediments.

The results from DDH 37 in conjunction with the results from other drillholes in this area, indicates that the grade of the cupriferous fault zone decreases both north along strike and down dip.

Drilling costs for DDH 37 totalled $6,253 at an average cost of $28.10 per metre.

DDH 37 MURRAYS REWARD PROSPECT

Grid reference	10263 N, 9772 E
R.L.	1210.3 metres.
Angle	65.5°
Bearing	N 49° E true
Date drilled	26.3.73 to 3.4.73
Drilling rate	13.9 metres per shift

1. OPERATIONAL DETAILS

1.1 Drilling details

DDH 37 at Murrays Reward Prospect was sited so as to pass between DDH 33 and DDH 34 and to intersect the cupriferous fault zone about 60 metres (vertically) below the intersections made by DDH 33 and DDH 34.

Drilling commenced on 26th March 1973.

Tricone drilling advanced to 60.96 metres at which depth progress became very slow due to excessive bit wear. No new tricone bits were available on site and the nose was cased with 9.14 metres of NW casing and drilling continued with NQWL equipment.

The drillhole advanced without incident to 101.49 metres but at this depth the hole collapsed and NW casing was reamed from 60.96 to 94.49 metres and eventually to 103.02 metres.

NQ diamond drilling progressed to 206.98 metres at which depth the rods became bogged. The hole was then cased with BW casing and drilling was continued with BQWL coring equipment.

The drillhole was completed on 3rd April 1973 at a depth of 222.77 metres.

During recovery of the BW casing the casing shoe and bottom length of casing broke off down the hole and could not be recovered.

The rods and the remainder of the casing were successfully recovered.

1.2 Drilling conditions

Drill runs and core recovery are tabulated in Appendix A.

Core recovery in DDH 37 was relatively low (94 per cent) particularly in the mineralized zone (78 per cent). The major core loss occurred in the interval 199.50 to 208.35 metres, recovery in this interval being only 76 per cent.

The relatively high core loss was due to the presence of fragmentary and broken ground associated with fault zones.

The fragmentary and fissile nature of much of the core was responsible for the short drill runs which averaged only 0.84 metres.

The average drilling rate was 13.9 metres per shift.

1.3 Drillhole Deviation

The results of the drillhole surveys were as follows:-

Collar	65.5°	at N 49° E true
30.5 metres	63.5°	acid tube
61.0 "	61.5°	" "
91.4 "	61°	" "
121.9 "	61°	" "
152.4 "	57.5°	" "
182.9 "	53.5°	" "
213.4 "	46°	" "

A tropari test at 182.9 metres yielded an angle of 53° on a bearing of N 56° E true.

1.4 Drilling costs

Drilling costs attributable to DDH 37 totalled $6253, made up as follows:-

Tricone drilling	$ 743.87
NQ diamond drilling	4,087.44
BQ diamond drilling	411.81
Running casing	276.47
Reaming casing	420.30
Recovering casing	99.50
Surveys	84.75
BW casing shoe	128.95
TOTAL	$6,253.09

The average drilling cost was $28.10 per metres.

Additional drilling costs not listed above included; core boxes (about $155) and assays (about $8).

2. GEOLOGY

The complete drill log is presented in Appendix B and may be summarized as follows:-

Tricone Drilling

0 to 60.96 metres; fine grained carbonaceous sediments.

Diamond Drilling

60.96 to 99.37 metres; quartzose siltstone and carbonaceous siltstone and shale. Moderately to highly fragmentary. Rare enhedral quartz veins ($\ll$ 1 cm) containing pyrite, arsenopyrite, chalcopyrite, wolframite and cassiterite.

99.37 to 102.41 metres; probable fault zone consisting of fragmentary carbonaceous sediments.

102.41 to 129.52 metres; carbonaceous and quartzose siltstone and slaty siltstone similar in parts to the interval 60.96 to 99.37 metres.

129.52 to 130.74 metres; fault zones consisting of highly sheared and brecciated carbonaceous and chloritic siltstone.

130.74 to 180.12 metres; slaty chloritic siltstone. Moderately to highly fissile.

180.12 to 197.83 metres; similar to the interval 130.74 to 180.12 metres but contains a greater amount of carbonaceous material.

197.83 to 204.90 metres; slaty chloritic siltstone. Pyritic quartz and quartz-dolomite veins become more common towards the base. Minor pyrite and chalcopyrite occur in quartz-dolomite between 203.48 and 203.56 metres and between 204.31 and 204.50 metres.

204.90 to 210.04 metres; talcose and pyritic quartz-dolomite containing minor disseminated chalcopyrite. Moderately to highly fragmentary.

210.04 to 222.77 metres; slaty chloritic and carbonaceous siltstone.

3. SAMPLES AND ASSAYS

Four core samples were assayed for copper with the following results:-

SAMPLE NO. BAL	INTERSECTION METRES	INTERVAL METRES	ASSAY VALUE ppm Cu
2194	202.70 to 204.90	2.20	643
2195	204.90 " 207.51	2.61	975
2196	207.51 " 210.04	2.53	3750
2197	210.04 " 212.00	1.96	750

The assay values confirm the presence of anomalous but sub-economic mineralization in the quartz-dolomite between 204.90 and 210.04 metres. This interval contains an average of 2340 ppm Cu over a true thickness of 5.0 metres.

The very low grade but still anomalous copper values on either side of the mineralized zone proper, reflect the presence of minor amounts of chalcopyrite in quartz and quartz-dolomite veins.

4. CONCLUSION

DDH 37 confirmed the down-dip extension of the cupriferous fault zone between DDH 33 and DDH 34.

The results of DDH 37, taken in conjunction with the results from the other drillholes in this area, appear to indicate a decrease in both grade and thickness of the cupriferous fault zone down-dip and north along strike

M. H. McINTYRE

1st May, 1973.

APPENDIX A

DDH 37, DRILL RUNS & CORE RECOVERY

INTERSECTION METRES	INTERVAL METRES	CORE RECOVERY METRES	CORE RECOVERY PER CENT
60.96 to 61.87	0.91	0.91	100
61.87 " 63.24	1.37	1.37	100
63.24 " 64.46	1.22	1.22	100
64.46 " 64.91	0.45	0.45	100
64.91 " 65.52	0.61	0.61	100
65.52 " 66.59	1.07	1.07	100
66.59 " 67.82	1.23	1.23	100
67.82 " 68.73	0.91	0.91	100
68.73 " 70.26	1.53	1.53	100
70.26 " 71.16	0.90	0.82	91
71.16 " 71.46	0.30	0.30	100
71.46 " 71.92	0.46	0.46	100
71.92 " 72.38	0.46	0.46	100
72.38 " 72.68	0.30	0.30	100
72.68 " 73.44	0.76	0.76	100
73.44 " 74.52	1.08	1.08	100
74.52 " 75.43	0.91	0.91	100
75.43 " 76.19	0.76	0.76	100
76.19 " 77.11	0.92	0.92	100
77.11 " 77.41	0.30	0.30	100
77.41 " 78.33	0.92	0.92	100
78.33 " 78.94	0.61	0.61	100
78.94 " 79.85	0.91	0.91	100
79.85 " 80.31	0.46	0.46	100
80.31 " 80.84	0.53	0.53	100
80.84 " 81.69	0.85	0.85	100
81.69 " 82.07	0.38	0.38	100
82.07 " 82.60	0.53	0.53	100
82.60 " 83.59	0.99	0.99	100
83.59 " 84.58	0.99	0.99	100
84.58 " 86.25	1.67	1.67	100
86.25 " 88.00	1.75	1.75	100
88.00 " 88.84	0.84	0.84	100
88.84 " 90.37	1.53	1.53	100
90.37 " 92.65	2.28	2.28	100
92.65 " 93.72	1.07	1.07	100
93.72 " 95.39	1.67	1.67	100
95.39 " 96.00	0.61	0.61	100
96.00 " 96.77	0.77	0.77	100
96.77 " 97.54	0.77	0.77	100
97.54 " 98.45	0.91	0.91	100
98.45 " 99.37	0.92	0.92	100
99.37 " 99.98	0.61	0.51	84
99.98 " 100.89	0.91	0.76	84
100.89 " 101.50	0.61	0.41	67
101.50 " 101.96	0.46	0.46	100
101.96 " 102.41	0.45	0.45	100
102.41 " 103.32	0.91	0.91	100
103.32 " 103.63	0.31	0.31	100
103.63 " 104.54	0.91	0.91	100
104.54 " 105.15	0.61	0.61	100
105.15 " 105.91	0.76	0.76	100
105.91 " 106.06	0.15	0.15	100
106.06 " 106.82	0.76	0.76	100
106.82 " 107.74	0.92	0.92	100
107.74 " 108.65	0.91	0.91	100
108.65 " 109.88	1.23	1.23	100
109.88 " 110.64	0.76	0.76	100

INTERSECTION METRES	INTERVAL METRES	CORE RECOVERY	
		METRES	PER CENT
110.64 to 111.55	0.91	0.91	100
111.55 " 112.47	0.92	0.92	100
112.47 " 113.69	1.22	1.22	100
113.69 " 114.76	1.07	1.07	100
114.76 " 116.13	1.37	1.37	100
116.13 " 117.20	1.07	1.07	100
117.20 " 118.10	0.90	0.90	100
118.10 " 118.86	0.76	0.76	100
118.86 " 119.32	0.46	0.46	100
119.32 " 120.84	1.52	1.52	100
120.84 " 121.46	0.62	0.62	100
121.46 " 122.35	0.89	0.89	100
122.35 " 122.96	0.61	0.61	100
122.96 " 123.57	0.61	0.61	100
123.57 " 124.18	0.61	0.61	100
124.18 " 124.79	0.61	0.61	100
124.79 " 126.01	1.22	1.22	100
126.01 " 127.23	1.22	1.22	100
127.23 " 127.99	0.76	0.76	100
127.99 " 128.75	0.76	0.76	100
128.75 " 129.52	0.77	0.77	100
129.52 " 129.82	0.30	0.30	100
129.82 " 130.74	0.92	0.46	50
130.74 " 131.96	1.22	0.92	75
131.96 " 132.87	0.91	0.91	100
132.87 " 133.78	0.91	0.91	100
133.78 " 134.85	1.07	0.82	77
134.85 " 135.46	0.61	0.61	100
135.46 " 136.37	0.91	0.61	67
136.37 " 137.13	0.76	0.76	100
137.13 " 138.04	0.91	0.76	83
138.04 " 139.26	1.22	1.22	100
139.26 " 140.34	1.08	1.08	100
140.34 " 141.40	1.06	0.91	86
141.40 " 142.47	1.07	0.92	86
142.47 " 143.23	0.76	0.76	100
143.23 " 144.15	0.92	0.67	73
144.15 " 144.60	0.45	0.38	73
144.60 " 145.07	0.47	0.47	100
145.07 " 145.98	0.91	0.91	100
145.98 " 146.44	0.46	0.46	100
146.44 " 146.90	0.46	0.46	100
146.90 " 147.66	0.76	0.76	100
147.66 " 148.26	0.60	0.60	100
148.26 " 148.71	0.45	0.38	85
148.71 " 149.32	0.61	0.54	88
149.32 " 150.09	0.77	0.77	100
150.09 " 150.54	0.45	0.45	100
150.54 " 151.31	0.77	0.77	100
151.31 " 151.92	0.61	0.46	75
151.92 " 153.44	1.52	1.52	100
153.44 " 154.51	1.07	1.07	100
154.51 " 155.29	0.78	0.78	100
155.29 " 156.05	0.76	0.76	100
156.05 " 157.27	1.22	1.22	100
157.27 " 158.18	0.91	0.91	100
158.18 " 159.72	1.54	1.54	100
159.72 " 160.78	1.06	0.76	81
160.78 " 161.24	0.46	0.46	100
161.24 " 162.16	0.92	0.92	100
162.16 " 162.91	0.75	0.75	100

INTERSECTION METRES	INTERVAL METRES	CORE RECOVERY METRES	CORE RECOVERY PER CENT
162.91 to 163.52	0.61	0.61	100
163.52 " 164.58	1.06	1.06	100
164.58 " 165.04	0.46	0.46	100
165.04 " 165.65	0.61	0.61	100
165.65 " 166.87	1.22	0.45	37
166.87 " 167.64	0.77	0.70	91
167.64 " 168.25	0.61	0.61	100
168.25 " 168.55	0.30	0.30	100
168.55 " 170.08	1.53	0.76	50
170.08 " 170.38	0.30	0.30	100
170.38 " 170.99	0.61	0.61	100
170.99 " 171.29	0.30	0.30	100
171.29 " 171.60	0.31	0.31	100
171.60 " 172.36	0.76	0.76	100
172.36 " 172.82	0.46	0.46	100
172.82 " 173.27	0.45	0.45	100
173.27 " 174.14	0.87	0.87	100
174.14 " 174.49	0.35	0.28	80
174.49 " 177.84	3.35	0.45	13
177.84 " 178.29	0.45	0.45	100
178.29 " 179.06	0.77	0.77	100
179.06 " 179.67	0.61	0.61	100
179.67 " 180.12	0.45	0.45	100
180.12 " 180.74	0.62	0.62	100
180.74 " 181.50	0.76	0.76	100
181.50 " 182.26	0.76	0.76	100
182.26 " 183.20	0.94	0.94	100
183.20 " 183.81	0.61	0.61	100
183.81 " 184.26	0.45	0.45	100
184.26 " 184.57	0.31	0.15	50
184.57 " 185.64	1.07	1.07	100
185.64 " 186.56	0.92	0.92	100
186.56 " 187.47	0.91	0.91	100
187.47 " 188.23	0.76	0.76	100
188.23 " 189.61	1.38	1.38	100
189.61 " 190.37	0.76	0.76	100
190.37 " 191.59	1.22	1.22	100
191.59 " 192.20	0.61	0.61	100
192.20 " 194.32	2.12	1.82	86
194.32 " 194.62	0.30	0.30	100
194.62 " 195.69	1.07	1.07	100
195.69 " 196.60	0.91	0.91	100
196.60 " 197.37	0.77	0.77	100
197.37 " 197.83	0.46	0.31	67
197.83 " 199.05	1.22	1.22	100
199.05 " 199.50	0.45	0.45	100
199.50 " 200.11	0.61	0.54	89
200.11 " 201.03	0.92	0.61	67
201.03 " 201.48	0.45	0.22	50
201.48 " 202.10	0.62	0.46	75
202.10 " 202.70	0.60	0.45	75
202.70 " 204.16	1.46	1.46	100
204.16 " 205.00	0.84	0.77	92
205.00 " 205.45	0.45	0.38	85
205.45 " 205.83	0.38	0.28	74
205.83 " 206.44	0.61	0.41	67
206.44 " 206.83	0.39	0.29	75
206.83 " 207.51	0.68	0.23	34
207.51 " 208.35	0.84	0.64	76
208.35 " 208.80	0.45	0.45	100

INTERSECTION METRES	INTERVAL METRES	CORE RECOVERY METRES	CORE RECOVERY PER CENT
208.80 to 209.56	0.76	0.76	100
209.56 " 210.09	0.53	0.53	100
210.09 " 210.93	0.84	0.84	100
210.93 " 212.00	1.07	1.07	100
212.00 " 214.54	2.54	2.54	100
214.54 " 215.54	1.00	1.00	100
215.54 " 216.13	0.59	0.59	100
216.13 " 216.82	0.69	0.69	100
216.82 " 217.05	0.23	0.23	100
217.05 " 219.04	1.99	1.99	100
219.04 " 219.80	0.76	0.76	100
219.80 " 220.79	0.99	0.99	100
220.79 " 221.93	1.14	1.14	100
221.93 " 222.77	0.84	0.84	100

088

636088

APPENDIX B

DDH 37 DRILL LOG

INTERSECTION METRES	DESCRIPTION
0 to 60.96	Tricone drilling, no core.
60.96 to 99.37	Pale to medium grey quartzose siltstone and dark grey carbonaceous siltstone and shale. The quartzose siltstone contains common disseminated sedimentary pyrite and cavities after pyrite. Laminated in parts, otherwise finely bedded. Moderately fissile, parting parallel to original bedding. A few joint planes are faced with thin pyrite fillings. Moderately to highly fragmentary. Faint green (chloritic) tinge in parts. Quartzitic in short intervals. Few slump structures. Few microfaults some of which are slickensided and faced with pyrite films ($<$ 1 mm). Rare enhedral quartz veins ($\ll$ 1 cm) containing pyrite, arsenopyrite, chalcopyrite, wolframite and cassiterite e.g. 64.65m, 69.6m, 70.26m, 71.92m, 74.87m, 76.00m, 77.3m, 79.35m, 80.40m, 81.40m, 87,7m. At 84.7 metres is a straight, soft grass green, chlorite (?) vein dipping 25°. Bedding dips; 5° at 61.0m, 10° at 64.6m, 0° to 5° at 66.7m, 0° to 5° at 68.8m, 5° at 70.6m, 0° to 5° at 74.3m, 5° at 77.2m, 0° to 5° at 79.9m, 5° to 10° at 82.4m, 15° at 84.2m, 0° to 5° at 90.4m, 20° at 92.3m, 10° at 94.1m, 5° at 96.1m,
99.37 to 102.41	Fragmentary carbonaceous siltstone, brecciated in parts, probable fault zone.
102.41 to 129.52	Medium to dark grey (slightly grey-green) carbonaceous and quartzose siltstone and slaty siltstone, similar to the interval 60.96 to 99.37 metres in parts. Laminated in parts, otherwise fine to medium beds. Few graded beds.

INTERSECTION METRES	DESCRIPTION
	Minor dissemintated sedimentary pyrite in the pale (and coarser) quartzose units. Rare pyritic quartz veins. Few microfaults. Moderately fissile, parting parallel to original bedding. Rare, irregular and discontinuous veins and segregations of yellow-brown dolomite commonly occurring in microfaults and fractures below 121.0 metres. At about 110.5 metres is a 20 cm fault zone consisting of soft, sheared, graphitic and slickensided carbonaceous siltstone. Bedding dips; 0° to 5° at 102.5m, 20° at 104.4m, 5° at 106.9m, 10° to 15° at 108.9m, 15° at 111.2m, 15° to 20° at 112.9m, 5° to 15° at 115.0m, 0° to 5° at 119.4m, 5° at 121.9m, 20° at 125.4m.
129.52 to 130.74	Highly sheared and brecciated fault zone. Dark grey carbonaceous in the upper 30cm, The remainder being pale to medium green chloritic siltstone containing minor dolomite veins and stringers. The carbonaceous member is graphitic and slickensided. Soft and friable.
130.74 to 180.12	Pale and medium green and grey-green slaty chloritic siltstone containing few disseminated pyrite blebs. Few, slightly pyritic, dolomite and quartz-dolomite veins. Fragmentary. Moderately to highly fissile. At about 151.6 metres is a 50 cm fault zone consisting of fragmentary, brecciated siltstone. At about 169.95 metres is a 2 cm band of slightly pyritic quartz-dolomite containing few siltstone fragments. At about 170.1 metres are two quartz-dolomite fragments. At 177.84 metres are several quartz-dolomite fragments.

INTERSECTION METRES	DESCRIPTION
	Bedding dips; 15° at 133.9m, 25° at 135.1m, 25° at 129.3m, 20° at 136.5m, 25° at 139.4m, 25° to 30° at 142.0m, 45° at 144.8m, 25° at 148.0m, 50° at 149.9m, 35° to 40° at 152.2m, 45° at 154.7m, 40° to 45° at 157.2m, 45° at 159.0m, 50° at 161.1m, 50° at 164.3m, 45° at 167.5m, 45° to 50° at 171.7m, 40° at 173.3m, 45° to 50° at 178.4m.
180.12 to 197.83	Medium to dark grey and grey-green slaty carbonaceous (and chloritic) siltstone. Similar to the interval 130.74 to 180.12 metres but darker (higher carbonaceous content?). Minor disseminated pyrite (≤1cm). Few lensoid and discontinuous pyrite bands parallel to bedding. Few pyritic quartz veins. The upper and lower boundaries of this interval are gradational. Bedding dips; 45° at 182.9m, 40° to 45° at 184.5m, 40° at 188.6m, 40° at 191.1m, 45° to 50° at 191.8m, 45° at 195.9m.
197.83 to 204.90	Medium to dark green, slightly slaty chloritic siltstone containing minor disseminated pyrite. Pyritic quartz and quartz-dolomite veins become more common towards the base of the unit particularly at; a) 203.48 to 203.56 metres; quartz-dolomite containing minor disseminated pyrite and chalcopyrite and few bands (≤1cm) of chloritic siltstone. Dip 55°. b) 204.31 to 204.50 metres; quartz-dolomite containing rare disseminated pyrite and chalcopyrite and fragments and disrupted bands of chloritic siltstone at base indicating shearing or faulting. Few grey indistinct "porphyroblasts" towards the base, many of which appears to be aligned parallel to an indistinct cleavage. Original bedding poorly preserved. Bedding dips; 35° to 40° at 197.9m. Few slickensided microfaults.

INTERSECTION METRES	DESCRIPTION
204.90 to 210.04	CUPRIFEROUS TALCOSE QUARTZ-DOLOMITE Talcose and pyritic quartz-dolomite containing minor disseminated chalcopyrite and a few bands ($\leqslant$ 10 cm) and fragments of medium and dark green chloritic siltstone and chloritic talc. The chalcopyrite occurs as disseminated blebs ($\leqslant$1 cm) and irregular and discontinuous stringers. Moderately to highly fragmentary. Few red-black (ferruginous?) flecks in parts. Slightly to moderately cavernous in parts after talc (washed out) and dolomite?.
210.04 to 222.77	Dark grey-green slaty chloritic carbonaceous siltstone containing a few pyritic quartz bands and veins ($\leqslant$ 20cm but generally $<$ 10cm) a few of which contain siltstone fragments DDH 37 COMPLETED AT 222.77 METRES

4214 / B/5

PLAN A

GROUND CONTROL
PHOTOGRAMMETRY
and
FAIR DRAWING
by
AUSTRALIAN AERIAL MAPPING PTY LTD GORDON N.S.W.

DATUM OF HEIGHTS MEAN SEA LEVEL DERIVED FROM MT. FRANKLAND 1465 FEET

GRID VALUES IN FEET ARE ON AUSTRALIAN TRANSVERSE MERCATOR PROJECTION WITH CENTRAL MERIDIAN OF 146° EAST LONGITUDE DERIVED FROM MT. FRANKLAND

73-948

MT. BALFOUR AREA

AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.

636092

CONTOUR INTERVAL 100 FEET.

SCALE: 1: 20000

5 cm

2019

PLAN A.

4214/C/2

PLAN B

EMMETTS ADIT

EMMETTS COTTAGES

EMMETTS CREEK

MTRSTRID

CENTRAL SWAMP

BALFOUR SWAMP

SPECIMEN HILL

MAIN CREEK

TO JENNA

AREA A

AREA B

M.H.M. 4/73

73-948

636093

GROUND CONTROL
PHOTOGRAMMETRY
and
FAIR DRAWING
by
AUSTRALIAN AERIAL MAPPING PTY LTD GORDON N.S.W.

DATUM OF HEIGHTS MEAN SEA LEVEL DERIVED FROM MT FRANKLAND 1465 FEET

GRID VALUES IN FEET ARE ON AUSTRALIAN TRANSVERSE MERCATOR PROJECTION WITH CENTRAL MERIDIAN OF 146° EAST LONGITUDE DERIVED FROM MT FRANKLAND

MT. BALFOUR AREA

AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.

5 cm

CONTOUR INTERVAL 20 FEET

0 200 500 1000 2000 Feet

SCALE: 1:10,000

SHEET INDEX

1
2
3
4

GN

SHEET 2 2020

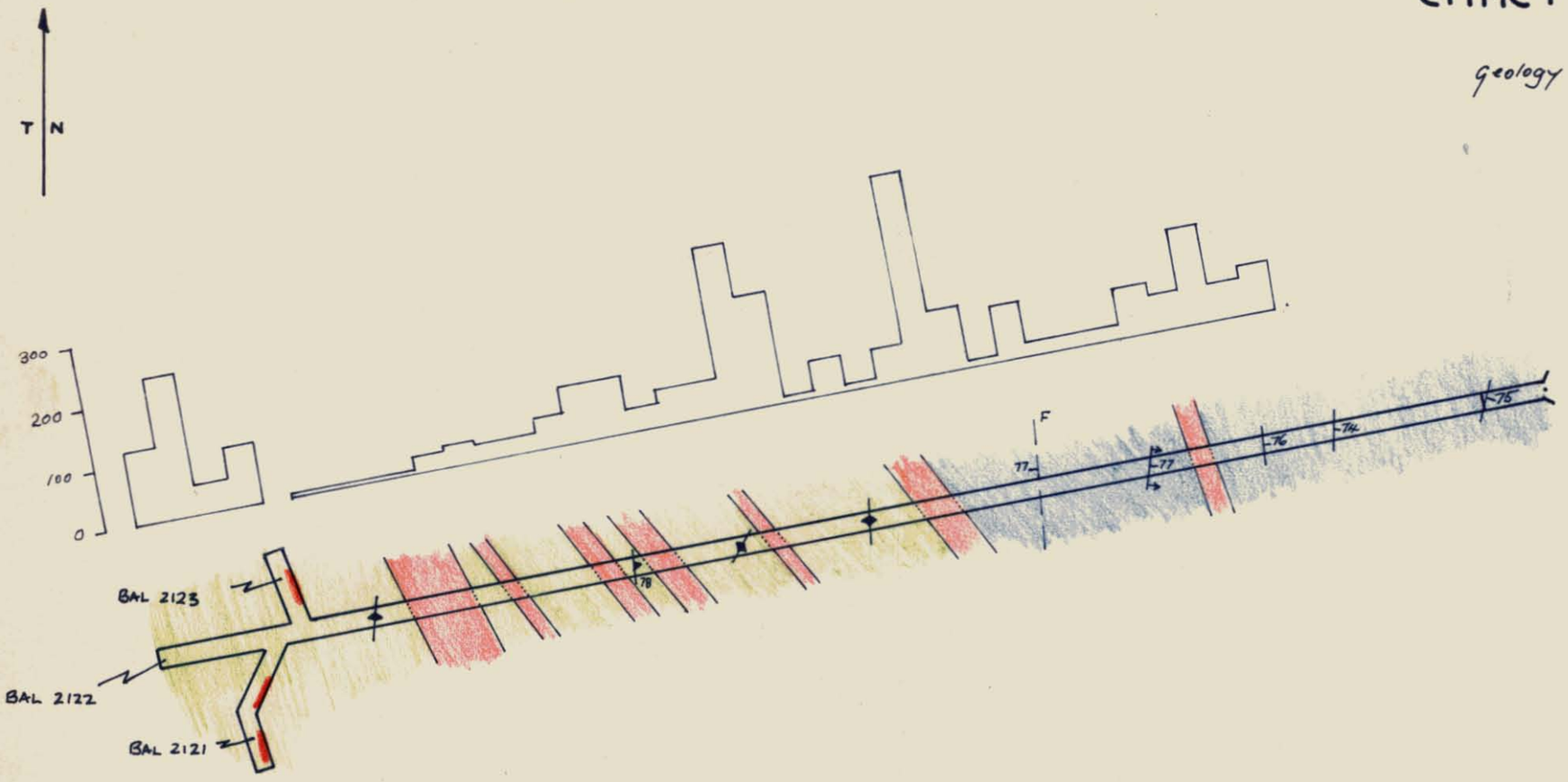
PLAN B.

73-948 093

PLAN C

EMMETTS ADIT

geology & sampling



attitude S_0

attitude S_1

quartz

carbonaceous sediments

slate

0 5 10 15 20
metres

5 cm

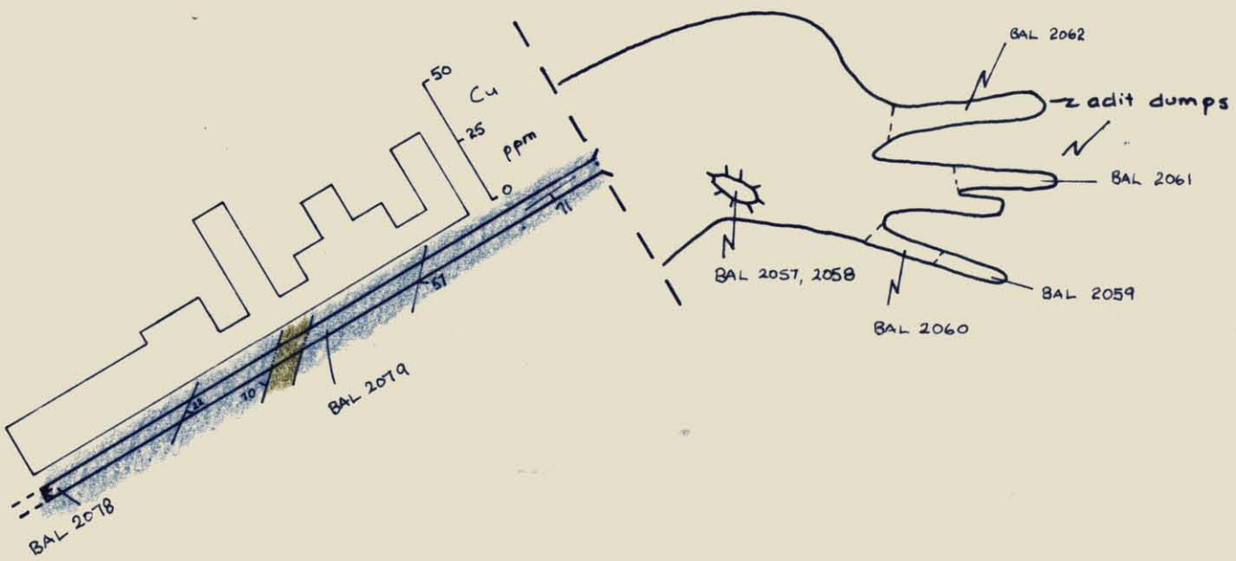
636094

M·H·M 2/73

094

73-9448

PLAN D



WARATAH PROSPECT ADIT

Geology & sampling

carbonaceous sediments

dyke

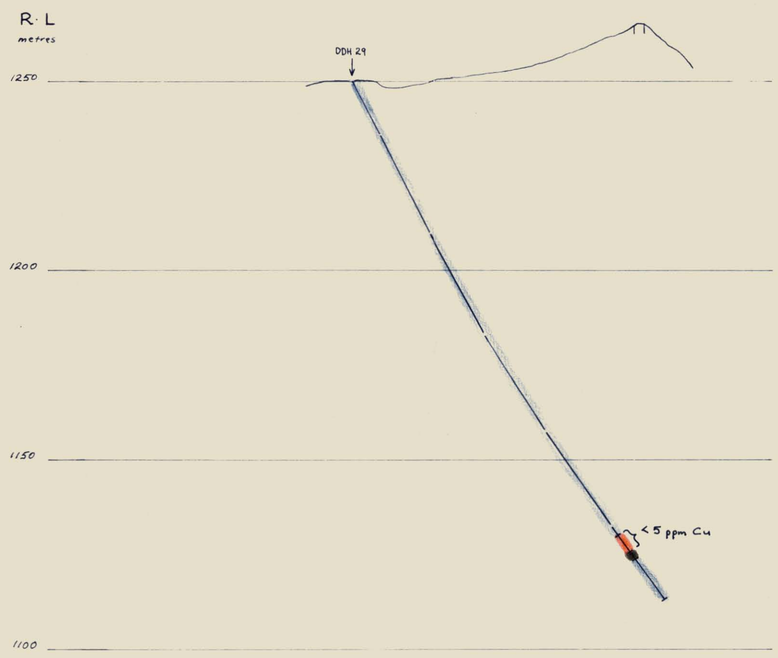
636095

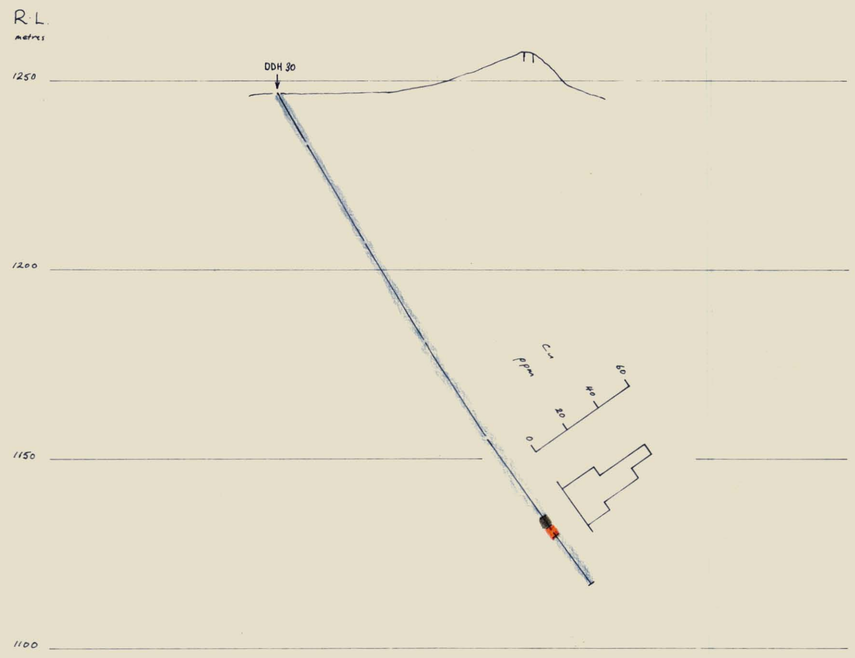
0 5 10 15 20
metres

5 cm

M.H.M 2/73

PLAN E





LEGEND

- carbonaceous sediments
- quartz
- fault zone

ASSAY VALUES & CORE RECOVERY

Intersection metres	Interval metres	Assay Value ppm Cu	Core Recovery per cent	
140·32 to 142·93	2·61	< 5	92	DDH 29
142·93 " 145·54	2·61	< 5	100	
129·94 to 132·90	2·96	20	88	DDH 30
132·90 " 135·90	3·00	49	56	
135·90 " 138·96	3·06	36	43	
138·96 " 141·71	2·75	14	95	

DDH 29 section on bearing 063° true

DDH 30 section on bearing 065° true

636096

5 cm

A·C·I MINERALS PTY. LTD.

E.L. 16/68, BALFOUR

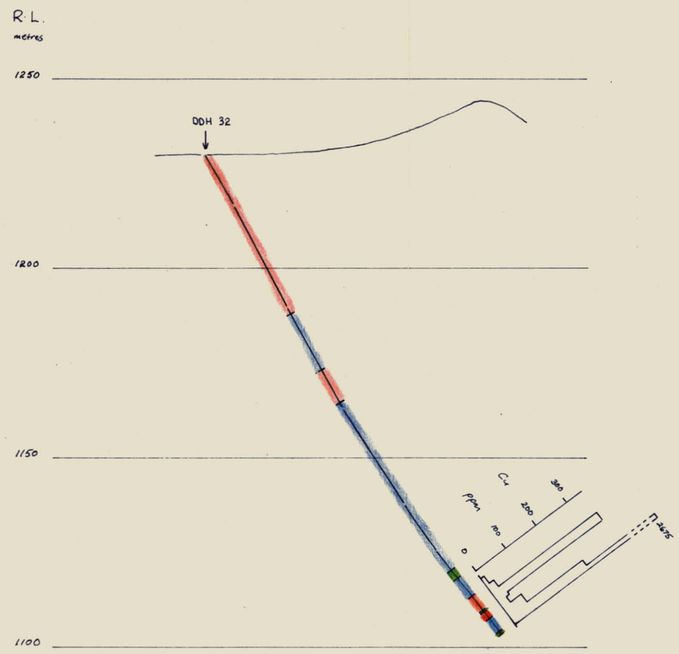
WARATAH PROSPECT

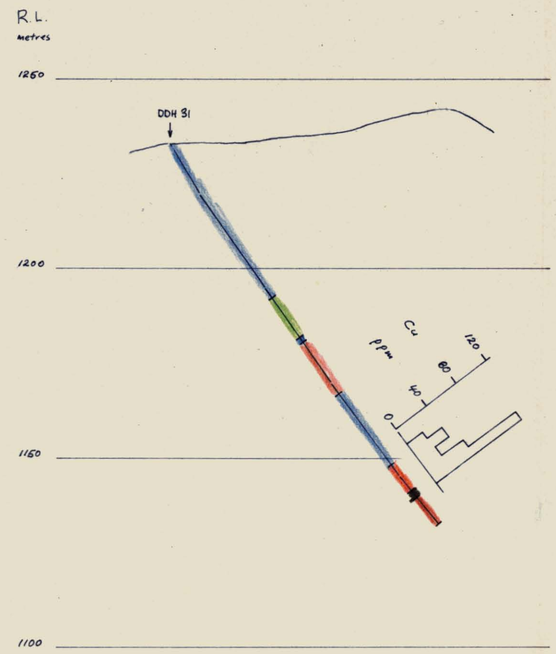
GEOLOGICAL & ASSAY SECTIONS

DDH 29 & DDH 30 2021

PLAN E. Scale 1 : 1000 M·H·M 5/73

PLAN F





LEGEND

- carbonaceous sediments
- chloritic sediments
- chloritic carbonaceous sediments
- quartz-dolomite
- fault zone

ASSAY VALUES & CORE RECOVERY

Intersection metres	Interval metres	Assay value ppm Cu	Core recovery per cent	
101·14 to 103·27	2·13	19	100	DDH 31
103·27 " 106·30	3·03	39	"	
106·30 " 108·95	2·65	22	"	
108·95 " 111·93	2·98	50	"	
111·93 " 114·15	2·22	113	"	

136·00 to 137·28	2·28	10	100	DDH 32
137·28 " 139·58	2·30	24	53	
139·58 " 142·02	2·44	348	57	
142·02 " 142·63	0·61	34	100	
142·63 " 144·79	2·16	25	100	
144·79 " 147·27	2·48	60	100	
147·27 " 149·32	2·05	244	100	
149·32 " 150·24	0·92	2675	100	

DDH 31 section on bearing 062° true

DDH 32 section on bearing 062° true

5 cm

636097

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PIERPONT MORGAN PROSPECT

GEOLOGICAL & ASSAY SECTIONS

DDH 31 & DDH 32 2022

PLAN F Scale 1:1000 M.H.M 5/73

PLAN G

track

drillhole location & bearing

BALFOUR

TEMMA

N

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MURRAYS REWARD PROSPECT

Location of drillholes 16, 17, 24, 33, 34, 35, 36, 37

PLAN G. Scale 1 : 1000

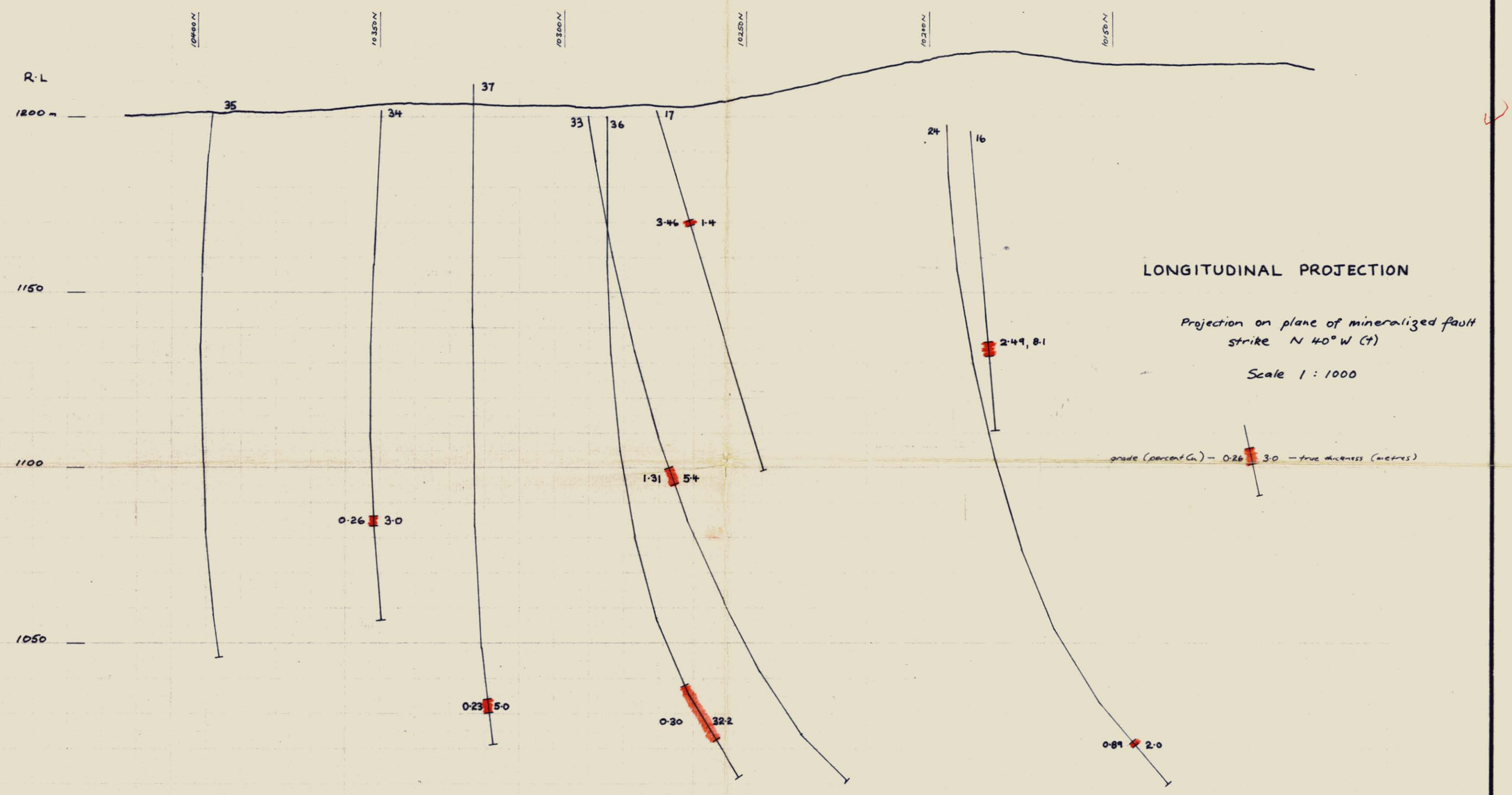
636098

5 cm

73-948

2023 M·H·M 5/73

PLAN H



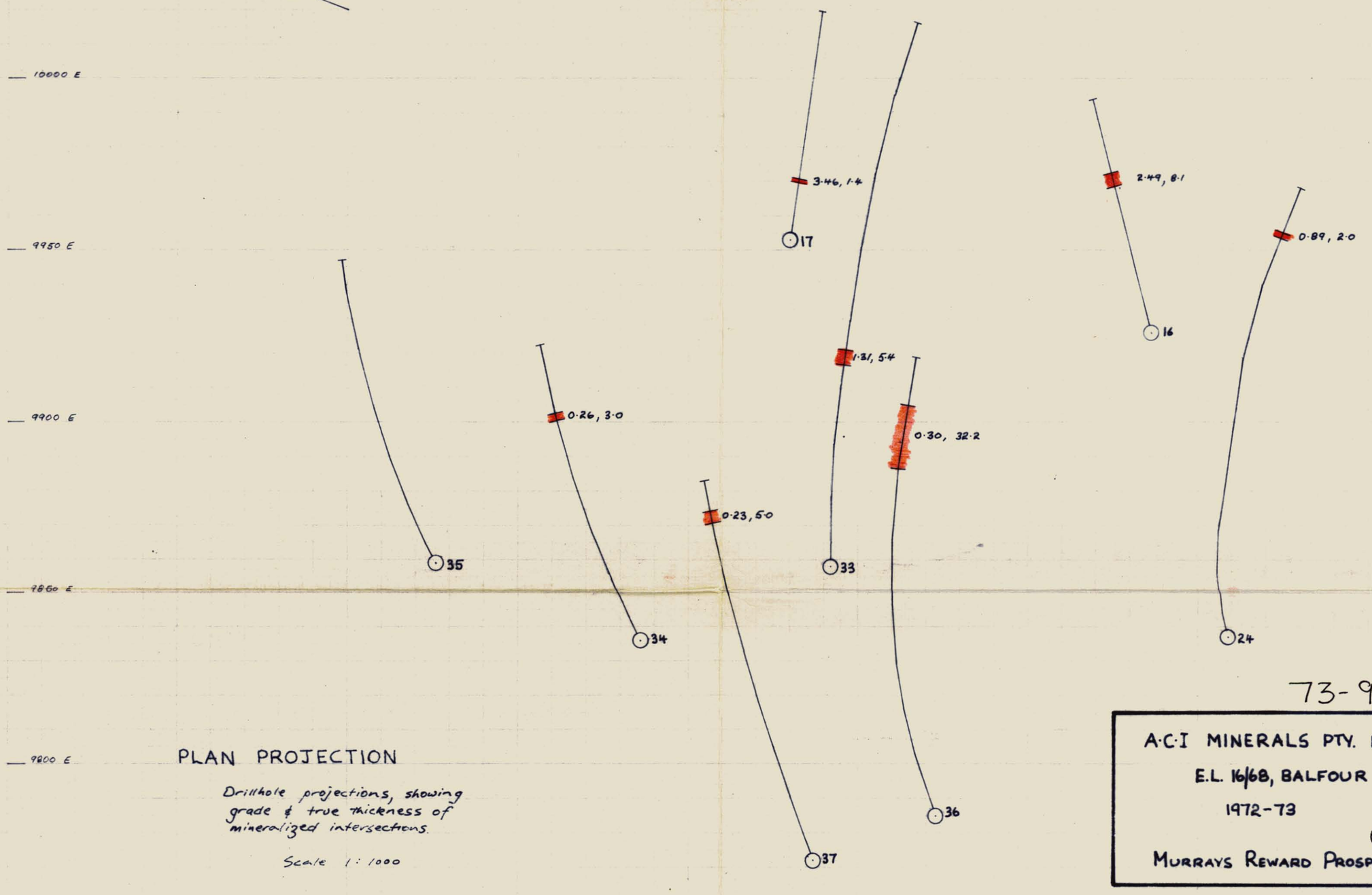
LONGITUDINAL PROJECTION

Projection on plane of mineralized fault strike N 40° W (T)

Scale 1 : 1000

grade (percent Cu) – 0·26 3·0 – true thickness (metres)

PLAN I



PLAN PROJECTION

Drillhole projections, showing grade & true thickness of mineralized intersections.

Scale 1 : 1000

0·26, 3·0 grade (% Cu) & true thickness (metres)

34 drillhole number

73-948

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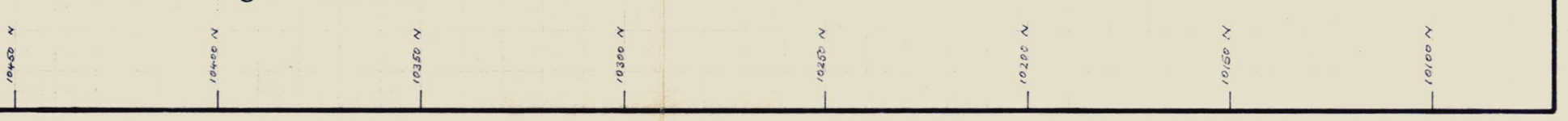
E.L. 16/68, BALFOUR

1972-73

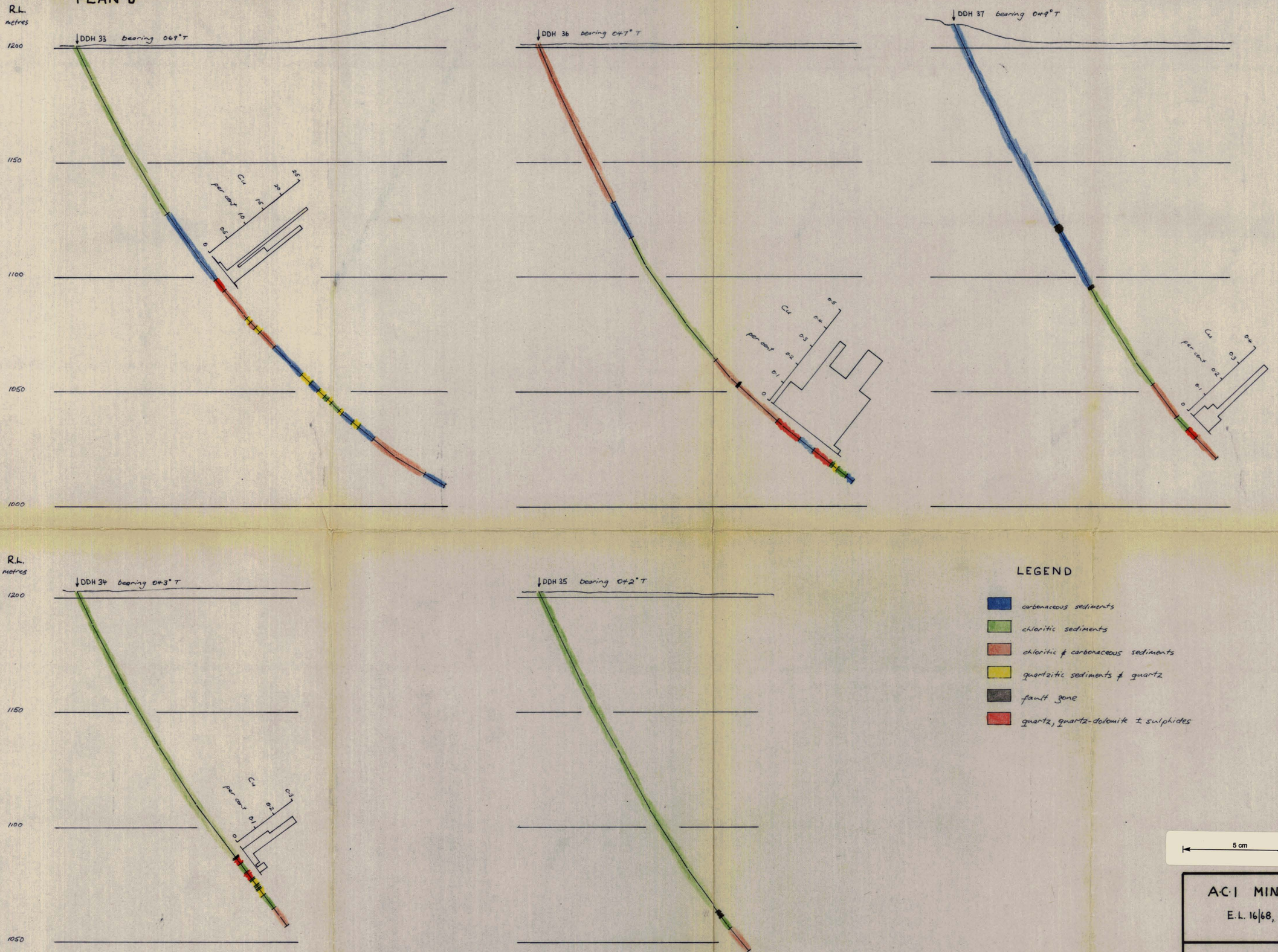
636099

MURRAYS REWARD PROSPECT

5 cm



PLAN J



LEGEND

- carbonaceous sediments
- chloritic sediments
- chloritic & carbonaceous sediments
- quartzitic sediments & quartz
- fault zone
- quartz, quartz-dolomite ± sulphides

636100

5 cm

73-948

A·C·I MINERALS PTY. LTD.

E.L. 16/68, BALFOUR, 1973

MURRAYS REWARD PROSPECT

Geological & assay sections, DDH 33 to DDH 37

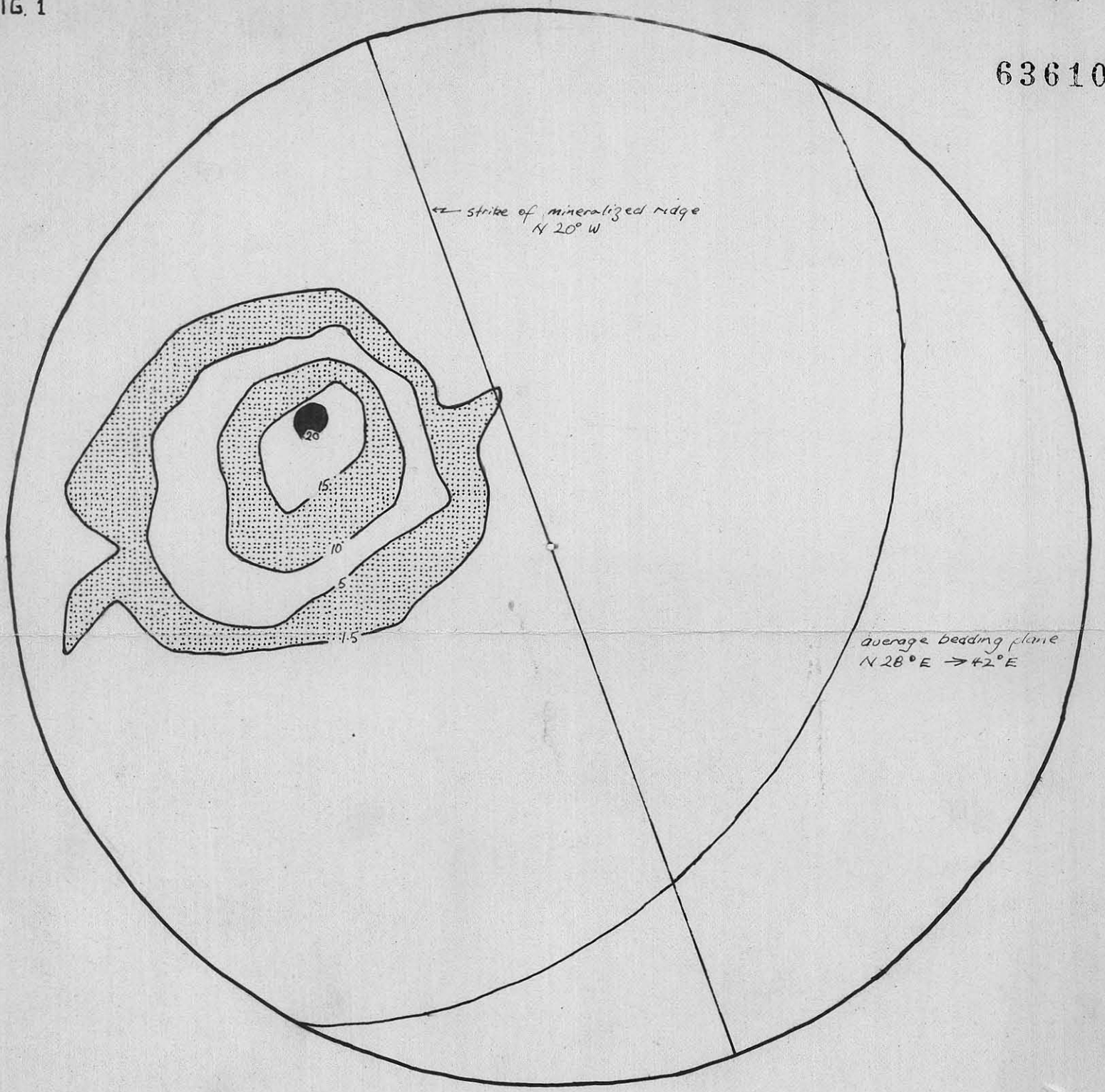
2025

PLAN J. Scale 1:1000 MH·M 5/73

092
FIG. 1

73-948

636101



WARATAH PROSPECT

Poles to S_0, 131 points

5 cm

M.H. M 5/73