916001

000

EXPLORATION LICENCE 8/79

MAYDENA, TASMANIA

PROGRESS REPORT TO 31st OCTOBER, 1981

INCLUDING

REPORT FOR THE SIX MONTHS ENDED 31st OCTOBER, 1981

81 - 1658

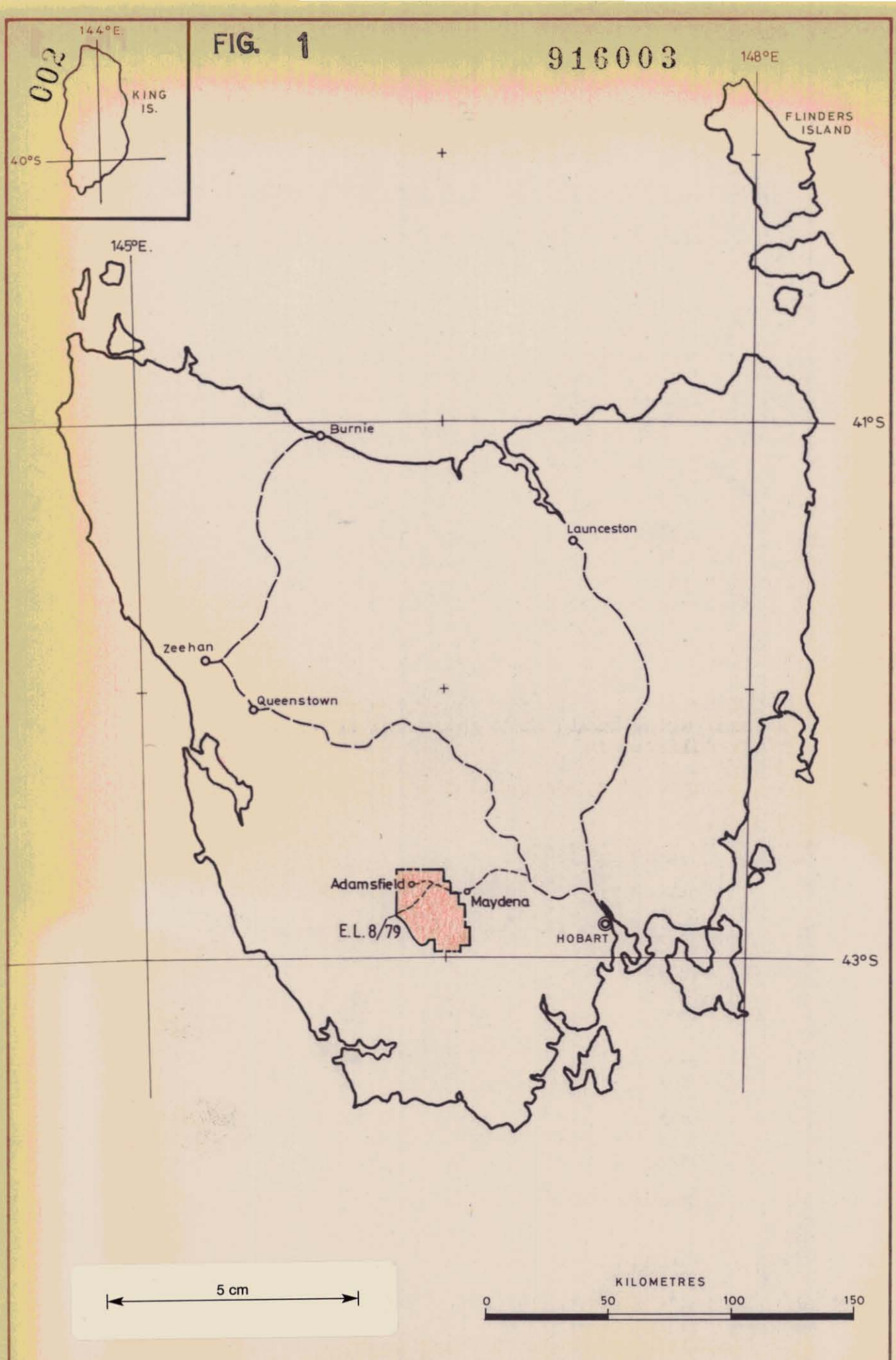
001

916002

CONTENTS

APPENDICES

FIGURES



Centre: Melbourne	THE BROKEN HILL PROPRIETARY CO LTD	Project No
Date: 17-11-80	E.L.8/79 MAYDENA, TASMANIA LOCALITY MAP	Drawing No: A4-2040

003

EXPLORATION LICENCE 8/79

MAYDENA, TASMANIA

PROGRESS REPORT TO 31st OCTOBER, 1981 INCLUDING

REPORT FOR THE SIX MONTHS ENDED 31st OCTOBER, 1981

1. GENERAL

Exploration Licence 8/79 of 176 square kilometres was first granted to The Broken Hill Proprietary Company Limited on 30th April, 1980 (see Figure 1). The current expiry date is 31st October, 1981. An application for renewal has been submitted.

2. EXPLORATION PHILOSOPHY

Our principal target within the licence area is a skarn or massive sulphide hosted tin-tungsten deposit. The area, including that part still under application as licence area EL 12/79, was chosen for exploration on the following basis:

1) the presence of unexplained airborne magnetic and arsenic in stream anomalies in the Mt. Mueller area;

2) the presence of extensive sequences of carbonate rocks which could form potential hosts to mineralisation;

3) the reported presence of tin in the Styx River.

3. SUMMARY OF WORK COMPLETED

1. Literature review and assessment of available data;

2. 1:50,000 scale reconnaissance geological mapping;

3. Stream sampling;

4. Rock chip and soil sampling;

5. Preliminary evaluation of the Humboldt prospect (see Figure 2);

6. An airborne electromagnetic (Dighem II) and magnetics survey over approximately 50 square kilometres in the northern part of the licence area;

7. Preliminary ground follow-up of EM anomalies.

4. SUMMARY OF WORK IN PROGRESS

1. Ground follow-up of Dighem EM anomalies;

2. Detailed mapping north east of Mt. Mueller.

cont./..

5. RESULTS

5.1 Geology

Sedimentary rocks in the licence area range in age from Precambrian to Permian. (see Figure 2) The Precambrian rocks include dolomite, dolomitic shale, black and chocolate shales and ortho-quartzite, which have been tightly folded around WNW to NW trending axes. Brown to red lithicwackes with a tuffaceous component derived from basic volcanism crop out in the Maynes Hill - Fourteen Mile Creek area. These rocks are similar to those making up the Cambrian sequences in the Boyd River area. South of Mt. Mueller, similar Cambrian (?) sediments include dolomite and carbonaceous dolomite units. Ordovician conglomerate, quartzite, shale and limestone crop out in the northern part of the licence area from Maydena to the Florentine valley. The Ordovician rocks are generally folded about open folds with NW to N-S axes. The Permian rocks include a basal tillite or pebbly mudstone with minor varve units overlain in turn by dark grey mudstone and siltstone, limestone and fossiliferous yellow-brown mudstone and shale. The Permian rocks dip gently to the east.

The only intrusive rocks located to date in the area include minor Jurassic dolerite at Wherrett's Lookout and an alkaline dyke rock (porphyritic microsyenite) of presumed Cretaceous age in the Maynes Hill area. The latter is similar to alkaline dyke rocks exposed on the Gordon Road west of Frodsham's Pass.

5.2 Geochemistry

5.2.1 Stream Sampling Results

To date, fifty-eight stream samples have been collected from the licence area at an average density of one per three square kilometres. Samples were sieved to minus 80 mesh and analysed for tin, tungsten, copper, lead, zinc, silver, arsenic, gold, antimony, nickel, cobalt and in some instances chromium.

All tin and tungsten values are less than or equal to 10 ppm respectively. Some samples are weakly anomalous with respect to zinc (to 180 ppm), silver (4 ppm), arsenic (25 ppm), gold (20 ppb) and antimony (7600 ppb). Values are plotted on Figures 4 to 7, and are listed in Appendix 1.

cont./..

5.2.2 Rock and Soil Sampling

Twenty-one soil samples (MA Series) were collected on a traverse along Mayne's Road, east of Fourteen Mile Creek. Samples were sieved to minus 80 mesh and analysed for tin, tungsten, copper, lead, zinc, silver, nickel, cobalt, arsenic, antimony and gold. Six samples are anomalous with respect to copper in the range 120 to 225 ppm against a background of less than 2 to 80 ppm. Relatively high nickel (70-200 ppm) and cobalt (40-105 ppm) were recorded in the same samples. Values are plotted on Figures 4 to 7 and are listed in Appendix 1.

Twenty-two rock chip samples were collected from outcrops, as well as from workings at the old Humboldt mine. Some samples are anomalous with respect to arsenic (viz: Ordovician conglomerate at the Tim Shea road metal quarry - 330-470 ppm; black slates on the Gordon Road 1.5 km west of the landing ground - 16-55 ppm; and transported ironstone at the Humboldt mine - 20-40 ppm). Values are plotted on Figures 4 to 7 and are listed in Appendix 1.

No significant tin or tungsten anomalies in rock were recorded. Minor antimony (to 4900 ppb) and gold (to 30 ppb) were recorded in the Tim Shea samples.

The leached transported ironstone exposed in a shallow trench at the Humboldt mine was not anomalous with respect to base or precious metals.

5.3 Geophysics

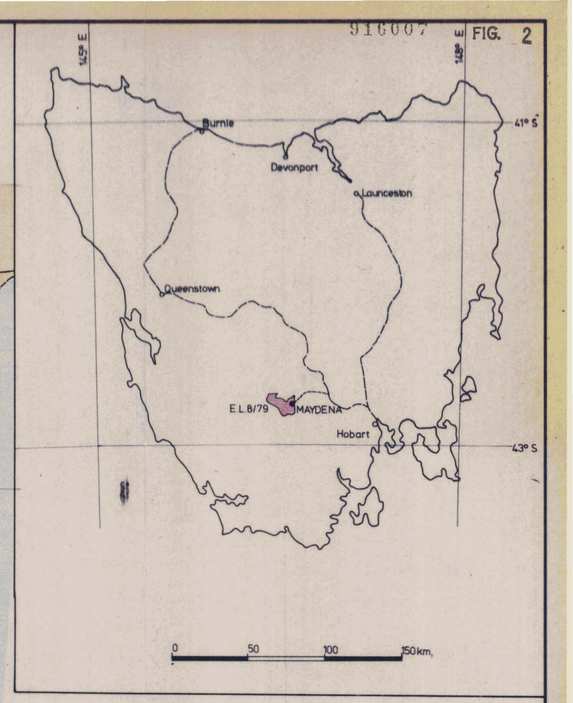
A report on the Dighem II survey of the northern portion of Exploration Licence 8/79 and part of licence area 12/79 (under application) is attached (Appendix 3). This report includes comments by Dighem Limited.

6. WORK PROPOSED

1. Continue evaluation of the Humboldt prospect;
2. Continue evaluation of the Mayne's Hill geochemical/ magnetic anomalies;
3. Continue follow-up of Dighem anomalies;
4. Diamond drill selected targets.

This report is submitted to The Mines Department as required by Schedule A of Exploration Licence 8/79.

916007 FIG. 2



MOUNT FIELD NATIONAL PARK

E.L 7/89

TIM SHEA

HUMBOLDT

MAYDENA

Kallista Creek

Tyenna River

Fourteen Mile Creek

MAYNE'S HILL

Styx River

52,70,000 N

52, 60,000 N

52, 50,000 N

450,000 E

460,000 E

470,000 E

LEGEND

QUATERNARY	Q	Alluvium, scree.
TERTIARY	Fe Tt	Till, ferricrete (Fe), silcrete (Si).
PERMIAN	Ptl	Pebbly mudstone, (tillite)
	Pu	Permian undifferentiated siltstone, sandstone, shale.
	Puu	Upper Permian undifferentiated siltstone, sandstone, shale.
ORDOVICIAN	Ogl	Limestone (Gordon Limestone) calcareous mudstone.
	Oss	Mudstone, siltstone, sandstone, conglomerate.
CAMBRIAN	t	Shale, conglomerate, minor acid volcanics.
		Serpentinite, minor gabbro, pyroxenite (emplacement age).
PRECAMBRIAN	Pf	Quartzite, slates, dolomite, dolomitic shales.
JURASSIC	Jdl	Dolerite

Lineament
Geological Boundary (approx)
Geological Boundary inferred
Unconformity
Outcrops.
Dip and strike.

5 cm

Scale 1:50,000

0 1 2 3 4 5

003

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

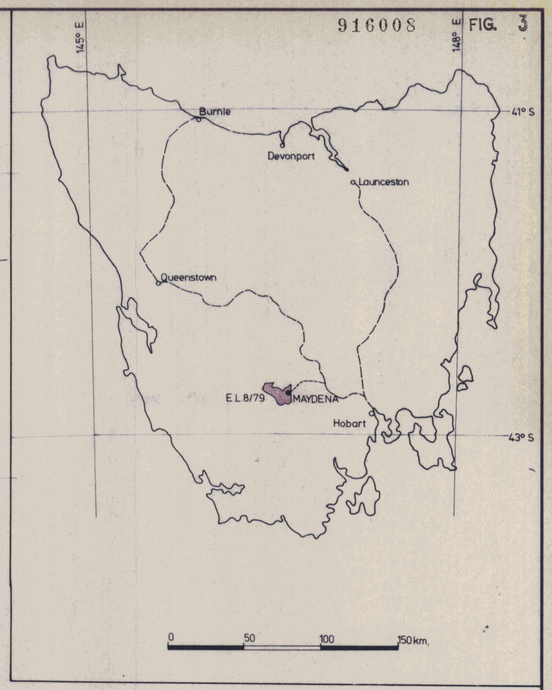
E.L. 8/79, MAYDENA, TAS.

GEOLOGY

Drawn: R.H	Date: 27·10·81	Centre: Hobart
Traced: Hilary	Project No: T 620	Drawing No: A1-
Checked:		

Revisions:

916008 FIG. 3



52,70,000 N

52, 60, 000 N

52, 50, 000 N

450,000 E

460,000 E

470,000 E

MOUNT FIELD NATIONAL PARK

E.L.8/79

TIM SHEA

HUMBOLDT

MAYDENA

MAYNE'S HILL

Tiger Adamsfield

Datum Mayfern

Kallista Creek

Vienna

Fourteen Mile Creek

Adamsfield Bowes

Mayfern Skeleton

Styx River

? MN520

EXPLANATION

- 80 Mesh Soil Sample Locations
- Rock Chip Sample Locations
- 80 Mesh Stream Sample Locations.
- 40 Mesh Stream Sample Locations.

Stream sediments

Sample Nos	Data base nos
MN1-27	21201 - 21227
M1 - 6	21231 - 21236
F1 - F18	21241 - 21258
MKC 1-9	21261 - 21269

NB MKC 7, ~~MN526~~, M2, M3 on ledger but not on map

5 cm

Scale 1: 50,000

0 1 2 3 4 5

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

E.L. 8/79. MAYDENA. TAS.

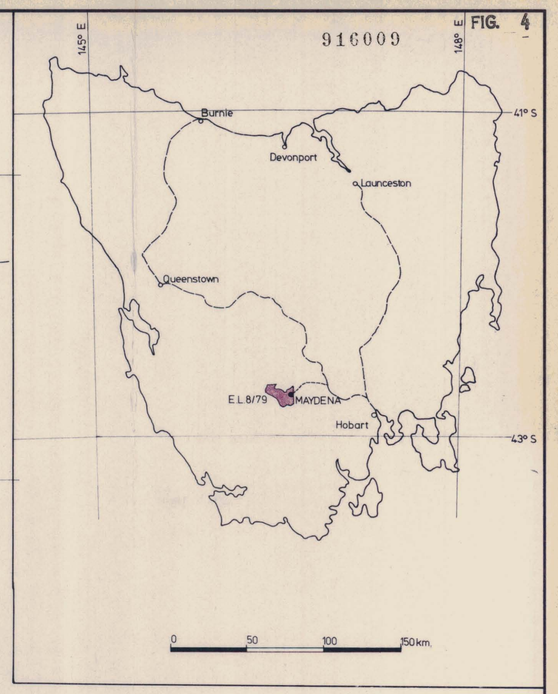
GEOCHEMICAL SAMPLE LOCATIONS

Revisions:			
	Drawn: R.H	Date: 30-10-81	Centre: Hobart.
	Traced: Hilary	Project No: T 620	Drawing No: A1-
	Checked:		

007

916009

FIG. 4



MOUNT FIELD NATIONAL PARK

52,70,000 N

52, 60,000 N

52, 50,000 N

TIM SHEA

HUMBOLDT

Kallista Creek

Tyenna River

MAYDENA

MAYNE'S HILL

Fourteen Mile Creek

Styx River

EXPLANATION

- ○ 80 Mesh Soil Sample results.
- • Rock Chip Sample results.
- ~ 80 Mesh Stream Sample results.

Sn / W results in ppm.

5 cm

Scale 1:50,000

0 1 2 3 4 5

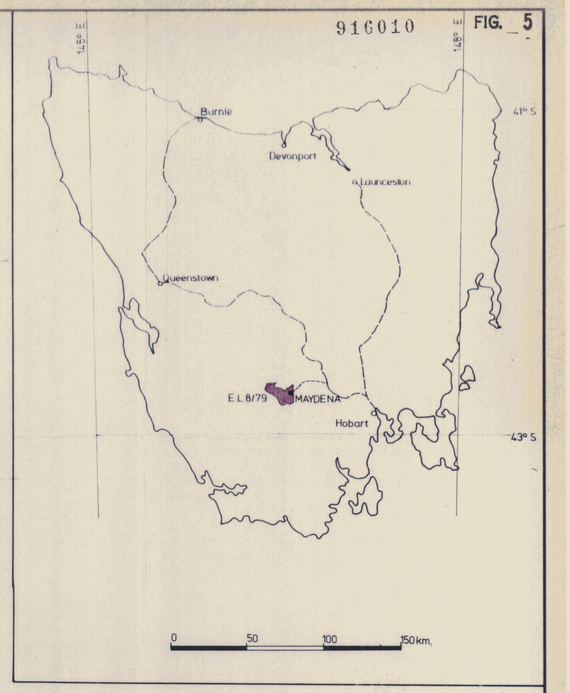
THE BROKEN HILL PROPRIETARY CO LTD
EXPLORATION DEPARTMENT

E.L. 8/79, MAYDENA, TAS.
GEOCHEMICAL SAMPLE RESULTS
Sn / W

Drawn: RH	Date: 30-10-81	Centre: Hobart
Traced: Wong	Project No: T 620	Drawing No: A1
Checked:		

008

916010 FIG. 5



MOUNT FIELD NATIONAL PARK

TIM SHEA

HUMBOLDT

MAYDENA

MAYNE'S HILL

Kallista Creek

Fourteen Mile Creek

Styx River

52, 70,000 N

52, 60,000 N

52, 50,000 N

450,000 E

460,000 E

470,000 E

MA Series Soils

4 - 20/25/60
80/30/195
30/35/80
25/30/120
20/30/130
65/35/65

10 - 145/25/105
120/30/110
160/25/110
220/25/110
220/30/100

13 - 220/30/95
55/30/50
57/12
No Sample

14 - <2/30/10

EXPLANATION

- ∘ 80 Mesh Soil Sample Locations and results.
- • Rock Chip Sample Locations and results.
- 40 Mesh Stream Sediment Locations and results
- 80 Mesh Stream Sediment Locations.

All results for Cu/Pb/Zn in ppm.

5 cm

Scale 1:50,000

0 1 2 3 4 5

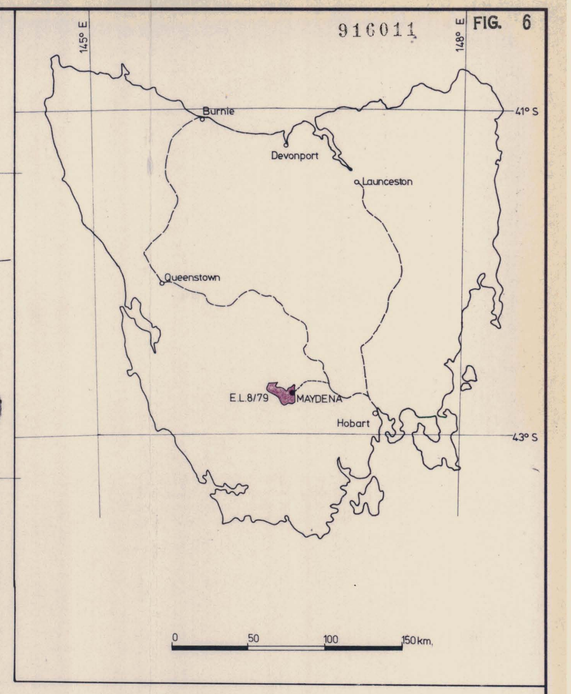
THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

E.L. 8/79, MAYDENA, TAS.
GEOCHEMICAL SAMPLE RESULTS
Cu/Pb/Zn

Drawn: R.H	Date: 3·11·81	Centre: Hobart.
Traced: Hilary	Project No: T 620	Drawing No: A1-003
Checked:		

Revisions:

916011 FIG. 6



MOUNT FIELD NATIONAL PARK

52,70,000 N

52, 60,000 N

52, 50,000 N

TIM SHEA

HUMBOLDT

MAYDENA

MAYNE'S HILL

Kallista Creek

Ivenno Creek

Three Mile Creek

Styx River

EXPLANATION

- ○ 80 Mesh Soil Sample Locations and results.
- ● Rock Chip Sample Locations and results
- 40 Mesh Stream Sediment Locations and results.
- 80 Mesh Stream Sediment Locations and results.

As results in ppm
Au and Sb results in ppb.

5 cm

Scale 1:50,000

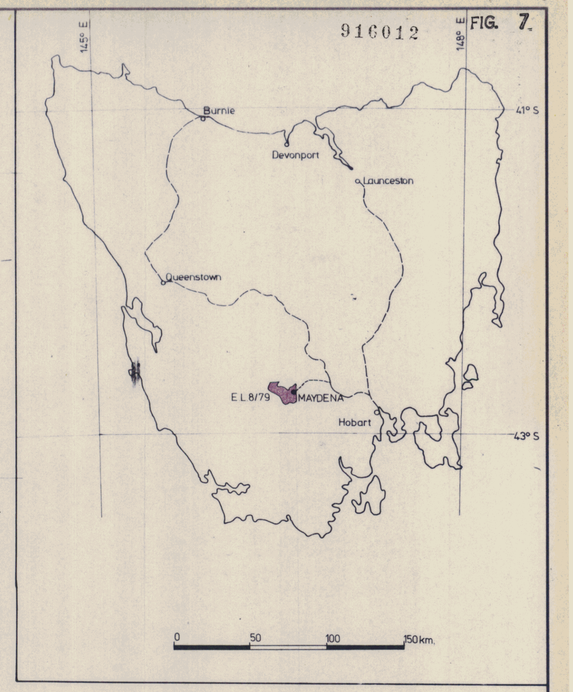
0 1 2 3 4 5

THE BROKEN HILL PROPRIETARY CO. LTD. EXPLORATION DEPARTMENT		
E.L. 8/79 MAYDENA, TAS. GEOCHEMICAL SAMPLE RESULTS Au/As/Sb		
Drawn RH	Date 30-10-81	Centre Hobart
Traced Riley	Project No.	Drawing No.
Checked	T 620	A1

Revisions

010

916012 FIG. 7.



52,70,000 N

52, 60, 000 N

52, 50, 000 N

4,50,000 E

4,60,000 E

4,70,000 E

MOUNT FIELD NATIONAL PARK

TIM SHEA

HUMBOLDT

MAYDENA

MAYNE'S HILL

Kallista Creek

Tyenna River

Styx River

Mc Evoy Creek

EXPLANATION

- 80 Mesh Soil Sample Locations and results.
- Rock Chip Sample Locations and results.
- 40 Mesh Stream Sample Locations and results.
- 80 Mesh Stream Sample Locations and results

5 cm

Scale 1:50,000

0 1 2 3 4 5

THE BROKEN HILL PROPRIETARY CO. LTD.
EXPLORATION DEPARTMENT

E.L. 8/79, MAYDENA, TAS.
GEOCHEMICAL SAMPLE RESULTS.
Ni / Co / Cr

Revisions:			
	Drawn: R.H	Date: 3·11·81	Centre: Hobart.
	Traced: Hilary	Project No: T 620	Drawing No: A1-
	Checked:		

011

012

APPENDIX 1

GEOCHEMICAL RESULTS

013

916014

Rock Chip Sample Results

	Sn	W	As	Cu	Pb	Zn	Ag	Ni	Co	Sb*	Au*	Cr
SWT B1	<5	<10	4	20	15	10	1	15	10	<50	30	30
2	"	"	4	10	20	5	1	15	10	250	30	35
3	"	"	2	30	20	5	1	10	10	200	10	25
4	"	"	3	10	15	5	1	10	10	250	15	10
8	"	"	16	160	30	10	<1	50	20	600	10	125
9	"	"	8	50	20	15	<1	50	20	400	3	45
10	"	"	470	560	30	20	<1	480	155	4400	30	1100
11	"	"	330	340	20	60	1	140	50	4900	25	3600
SWT 14A	<5	<10	30	15	60	25	3	NR	NR	<50	3	
15A	"	"	16	55	65	15	3	NR	NR	50	10	
16	"	"	2	25	40	10	2	NR	NR	100	5	
17	"	"	55	10	105	5	4	NR	NR	500	10	
18	"	"	25	20	60	5	2	NR	NR	150	5	
19	"	"	40	30	45	300	2	NR	NR	250	5	
20	"	"	20	50	45	210	1	NR	NR	300	5	
23	"	"	NR	35	45	20	1	25	20	NR	NR	300
MAR 1	<5	<10	12	25	25	115	2	100	55	50	<3	
2	"	"	8	20	30	80	3	55	95	50	<3	
3	"	"	6	165	20	105	3	115	330	<50	3	
4	5	"	8	20	15	65	1	40	20	100	<3	
5	<5	"	8	20	10	20	1	15	20	100	<3	
6	<5	"	8	200	15	170	2	45	45	100	3	

* ppb

Analyst: Aust. Lab. Services - Sn, W method XRFIA
Cu, Pb, Zn, Ag, Ni, Co method 1
Au method 120A
Sb method 8A
As method 5B

Rock Chip Sample Log

SWT B1	Black slate with minor pyrite and quartz veinlets
SWT B2	Black slate
SWT B3	Black slate
SWT B4	Black slate
SWT B8	Light grey fractured quartzite with minor dissem pyrite
SWT B9	As above (Kallista Creek bridge)
SWT B10	Siliceous conglomerate with light green chromium stain
SWT B11	As above with minor pyrite. (Tim Shea quarry)
SWT 14A	Black shale, no pyrite visible but sulphur present, minor goethite
SWT 15A	As above
SWT 16	Grey-brown dolomite, massive, thin stringers calcite/siderite?
SWT 17	Black shale as for SWT 14A, minor limonite.
SWT 18	Black slate as above - hard
SWT 19	Porous orange-red ironstone, no boxworks, massive limonite
SWT 20	As above with quartz, siliceous matrix (19, 20 from Humboldt Mine)
SWT 23	Grey to black chert breccia with minor pyrite, locally leached
MAR 1	Yellow-brown slate (?), sheared siliceous, clay, geothite on joints
MAR 2	Weathered intrusive (?) minor geothite on frac's
MAR 3	Brown slate?, highly weathered (may be igneous), no bedding recognised.
MAR 4	Hornblende porphyry, trace dissem pyrite, fine light grey siliceous matrix
MAR 5	Siliceous rock with limonite, leached, porous, Tertiary?
MAR 6	Green, fine grained weathered sediment or volcanic? (MA 7 site)

005 011

916016

OFFICE & LABORATORY
44 BALACLAVA ST., WOOLLOONGABBA 4102
Phone (07) 391 6986 A/H 355 0776
TELEX ALSEV 42344

LABORATORY REPORT

R. W. YERBURY
DIRECTOR

BATCH No.: M039 CLIENT BHP CO LTD- EXPLORATION DEPT

ORDER No.: T620/500 AREA: TASMANIA DATE RECEIVED: 5.12.79

SAMPLE TYPE: ~~ROCK STM SED, SOIL~~ No.: 52 DATE COMPLETED: 23.1.80

ATTENTION: DR R HINE

DATA BASE NOS

SAMPLE No.	Cu ppm	Pb ppm	Zn ppm	Ag ppm	As ppm	Au ppb	Sn ppm	W ppm		
21261 MKC 1	15	30	105	2	6	10	<5	<10		
2 2	10	20	20	1	2	10	<5	<10		
3 3	20	40	105	3	8	15	<5	<10		
4 4	50	40	145	3	10	10	<5	<10		
5 5	10	25	55	4	9	10	<5	<10		
21266 6	20	35	60	3	8	10	<5	<10		
NOT ON MAP 7	10	25	60	1	4	20	<5	<10		
21268 8	10	20	45	2	3	15	<5	<10		
21269 MKC 9	15	25	40	1	3	10	<5	<10		
21201 MNS 1	15	35	45	2	3	10	<5	<10		
21202 2	10	20	40	1	2	10	<5	<10		
21203 3	10	20	10	<1	2	<3	Insufficient Sample			
21204 MNS 4	10	10	15	<1	2	15	< 5	<10		

METHODS: Cu Pb Zn Ag METHOD 1 As METHOD 5-B
Au METHOD 120A Sn W METHOD 9A XRF

Signatory

016

916017

ALS

OFFICE & LABORATORY
44 BALACLAVA ST., WOOLLOONGABBA 4102
Phone (07) 391 6986 A/H 355 0776
TELEX ALSEV 42344

LABORATORY REPORT

R. W. YERBURY
DIRECTOR

BATCH No.: M039 CLIENT BHP CO LTD

ORDER No.: AREA: DATE RECEIVED:

SAMPLE TYPE: No.: DATE COMPLETED:

ATTENTION:

SAMPLE No. (DATA FILE NO)		Cu ppm	Pb ppm	Zn ppm	Ag ppm	As ppm	Au ppb	Sn ppm	W ppm	
MNS 5	21205	10	5	<2	2	<1	<3	<5	<10	
6	06	30	40	50	1	6	<3	<5	<10	
7	07	35	25	35	1	5	3	<5	<10	
8	08	10	5	5	1	<1	5	<5	<10	
9	09	10	20	15	1	3	<3	<5	<10	
10	21210	10	15	10	<1	6	<3	<5	<10	
11	11	10	15	15	<1	16	5	<5	<10	
12	12	10	25	180	1	25	<3	<5	<10	
13	13	10	30	125	1	25	<3	<5	<10	
14	14	10	15	25	2	2	5	<5	<10	
15	15	10	15	25	1	2	15	<5	<10	
16	16	10	15	15	1	2	5	<5	<10	
17	17	10	15	20	2	1	3	<5	<10	
18	18	10	15	10	1	<1	3	<5	<10	
19	19	20	25	30	3	2	3	<5	<10	
20	21220	10	15	10	<1	2	5	<5	<10	
21	21	10	15	35	<1	3	5	<5	<10	
22	22	10	20	45	1	1	5	<5	<10	
MNS 23	21223	10	20	30	<1	2	3	<5	<10	
MA 1		210	40	65	3	<1	3	Insufficient	Sample	
2		220	35	75	3	<1	3	<5	<10	
3		210	40	75	4	<1	3	<5	<10	

NATA

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METHODS:

Signatory

017

916018

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OFFICE & LABORATORY
44 BALACLAVA ST., WOOLLOONGABBA 4102
Phone (07) 391 6986 A/H 355 0776
TELEX ALSEV 42344

LABORATORY REPORT

R. W. YERBURY
DIRECTOR

BATCH No.: B 194 CLIENT: B.H.P. COMPANY LIMITED
ORDER No.: TELEX AREA: HOBART DATE RECEIVED: 29.2.80
SAMPLE TYPE: X MC39,H159,K069 No.: 72 DATE COMPLETED: 16.4.80
ATTENTION: DR. R. HINE

SAMPLE No.	Sb ppb
SWT 13	950
14	-50
15	50
16	100
17	500
18	150
19	250
SWT 20	300
MKC 1 21261	50
2 62	150
3 63	-50
4 64	-50
5 65	-50
6 66	150
7 67	-50 ? NOT ON MAP
8 68	4250
9 21269	1000
MNS 1 21201	-50
2 02	-50
3 03	-50
4 04	-50
5 05	-50
6 06	-50
7 07	-50
8 08	-50
9 09	-50
MNS 10 21210	50
11 11	300
12 12	-50
MNS 13 21213	-50

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METHODS: Sb BY METHOD 8-A

Signatory

018

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916019

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Phone (07) 391 6986 A/H 355 0776
TELEX ALSEV 42344

LABORATORY REPORT

R. W. YERBURY
DIRECTOR

BATCH No.: B 194 CLIENT B.H.P. COMPANY LIMITED

ORDER No.: AREA: DATE RECEIVED:

SAMPLE TYPE: No.: DATE COMPLETED:

ATTENTION:

SAMPLE No.	Sb ppb
BATCH M 039	
MNS 14 21214	250
15 15	-50
16 16	-50
17 17	-50
18 18	-50
19 19	50
MNS 20 21220	-50
21 21	50
22 22	50
23 21223	-50
MA 1	-50
2	-50
3	-50

019

ALS

LABORATORY REPORT

916020

OFFICE & LABORATORY
44 BALACLAVA ST., WOOLLOONGABBA 4102
Phone (07) 391 6986 A/H 355 0776
TELEX ALSEV 42344

R. W. YERBURY
DIRECTOR

BATCH No.: B 157 CLIENT B.H.P. COMPANY LIMITED
ORDER No.: T620/500 AREA: HOBART DATE RECEIVED 26.2.80
SAMPLE TYPE: S/S, SOIL, ROCK, CONC. No.: 65 DATE COMPLETED 10.4.80
ATTENTION: DR. R. HINE

SAMPLE No.	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Sn ppm	W ppm	As ppm	Sb ppb
F/1 21241	5	15	60	2	45	15	<5	<10	4	50
2 2	5	20	65	2	70	20	<5	<10	2	<50
3 3	15	25	80	2	64	25	5	<10	2	7.6ppm
4 4	10	25	80	2	75	30	<5	<10	8	600
5 5	10	20	70	1	60	20	<5	<10	6	150
6 6	5	15	40	1	30	15	10	<10	<2	50
7 7	10	15	50	1	40	15	<5	<10	6	50
8 8	10	15	40	1	40	10	<5	<10	<2	<50
9 9	5	15	70	1	45	20	<5	<10	6	150
F/10 21250 C	2	15	70	1	65	15	<5	<10	2	250
11 1	5	15	70	1	50	20	<5	<10	2	100
12 2	5	15	55	1	45	15	<5	<10	4	<50
13 3	2	15	75	1	45	20	<5	<10	2	50
14 4	2	10	25	1	25	10	<5	<10	2	<50
15 5	10	15	100	1	35	20	5	<10	6	<50
F/16 21256	10	20	100	1	85	25	<5	<10	6	<50

NATA

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METHODS: Cu, Pb, Zn, Ag, Ni, Co BY METHOD 1
Sn, W BY METHOD XRF 1-A
As BY METHOD XRF 1-C Sb BY METHOD 8-A

Signatory G. Lawrence

020

ALS

916021

OFFICE & LABORATORY
44 BALACLAVA ST., WOOLLOONGABBA 4102
Phone (07) 391 6986 A/H 355 0776
TELEX ALSEV 42344

LABORATORY REPORT

- 1.A -

R. W. YERBURY
DIRECTOR

BATCH No.: B 157-1 CLIENT B.H.P. COMPANY LIMITED

ORDER No.: _____ AREA: _____ DATE RECEIVED: _____

SAMPLE TYPE: _____ No.: _____ DATE COMPLETED: _____

ATTENTION: _____

SAMPLE No.	Au ppb
F/1 21241	3
2 2	3
3 3	3
4 4	10
5 5	10
6 6	10
7 7	15
8 8	10
9 9	30
F/10 21250	10
11 1	25
12 2	10
13 3	10
14 4	10
15 5	10
F/16 21256	10

NATA

METHODS: Au BY METHOD 120-A

Signatory G. Lamm

021

916022

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TELEX ALSEV 42344

LABORATORY REPORT

R. W. YERBURY
DIRECTOR

BATCH No.: B 157 CLIENT B.H.P. COMPANY LIMITED

ORDER No.: AREA: DATE RECEIVED:

SAMPLE TYPE: No.: DATE COMPLETED:

ATTENTION:

SAMPLE No.	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Sn ppm	W ppm	As ppm	Sb ppb
F/17 21257	10	15	70	<1	30	15	<5	<10	4	<50
18 21258	5	10	15	<1	15	10	<5	<10	4	<50
S/1	10	10	55	1	35	15	<5	<10	6	<50
2	10	20	60	1	30	20	<5	<10	8	250
MNS/24 21224	20	20	10	1	25	20	<5	<10	6	50
25 25	5	5	5	<1	10	5	<5	<10	4	<50
26 26	2	10	5	<1	10	15	5	<10	6	100
27 21227	2	10	10	<1	10	10	<5	<10	6	<50
MA/4	20	25	60	2	35	50	<5	<10	2	<50
5	80	30	155	4	125	60	5	<10	8	50
6	30	35	80	4	90	30	<5	<10	8	50
7	25	30	120	4	70	105	<5	<10	6	<50
8	25	30	130	4	75	75	<5	<10	6	600
9	65	35	65	3	100	20	<5	<10	6	100
MA/10	145	25	105	3	175	50	<5	<10	6	50
11	120	30	110	3	180	40	<5	<10	6	<50
12A	140	25	80	3	145	55	<5	<10	6	<50
12B	180	30	110	4	190	70	<5	<10	6	50
12C	160	25	110	3	200	70	<5	<10	2	50
13	220	25	110	3	155	80	<5	<10	6	200
14	220	30	100	3	160	55	<5	<10	6	100
15	225	30	95	3	145	80	<5	<10	6	150
16	55	35	50	2	60	20	10	<10	10	50
17	5	5	2	<1	10	5	<5	<10	6	50
18	----------SAMPLE NOT RECEIVED----------									
19	<2	30	10	1	15	10	<5	<10	6	50
MAR/1	25	25	115	2	100	55	<5	<10	12	50
2	20	30	80	3	55	95	<5	<10	8	50
3	165	25	105	3	115	330	<5	<10	6	<50
4	20	15	65	1	40	20	5	<10	8	100
MAR/5	20	10	20	1	15	20	<5	<10	8	100

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METHODS:

Signatory

022

916023

ALS
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Phone (07) 391 6986 A/H 355 0776
TELEX ALSEV 42344

LABORATORY REPORT

- 2 A -

R. W. YERBURY
DIRECTOR

BATCH No.: B 157-1 CLIENT B.H.P. COMPANY LIMITED

ORDER No.: AREA: DATE RECEIVED:

SAMPLE TYPE: No.: DATE COMPLETED:

ATTENTION:

SAMPLE No.	Au ppb
F/17 21257	15
18 21258	10
S/1	10
2	15
MNS/24 21224	10
25 5	10
26 6	10
27 21227	10
MA/4	10
5	5
6	35
7	5
8	3
9	3
MA/10	10
11	<3
12A	10
12B	<3
12C	<3
13	5
14	3
15	10
16	<3
17	3
18	SAMPLE NOT RECEIVED
19	<3
MAR/1	<3
2	<3
3	3
4	<3
MAR/5	<3

NATA

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METHODS:

Signatory

LABORATORY REPORT

Ph 07 3916799
TELEX ALSEV 42344

Batch No.: D128 | Client: BHP COMPANY LIMITED, | Area Contact: DR. R. HINE
Address: P.O. BOX 559 | Address: G.P.O. BOX 1140 L,
Date Received 21/04/81 | CAMBERWELL | HOBART TAS.
Date Completed 08/05/81 | VIC

Order No.: T670 - 000645 | Sample Type: S/SED,SOIL,ROCK | No. of Samples: 6

SAMPLE NO.	Cu	Pb	Zn	Ag	Ni	Co	Cr	As	Sb	Au	ELEM
	m	m	m	m	m	m	m	m	m	m	UNIT
	1	1	1	1	1	1	1	5-B	8	120	METH
M 1 21231	10	20	95	2	20	20	200	4	30	<0.1	
M 2 MT DARWAN	10	30	50	2	20	15	280	3	30	<0.1	
M 3	15	30	60	1	20	20	170	2	20	<0.1	
M 4 21234	10	20	50	1	20	20	390	2	30	<0.1	
M 5 21235	10	20	35	1	35	15	150	2	20	<0.1	
M 6 21236	10	20	35	1	20	10	280	2	20	<0.1	

UNITS LEGEND ----- m - Parts per million b - Parts per billion % - percent
a - Absorbance

[redacted] TELEX [redacted] 12345 [redacted]

02 of 7

Batch No.: D128-1 Client: BHP COMPANY LIMITED, Area Contact: DR. R. HINE
Address: P.O. BOX 559 Address: G.P.O. BOX 1140 L,
Date Received 21/04/81 CAMBERWELL HOBART TAS.
Date Completed 08/05/81 VIC

Order No.: T670 - 000645 Sample Type: S/SED,SOIL,ROCK No. of Samples: 6

SAMPLE NO.	Sn	W	ELEMENTS
	m	m	UNITS
	XRF 1A	XRF 1A	METHODS
1 21233	<5	<10	
2	<5	<10	
3	5	<10	
4 21234	<5	<10	
5 21235	<5	<10	
6 21236	<5	<10	

UNITS LEGEND ----- m - Parts per million b - Parts per billion % - percent
g - Grams a - Absorbance

Signature: A.J. Finlayson

9160125

APPENDIX 2

PETROLOGICAL REPORTS

MST 20-4 : pyroxene basalt;
MRL 12,660 minor chlorite/uralite alteration interstitially, and in fissures with deuteric silica.

This is a massive, fairly homogeneous, fine crystalline rock (about 0.25 mm) composed essentially of a groundmass of randomly interlocking plagioclase laths (40-50%), crowded with squat, euhedral crystals of clino-pyroxene (40-50%).

Ill-defined, fine chlorite and uralitic alteration materials are ubiquitous (10%), interstitial and apparently replacing primary glass, also locally invading the plagioclase.

Patches of uralite, also of deuteric cherty quartz fill several irregular fissures.

(Cambrian sequence 125m west of Tower 114 on Sth Mueller Rd).

MST 20-5 : fine to coarse, rather unsorted, low-grade metamorphosed
MRL 12,661 (arkosic) lithic quartz sandstone;
minor matrix of quartz/biotite/muscovite.

This sample consists of a fairly homogeneous bedded aggregate of generally angular, but some subangular grains and lithic fragments ranging in size from 0.1 to 0.5 mm in maximum dimension.

A weakly limonitised, clay-sericite matrix forms about 15% of the rock.

The detrital components are:

. single crystal quartz grains	25-30%
. single crystal plagioclase grains (partly argillised)	10-15%
. lithic fragments composed of variable amounts of clay/sericite/ultrafine quartz	30-35%
. grains of chert	5%
. detrital muscovite	2-3%
. ? detrital biotite	5%
. weathered opaque oxides	2-3%

The siliceous/clay/sericite lithic detritus may be derived from a meta pelitic terrain, or possibly represent altered volcanic groundmass material. (There is no evidence of volcanic derivation of the coarser quartz grains).

The matrix to these grains (20%) is a low-grade metamorphic, assemblage, slightly schistose, muscovite, biotite and very fine quartz, with scattered Fe and Ti granules.

(Cambrian sequence 25m west of MST 20-4)

MST 20-10 : fine basic (basaltic) sediment, probably a tuff;
MRL 12,662 extensively pervasively silicified + minor albite and chlorite.

This rock consists largely of a fairly homogeneous, compact, bedded aggregate of uniformly very fine (0.15 mm) fragments of altered/turbid ? uralitised volcanic glass (35%), clino-pyroxene crystals (10-15%), and accessory plagioclase laths. These are all aggregated with, and/or contained within a matrix of cryptocrystalline quartz mixed with extremely fine chlorite and albite.

The rock is identified as a basic tuff (conceivably derived from the basalt MST 20-4), which has been pervasively silicified, + associated albite and chlorite.

(120m west of creek between Tower 114 & 113)

MST 30 : micro-dolerite (in which primary ? pyroxene is
MRL 12,663 completely chloritised);
minor titaniferous magnetite scattered.

This rock has a fine crystalline ophitic texture. Small laths (0.5 mm) of calcic-plagioclase are randomly interlocking to form about 50% of the rock.

Fine chlorite (40%) which completely replaces a former primary mafic-silicate phase fills between and thus moulds around single plagioclase laths, and groups of these.

Crystals of titaniferous magnetite (5-7%) are partly replaced by 'leucoxene', and trace laths of probable ilmenite are scattered.

Minor quartz grains cut the rock.

030

916031

MST 2 : coarse leuco granite, extensively stressed,
MRL 12,664 incipiently recrystallised with associated
fairly widespread sericitic alteration.

This rock has an inequigranular, but generally coarse to very coarse allotriomorphic granular texture, which has been modified by extensive stress resulting in partial granulation of major grain boundaries, also incipient recrystallisation and microfissuring inside the components minerals.

These minerals are mainly quartz and orthoclase (incipiently perthitic), and somewhat subordinate plagioclase which is extensively sericitised. Minor muscovite, also biotite altered to chlorite (+ Fe and Ti granules).

Extremely fine sericite and lesser microcrystalline quartz, probably generated essentially in-situ, occur at randomly in microfissures and stringers within some coarser crystals.

(Pebble in tillite Sth. Mt Mueller Rd)

MST 29 : completely serpentinised generally fine granular
MRL 12,665 pyroxenite (cumulate rock);
network of fine secondary magnetite;
accessory coarse chromite.

This rock consists essentially of a compact mass of extremely fine mesh-serpentine (antigorite).

A network of extremely fine secondary magnetite, defines a relict fine granular texture which indicates an original granular aggregate of mainly olivine, possibly a cumulate rock (in a differentiated sill); but several relicts of prismatic pyroxene are indicated by several coarse patches of serpentine with common orientation (possibly a post cumulate phase).

Stringers of secondary magnetite cut the rock.

Accessory coarse (1mm) subhedral, primary spinel crystals are scattered, identified in polished section as chromite. ?

Comments on possible comparisons between this MST Series and the HP Series are given together with descriptions of the HP rocks.

(Serpentinite road metal quarry 5th Mt. Muella)

Central Mineralogical Services

Sample No.	Classification - Composition	Fabric	Accessories	Comments
MAR 4 (MRL 11777) Dyke Maynes Rd	Porphyritic Microsyenite. Albite and albite-stilbite-pseudomorphed ?sanidine phenocrysts, chloritised ferromag. microphenocrysts in felsitic K-feldspar with albite microlites.	Phenocrysts to 2.5 mm (albite), ferromags (?amphibole) mean 300µ, evenly disseminated.	Leucoxenised opaques. Traces pyrite associated with chloritised ferromags, rare amygdales.	Distinctly alkaline (sodi-potassic), but possibly a minor differentiate of the basics. Typical minor intrusive fabric.
GOR 1 (MRL 11781) Dyke ... Gordon Rd	Biotite Trachyte. Random albite laths with interstitial K-feldspar. Disseminated Ti-phlogopitic biotite phenocrysts, fine accessory magnetite, semi-pervasive chlorite mesostasis.	Weak flow-fabric/banding. Laths mean 20 µ. Phenocrysts mean 100µ.	Rare pyroxene phenocrysts (altered, leached), traces apatite.	Fine-grained, but lacks definite extrusive features. Possibly core of flow or minor intrusive. Deuteric style of alteration.
GOR ... (MRL 11782) Pebble in tillite Styx Rd	Pyritic Biotite Adamellite. Sub- to prismatic zoned oligoclase, slightly subordinate orthoclase, microperthite, quartz, disseminated biotite flakes, semi-pervasive microscopic	Granitic with sparse oligoclase and orthoclase phenocrysts (to 7.5 mm) in mean 1 mm	Minor chlorite (after biotite), sericite (after oligoclase), traces apatite.	Pyrite in films, fine-grained disseminations penetrating cleavages, microfractures in oligoclase, to a lesser extent biotite and orthoclase.
MA 7B (MRL 11771) Maynes Hillock	Altered Basalt. Saussuritised/albitised plagioclase and subordinate, variably serpentinised clinopyroxene laths. Semi-pervasive chloritic mesostasis with leucoxenised opaques.	Laths mean 50 µ. Pyroxene partly enclosed feldspar (subophitic) and is partly skeletal.	Minor traces magnetite. Rare interstitial quartz. Traces uralitic tremolite-actinolite.	Deuterically altered core zone of flow or, conceivably, minor intrusive. Some chilled (slaggy) features. Incipiently sheared.
MKC 9 (MRL 11778) Upper Styx River	Carbonaceous Dolomite. Microcrystalline dolomite with bedded ultrafine carbonaceous matter. Frequent veins, aggregates of clear dolomite. Minor authigenic quartz, fine magnesite.	Contorted to brecciated, dolomite-healed, sub-millimetric-scale bedding laminations.	Thinly disseminated fine silt-sized clastic quartz.	Texturally similar to WR 4, but distinctly carbonaceous, magnesitic in part. Authigenic quartz crystals with zoned carbonate inclusions. No metasomat
WR 4 (MRL 11768)	Dolomite Breccia. Irregular clasts, lenses, relict laminated beds of microcrystalline dolomite; veined marginally, corroded, by coarser sparry carbonate.	Relict submillimetric bedding laminations in microcrystalline (mean 10µ) dolomite. "Cement"	Minor traces carbonaceous matter.	A virtually pure sedimentary dolomite with pervasive diagenetic carbonate (dolomite) veining. Incipiently recrystallized; devoid of metasomatic effects.
WR 4A (MRL 11769)	"Laterite". Largely structureless limonite. Disseminated ovoid to spherical aggregates of granular to radiating quartz. Rare silicified feldspar microlaths, ferruginised rock fragments.	Essentially random, quartz aggregates, ferruginised clasts 100 µ to 4 mm.	Rare angular to subround quartz grains and heavily degraded leucoxenic semi-opaques.	Quartz ovoids are amygdale-like in part. Probably a ferruginised residual breccia over basic (basalt) facies. No gossanous features.
MA 7A (MRL 11770)	Dolomitic Chert. Microcrystalline quartz with disseminated to frequent limonitic quartz pseudomorphs of carbonate rhombs; patchy degraded/ferruginised ?sericite. Late cavity-	Variably fractured, locally brecciated/ quartz-healed.	Minor ultrafine carbonate (inclusions in quartz).	Impure chert with crudely banded diagenetic carbonate rhombs (mean 50µ) and fractured zones replaced by secondary quartz.
MST42/MRL12876 Anomaly Ck E 114 anomaly	Reworked Tuff. Framework of angular to sub-angular sericite-chlorite-stained alkali feldspar, similarly altered microcrystalline lava clasts, shard fragments. Sericitic chlorite	Weakly bedded, poorly to moderately sorted, silty fine sand/sandy silt. Incipiently sheared.	Clastic quartz, conspicuous leucoxenised clastic opaques. Carbonaceous matter, traces pyrrhotite.	Distinct, mildly reworked, felsic intermediate-acid, tuffaceous characteristics. ?Syngenetic Fe-sulphide. Sparse quartz veinlets.

Central Mineralogical Services

Sample No.	Classification - Composition	Fabric	Accessories	Comments
MAR 4 (MRL 11777) Dyke Maynes Rd	Porphyritic Microsyenite. Albite and albite-stilbite-pseudomorphed ?sanidine phenocrysts, chloritised ferromag. microphenocrysts in felsitic K-feldspar with albite microlites.	Phenocrysts to 2.5 mm (albite), ferromags (?amphibole) mean 300µ, evenly disseminated.	Leucoxenised opaques. Traces pyrite associated with chloritised ferromags, rare amygdales.	Distinctly alkaline (sodi-potassic), but possibly a minor differentiate of the basics. Typical minor intrusive fabric.
GOR 1 (MRL 11781) Dyke ... Gordon Rd	Biotite Trachyte. Random albite laths with interstitial K-feldspar. Disseminated Ti-phlogopitic biotite phenocrysts, fine accessory magnetite, semi-pervasive chlorite mesostasis.	Weak flow-fabric/banding. Laths mean 20 µ. Phenocrysts mean 100µ.	Rare pyroxene phenocrysts (altered, leached), traces apatite.	Fine-grained, but lacks definite extrusive features. Possibly core of flow or minor intrusive. Deuteric style of alteration.
GOR ... (MRL 11782) Pebble in tillite Styx Rd	Pyritic Biotite Adamellite. Sub- to prismatic zoned oligoclase, slightly subordinate orthoclase, microperthite, quartz, disseminated biotite flakes, semi-pervasive microscopic sulphide films.	Granitic with sparse oligoclase and orthoclase phenocrysts (to 7.5 mm) in mean 1 mm	Minor chlorite (after biotite), sericite (after oligoclase), traces apatite.	Pyrite in films, fine-grained disseminations penetrating cleavages, microfractures in oligoclase, to a lesser extent biotite and orthoclase.
MA 7B (MRL 11771) Maynes Hollow	Altered Basalt. Saussuritised/albitised plagioclase and subordinate, variably serpentinised clinopyroxene laths. Semi-pervasive chloritic mesostasis with leucoxenised opaques.	Laths mean 50 µ. Pyroxene partly enclosed feldspar (subophitic) and is partly skeletal.	Minor traces magnetite. Rare interstitial quartz. Traces uralitic tremolite-actinolite.	Deuterically altered core zone of flow or, conceivably, minor intrusive. Some chilled (slaggy) features. Incipiently sheared.
MKC 9 (MRL 11778) Upper Styx River	Carbonaceous Dolomite. Microcrystalline dolomite with bedded ultrafine carbonaceous matter. Frequent veins, aggregates of clear dolomite. Minor authigenic quartz, fine magnesite.	Contorted to brecciated, dolomite-healed, sub-millimetric-scale bedding laminations.	Thinly disseminated fine silt-sized clastic quartz.	Texturally similar to WR 4, but distinctly carbonaceous, magnesitic in part. Authigenic quartz crystals with zoned carbonate inclusions. No metasomat
WR 4 (MRL 11768)	Dolomite Breccia. Irregular clasts, lenses, relict laminated beds of microcrystalline dolomite; veined marginally, corroded, by coarser sparry carbonate.	Relict submillimetric bedding laminations in microcrystalline (mean 10µ) dolomite. "Cement" mean 50µ.	Minor traces carbonaceous matter.	A virtually pure sedimentary dolomite with pervasive diagenetic carbonate (dolomite) veining. Incipiently recrystallized; devoid of metasomatic effects.
WR 4A (MRL 11769)	"Laterite". Largely structureless limonite. Disseminated ovoid to spherical aggregates of granular to radiating quartz. Rare silicified feldspar microlaths, ferruginised rock fragments.	Essentially random, quartz aggregates, ferruginised clasts 100 µ to 4 mm.	Rare angular to subround quartz grains and heavily degraded leucoxenic semi-opaques.	Quartz ovoids are amygdale-like in part. Probably a ferruginised residual breccia over basic (basalt) facies. No gossanous features.
MA 7A (MRL 11770)	Dolomitic Chert. Microcrystalline quartz with disseminated to frequent limonitic quartz pseudomorphs of carbonate rhombs; patchy degraded/ferruginised ?sericite. Late cavity-filling quartz.	Variably fractured, locally brecciated/quartz-healed.	Minor ultrafine carbonate (inclusions in quartz).	Impure chert with crudely banded diagenetic carbonate rhombs (mean 50µ) and fractured zones replaced by secondary quartz.
MST42/MRL12876 Anomaly Ck E 114 anomaly	Reworked Tuff. Framework of angular to subangular sericite-chlorite-stained alkali feldspar, similarly altered microcrystalline lava clasts, shard fragments. Sericitic chlorite	Weakly bedded, poorly to moderately sorted, silty fine sand/sandy silt. Incipiently sheared.	Clastic quartz, conspicuous leucoxenised clastic opaques. Carbonaceous matter, traces pyrrhotite. sulphide.	Distinct, mildly reworked, felsic intermediate-acid, tuffaceous characteristics. ?Syngenetic Fe-sulphide. Sparse quartz veinlets.

Central Mineralogical Services

Sample No.	Classification - Composition	Fabric	Accessories	Comments
MAR 4 (MRL 11777) Dyke Maynes Rd	Porphyritic Microsyenite. Albite and albite-stilbite-pseudomorphed ?sanidine phenocrysts, chloritised ferromag. microphenocrysts in felsitic K-feldspar with albite microlites.	Phenocrysts to 2.5 mm (albite), ferromags (?amphibole) mean 300µ, evenly disseminated.	Leucoxenised opaques. Traces pyrite associated with chloritised ferromags, rare amygdales.	Distinctly alkaline (sodi-potassic), but possibly a minor differentiate of the basics. Typical minor intrusive fabric.
GOR 1 (MRL 11781) Dyke ... Gordon Rd	Biotite Trachyte. Random albite laths with interstitial K-feldspar. Disseminated Ti-phlogopitic biotite phenocrysts, fine accessory magnetite, semi-pervasive chlorite mesostasis.	Weak flow-fabric/banding. Laths mean 20 µ. Phenocrysts mean 100µ.	Rare pyroxene phenocrysts (altered, leached), traces apatite.	Fine-grained, but lacks definite extrusive features. Possibly core of flow or minor intrusive. Deuteric style of alteration.
GOR ... (MRL 11782) Pebble in tillite Styx Rd	Pyritic Biotite Adamellite. Sub- to prismatic zoned oligoclase, slightly subordinate orthoclase, microperthite, quartz, disseminated biotite flakes, semi-pervasive microscopic sulphide films.	Granitic with sparse oligoclase and orthoclase phenocrysts (to 7.5 mm) in mean 1 mm	Minor chlorite (after biotite), sericite (after oligoclase), traces apatite.	Pyrite in films, fine-grained disseminations penetrating cleavages, microfractures in oligoclase, to a lesser extent biotite and orthoclase.
MA 78 (MRL 11771) Maynes Hillock	Altered Basalt. Saussuritised/albitised plagioclase and subordinate, variably serpentinised clinopyroxene laths. Semi-pervasive chloritic mesostasis with leucoxenised opaques.	Laths mean 50 µ. Pyroxene partly enclosed feldspar (subophitic) and is partly skeletal.	Minor traces magnetite. Rare interstitial quartz. Traces uralitic tremolite-actinolite.	Deuterically altered core zone of flow or, conceivably, minor intrusive. Some chilled (slaggy) features. Incipiently sheared.
MKC 9 (MRL 11778) Upper Styx River	Carbonaceous Dolomite. Microcrystalline dolomite with bedded ultrafine carbonaceous matter. Frequent veins, aggregates of clear dolomite. Minor authigenic quartz, fine magnesite.	Contorted to brecciated, dolomite-healed, sub-millimetric-scale bedding laminations.	Thinly disseminated fine silt-sized clastic quartz.	Texturally similar to WR 4, but distinctly carbonaceous, magnesitic in part. Authigenic quartz crystals with zoned carbonate inclusions. No metasomat
WR 4 (MRL 11768)	Dolomite Breccia. Irregular clasts, lenses, relict laminated beds of microcrystalline dolomite; veined marginally, corroded, by coarser sparry carbonate. matrix.	Relict submillimetric bedding laminations in microcrystalline (mean 10µ) dolomite. "Cement"	Minor traces carbonaceous matter.	A virtually pure sedimentary dolomite with pervasive diagenetic carbonate (dolomite) veining. Incipiently recrystallized; devoid of metasomatic
WR 4A (MRL 11769)	"Laterite". Largely structureless limonite. Disseminated ovoid to spherical aggregates of granular to radiating quartz. Rare silicified feldspar microlaths, ferruginised rock fragments.	Essentially random, mean 50µ. quartz aggregates, ferruginised clasts 100 µ to 4 mm.	Rare angular to subround quartz grains and heavily degraded leucoxenic semi-opaques.	effects. Quartz ovoids are amygdale-like in part. Probably a ferruginised residual breccia over basic (basalt) facies. No gossanous features.
MA 7A (MRL 11770)	Dolomitic Chert. Microcrystalline quartz with disseminated to frequent limonitic quartz pseudomorphs of carbonate rhombs; patchy degraded/ferruginised ?sericite. Late cavity-filling quartz.	Variably fractured, locally brecciated/ quartz-healed.	Minor ultrafine carbonate (inclusions in quartz).	Impure chert with crudely banded diagenetic carbonate rhombs (mean 50µ) and fractured zones replaced by secondary quartz.
MST42/MRL12876 Anomaly Ck E 114 anomaly	Reworked Tuff. Framework of angular to sub-angular sericite-chlorite-stained alkali feldspar, similarly altered microcrystalline lava clasts, shard fragments. Sericitic chlorite	Weakly bedded, poorly to moderately sorted, silty fine sand/sandy silt. Incipiently sheared.	Clastic quartz, conspicuous leucoxenised clastic opaques. Carbonaceous matter, traces pyrrhotite. sulphide.	Distinct, mildly reworked, felsic intermediate-acid, tuffaceous characteristics. ?Syngenetic Fe- Sparse quartz veinlets.

Central Mineralogical Services

Sample No.	Classification - Composition	Fabric	Accessories	Comments
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GOR (MRL 11782) Pebble in tillite Styx Rd	Pyritic Biotite Adamellite. Sub- to prismatic zoned oligoclase, slightly subordinate orthoclase, microperthite, quartz, disseminated biotite flakes, semi-pervasive microscopic	Granitic with sparse oligoclase and orthoclase phenocrysts (to 7.5 mm) in mean 1 mm	Minor chlorite (after biotite), sericite (after oligoclase), traces apatite.	Pyrite in films, fine-grained disseminations penetrating cleavages, microfractures in oligoclase, to a lesser extent biotite and orthoclase.
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MKC 9 (MRL 11778) Upper Styx River	Carbonaceous Dolomite. Microcrystalline dolomite with bedded ultrafine carbonaceous matter. Frequent veins, aggregates of clear dolomite. Minor authigenic quartz, fine magnesite.	Contorted to brecciated, dolomite-healed, sub-millimetric-scale bedding laminations.	Thinly disseminated fine silt-sized clastic quartz.	Texturally similar to WR 4, but distinctly carbonaceous, magnesitic in part. Authigenic quartz crystals with zoned carbonate inclusions. No metasomat
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MA 7A (MRL 11770)	Dolomitic Chert. Microcrystalline quartz with disseminated to frequent limonitic quartz pseudomorphs of carbonate rhombs; patchy degraded/ferruginised ?sericite. Late cavity-	Variably fractured, locally brecciated/ quartz-healed.	Minor ultrafine carbonate (inclusions in quartz).	Impure chert with crudely banded diagenetic carbonate rhombs (mean 50μ) and fractured zones replaced by secondary quartz.
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Central Mineralogical Services

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MKC 9 (MRL 11778) Upper Styx River	Carbonaceous Dolomite. Microcrystalline dolomite with bedded ultrafine carbonaceous matter. Frequent veins, aggregates of clear dolomite. Minor authigenic quartz, fine magnesite.	Contorted to brecciated, dolomite-healed, sub-millimetric-scale bedding laminations.	Thinly disseminated fine silt-sized clastic quartz.	Texturally similar to WR 4, but distinctly carbonaceous, magnesitic in part. Authigenic quartz crystals with zoned carbonate inclusions. No metasomat
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MA 7A (MRL 11770)	Dolomitic Chert. Microcrystalline quartz with disseminated to frequent limonitic quartz pseudomorphs of carbonate rhombs; patchy degraded/ferruginised ?sericite. Late cavity-filling quartz.	Variably fractured, locally brecciated/quartz-healed.	Minor ultrafine carbonate (inclusions in quartz).	Impure chert with crudely banded diagenetic carbonate rhombs (mean 50µ) and fractured zones replaced by secondary quartz.
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GOR 1 (MRL 11781) Dyke ... Gordon Rd	Biotite Trachyte. Random albite laths with interstitial K-feldspar. Disseminated Ti-phlogopitic biotite phenocrysts, fine accessory magnetite, semi-pervasive chlorite mesostasis.	Weak flow-fabric/banding. Laths mean 20 µ. Phenocrysts mean 100µ.	Rare pyroxene phenocrysts (altered, leached), traces apatite.	Fine-grained, but lacks definite extrusive features. Possibly core of flow or minor intrusive. Deuteric style of alteration.
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MA 7B (MRL 11771) Maynes Hollow	Altered Basalt. Saussuritised/albitised plagioclase and subordinate, variably serpentinised clinopyroxene laths. Semi-pervasive chloritic mesostasis with leucoxenised opaques.	Laths mean 50 µ. Pyroxene partly enclosed feldspar (subophitic) and is partly skeletal.	Minor traces magnetite. Rare interstitial quartz. Traces uralitic tremolite-actinolite.	Deuterically altered core zone of flow or, conceivably, minor intrusive. Some chilled (slaggy) features. Incipiently sheared.
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APPENDIX 3

GEOPHYSICAL REPORTS

REPORT ON DIGHEM II SURVEY

E.L. 8/79, Maydena, TASMANIA

November, 1980

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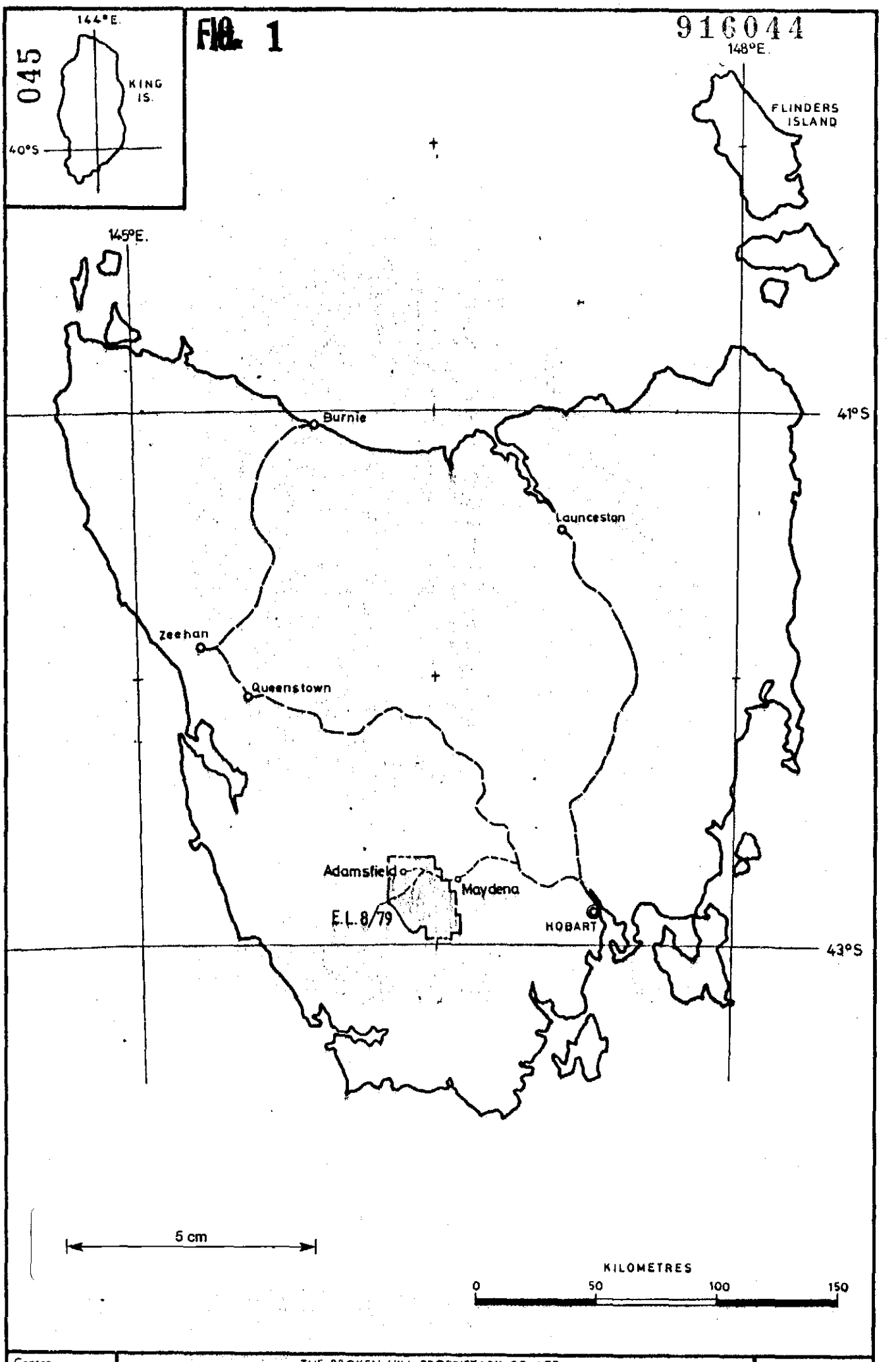
CONTENTS

List of Figures

SUMMARY

The Maydena Dighem^{II} survey, carried out to assist the search for replacement style tin-sulphide deposits, detected three anomalous zones worthy of further attention. Each is characterized by an E.M. anomaly and associated magnetic response consistent with that expected from a significant pyrrhotite-cassiterite assemblage. Ground inspection and possible geochemical/geophysical followup is recommended.



Centre Melbourne	THE BROKEN HILL PROPRIETARY CO. LTD	Project No.
Date 17-11-80	E.L.8/79 MAYDENA, TASMANIA LOCALITY MAP	Drawing No A4-2040

INTRODUCTION

The Maydena-Adamsfield Dighem^{II} survey (Figure 1) was carried out in April, 1980 to aid the search for sulphide-cassiterite replacement type deposits of the Renison style. Survey specifications were:-

1. A flight spacing of 250 metres.

2. Mean bird terrain clearance of 30 metres, and

3. Flight direction east-west.

Field data was compiled and processed in Canada by Dighem Ltd. and final maps and report were received in September, 1980. Analogue data, computer-generated profiles and survey maps have been studied for the purpose of defining areas of possible magnetic-sulphide mineralization.

All features of interest will be referred to by line number and identification letter, e.g. E.M. anomaly 103A, unless otherwise stated.

DISCUSSION OF RESULTS

The magnetic map of the survey area (Figure 2) shows a number of broad anomalies such as M2 and M3 which appear to be caused by mafic intrusives and/or serpentinite bodies at depth. They have no directly associated resistivity or E.M. anomalies and a number appear to be flat lying and of limited depth extent.

The resistivity map (Figure 3) shows a number of resistivity lows along the main east-west power line clearing - these are related to cultural interference and have been eliminated from further interest. Note that spurious E.M. anomalies (Figure 4) are also caused by the power line interference.

The Mt. Mueller-south E.M. trend is associated with a linear magnetic anomaly of upto 900 nT intensity and approximately 3km strike length. The likely cause of the magnetic anomaly is a basic intrusive or serpentinite body which has a relatively high conductivity. However, anomaly 115A occurs on the above trend as a distinct conductor - it may occur immediately adjacent to the magnetic unit.

The localized low resistivity anomaly (Figure 3) and associated E.M. anomaly at 114xE (Styx anomaly) indicate a very strong conductor at depth or at some distance from or angle to the flight line. Although no definite magnetic closure is seen on the magnetic (Figure 2) or enhanced (Figure 5) magnetic map, an associated anomaly of about 50 nT intensity can be seen on the profile data.

The styx West group of combined E.M. resistivity and magnetic anomalies occur south of Mt. Mueller-south trend. The style of magnetic response in this area differs from that over the interpreted large mafic/ultramafic bodies. Anomalies 1, 2 and 3 may be caused by discrete mafic/ultramafic plugs of relatively high conductivity due to increased weathering, or by magnetic sulphide zones.

The remaining weak E.M. anomalies which occur in the vicinity of Mt. Mueller, appear to be related to rock conductivity changes and possible aerodynamic noise.

CONCLUSIONS AND RECOMMENDATIONS

The Maydena Dighem survey has resulted in the detection of three main zones which are considered worthy of further attention:-

(i) The Mt. Mueller-South trend,

(ii) The Styx anomaly, and

(iii) The Styx-West group of anomalies.

The Styx anomaly should be given the highest priority for followup - its profile character suggests that its source may be at depth (>50m?). The Mt. Mueller-South trend appears to relate to a near surface magnetic unit. Ground inspection and possible ground geochemical/geophysical followup is strongly recommended for (i) and (ii). The Styx-West group of anomalies may be followed up by ground inspection as the magnetic profile indicate shallow depth or outcrop of magnetic units.

APPENDIX 1

Dighem Ltd., Adamsfield

Survey Report

INTRODUCTION

DIGHEM^{II} surveys of 853 line-km were flown for the Broken Hill Proprietary Company Limited in the interval from February 2 to February 27, 1980, and from April 1 to April 4, 1980. The surveys were flown in the Scamander (Figure 1a), Que River (Figure 1b), Wynyard and Waratah (Figure 1c), and Adamsfield (Figure 1d) areas of Tasmania. The Lama jet helicopter flew with an average airspeed of 125 km/h and EM bird height of 45 m. Ancillary equipment consisted of a Geometrics 803 magnetometer with its bird at an average height of 60 m, a Sperry radio altimeter, Geocam sequence camera, sferic/50-60 Hz monitor, Barringer 8-channel hot pen analog recorder, and a Geometrics G-714 digital data acquisition system with a Kennedy 9700 9-track 800 bpi magnetic tape recorder. The analog equipment recorded six channels of EM data at approximately 900 Hz and one of magnetics and radio altitude. The digital equipment recorded the EM data with a sensitivity of 0.25 ppm/bit and the magnetic field to an accuracy of one gamma.

The Appendix provides details on the data channels, their respective noise levels, and the data reduction procedure. The quoted noise levels are generally valid for wind speeds up to 35 km/h. Higher winds may cause the system to be grounded because excessive bird swinging produces control difficulties in piloting the helicopter. The swinging results from the 5 m^2 of area which is presented by the bird to broadside gusts. The DIGHEM system nevertheless can be flown under wind conditions that seriously degrade other AEM systems.

Adamsfield Area

The survey area is characterized by resistivities which vary from less than 30 ohm-m to in excess of 1000 ohm-m. Relatively extensive zones of resistivities less than 250 ohm-m can be readily recognized in the central and southern parts of the flight block. They reflect conductive bedrock and overburden features, as well as cultural sources.

The resistivity anomaly in the southern part of the block, which extends from 103A to 105xB, reflects conductive material which may occur at depth. Anomaly 105A indicates a bedrock conductor which occurs on the flank of a magnetic high. Contrary to the resistivity map, the magnetic maps indicate that this conductor has a separate source from 103A-105xB. Anomaly 106A appears to reflect a magnetic bedrock conductor, which according to the resistivity patterns may constitute a northeasterly extension of 105A.

The localized low resistivity anomaly centered at 114xE is of particular interest as it appears to reflect a bedrock conductor at depth. The EM traces indicate that the bird flew at a low angle to this conductor.

The resistivity anomaly in the central part of the survey area reflects a bedrock conductor at depth (note the apparent depth channel 41 on lines 112 to 116). It appears to be a flat lying conductor which has produced anomaly 115A. The EM responses indicate an excellent conductor to be present, although the 2584 mho conductance seems to be overestimated.

Other EM and resistivity anomalies appear to be caused by surface and cultural features.

The magnetic maps indicate that bodies of close to north-south strike are present in the survey area.

Respectfully submitted,

DIGHEM LIMITED

D.C. Fraser
President

Z. Dvorak
Geophysicist

ZD/ls

Seven
~~Twelve~~ map sheets accompany this report:

Electromagnetics	18 map sheets
Resistivity	18 map sheets
Magnetics + 3 map sheets	18 map sheets
Enhanced magnetics	18 map sheets

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303 AREA H BHP ADAMSFIELD APR/80

LINE & ANOMALY	STANDARD COIL REAL PPM	STANDARD COIL QUAD PPM	WHALETAIL COIL REAL PPM	WHALETAIL COIL QUAD PPM	VERTICAL DIKE COND MHOS	VERTICAL DIKE DEPTH* FEET	HORIZONTAL SHEET COND MHOS	HORIZONTAL SHEET DEPTH FEET	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH FEET
103A	6	17	9	33	2	0	1	87	140	0
105A	4	5	6	8	5	90	1	372	85	218
106A	4	3	2	3	7	117	2	484	66	342
110B	0	0	0	0	6	134	1	702	1034	0
111B	1	10	1	9	1	27	1	191	741	15
111C	1	36	6	60	1	0	1	19	431	0
111D	2	2	3	2	6	99	2	554	47	406
112A	4	2	0	1	16	147	3	604	21	484
113A	3	16	3	25	1	0	1	99	293	0
113B	0	0	4	6	3	81	1	445	407	149
113C	0	0	9	1	7	79	3	586	19	469
115A	5	0	3	0	2584	238	6	617	7	525
115B	1	1	6	3	15	210	3	670	22	550
122A	1	7	1	11	1	0	1	177	705	0
122B	4	22	9	42	2	0	1	85	173	0
123A	1	6	1	8	1	37	1	240	635	33

* ESTIMATED DEPTH MAY BE UNRELIABLE BECAUSE THE STRONGER PART OF THE CONDUCTOR MAY BE DEEPER OR TO ONE SIDE OF THE FLIGHT LINE, OR BECAUSE OF A SHALLOW DIP OR OVERBURDEN EFFECTS.

056

916055

303 AREA H BHP ADAMSFIELD APR/80

LINE & ANOMALY	STANDARD COIL REAL PPM	STANDARD COIL QUAD PPM	WHALETAIL COIL REAL PPM	WHALETAIL COIL QUAD PPM	VERTICAL DIKE COND MHOS	VERTICAL DIKE DEPTH* FEET	HORIZONTAL SHEET COND MHOS	HORIZONTAL SHEET DEPTH FEET	CONDUCTIVE EARTH RESIS OHM-M	CONDUCTIVE EARTH DEPTH FEET
125C	1	12	0	15	1	8	1	114	929	0
125D	4	10	0	25	1	35	1	178	295	40
126A	2	9	2	14	1	0	1	99	385	0
127A	4	3	1	2	6	160	1	526	80	368
1271C	4	19	3	21	1	0	1	108	250	0
128A	2	59	4	114	1	0	1	14	299	0
128B	2	22	3	40	1	0	1	33	475	0
1280B	1	37	1	51	1	27	1	31	452	0
1280C	15	25	0	40	4	63	1	195	99	90
1280E	4	58	2	76	1	0	1	30	340	0
1280F	24	50	6	102	3	7	1	108	75	24
130A	1	5	0	2	1	11	1	338	874	7
149A	2	7	2	11	1	36	1	224	358	57

* ESTIMATED DEPTH MAY BE UNRELIABLE BECAUSE THE STRONGER PART OF THE CONDUCTOR MAY BE DEEPER OR TO ONE SIDE OF THE FLIGHT LINE, OR BECAUSE OF A SHALLOW DIP OR OVERBURDEN EFFECTS.

F14
F2
F3
SWT B8-9
SWT 23
F5
F7
F1
F6
MKC 1
F8
F9
MA Series
4 6 8 10 12 MAR5,6. 16 17 18 19 MKC6
MKC5
MAR 1
MAR 2,3,4
MA1-3
F10
F11
MKC4
MKC3
MKC2
F12
Fourteen Mile Creek
MAYNE'S HILL
F13
F14
F15
F18
F16
F17
MKC 1-6, 8-9
MNS 1-25, 27
M1 14-6
F 1-18
MKC 7
MNS 26
M2-3
missing
M1
River
M4
M5
M6
Styx

MOUNT FIELD NATIONAL P

916057

SWT
B10
B11

TIM SHEA

MNS 24

MNS 25

MNS 26

MNS 27

SWT 19.20
HUMBOLDT

MKC9

MKC8

Kallista

Creek

MNS 18

MNS 19

MNS 4

MNS 5

MNS 3

MNS 14

MNS 2

MNS 1

MNS 15

MNS 16

MNS 17

MNS 12

MNS 11

MNS 13

Tyenna

SWT 14A 15A

SWT 16

816058

E.L.8/79

S 18

MNS19
MNS4
MNS6
MNS7
MNS8
MNS9
MNS5
MNS3
MNS14
MNS2
MNS1
MNS15
MNS16
MNS22
MNS23
MNS12
MNS11
MNS13
MNS17
MNS10
MNS20
MNS21
Creek
Tyenna
River
MAYDENA
SWT 14A
15A
SWT16-18
F4
F2
F3
SWT 88-9
SWT 29
F5
F7
F1
F6
MKC1
F8
MKC5

DIGHEM^{II} SURVEY

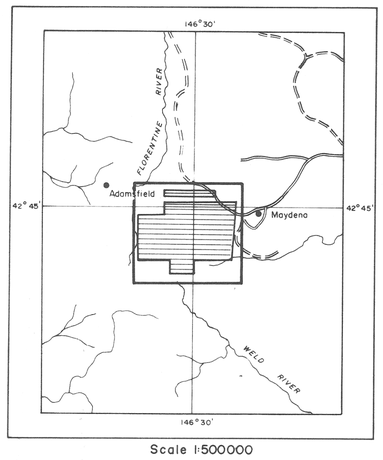
ADAMSFIELD, TASMANIA

MAGNETICS

FOR

BROKEN HILL PROPRIETARY CO. LTD.

LOCATION MAP



Scale 1:500000

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

SCALE 1:25,000

5 cm

1 0 1 2 Kilometres

1/2 0 1 Miles

Flight line

5281

Fiducials and numbers

5981

ISOMAGNETIC LINES

(total field)

1000 ..... 1000 gammas

200 ..... 200 gammas

..... 50 gammas

..... 10 gammas

..... magnetic depression

Magnetic Inclination within the survey area: 72°

916059

057

DIGHEM^{II} SURVEY

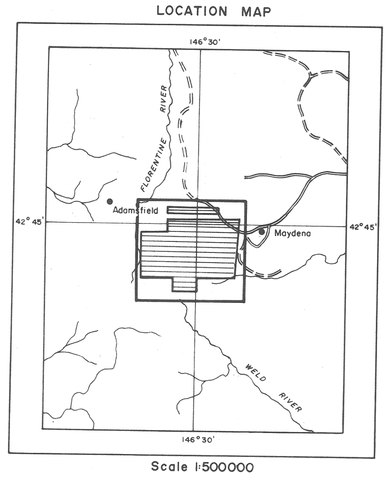
ADAMSFIELD, TASMANIA

RESISTIVITY

FOR

BROKEN HILL PROPRIETARY CO. LTD.

LOCATION MAP



Scale 1:500000

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

SCALE 1 : 25,000

5 cm

1 0 1 2 Kilometres

1/2 0 1 Miles

Flight line

1256

Fiducials and numbers

9561

LEGEND

Contours in ohm - m at eight intervals per decade.

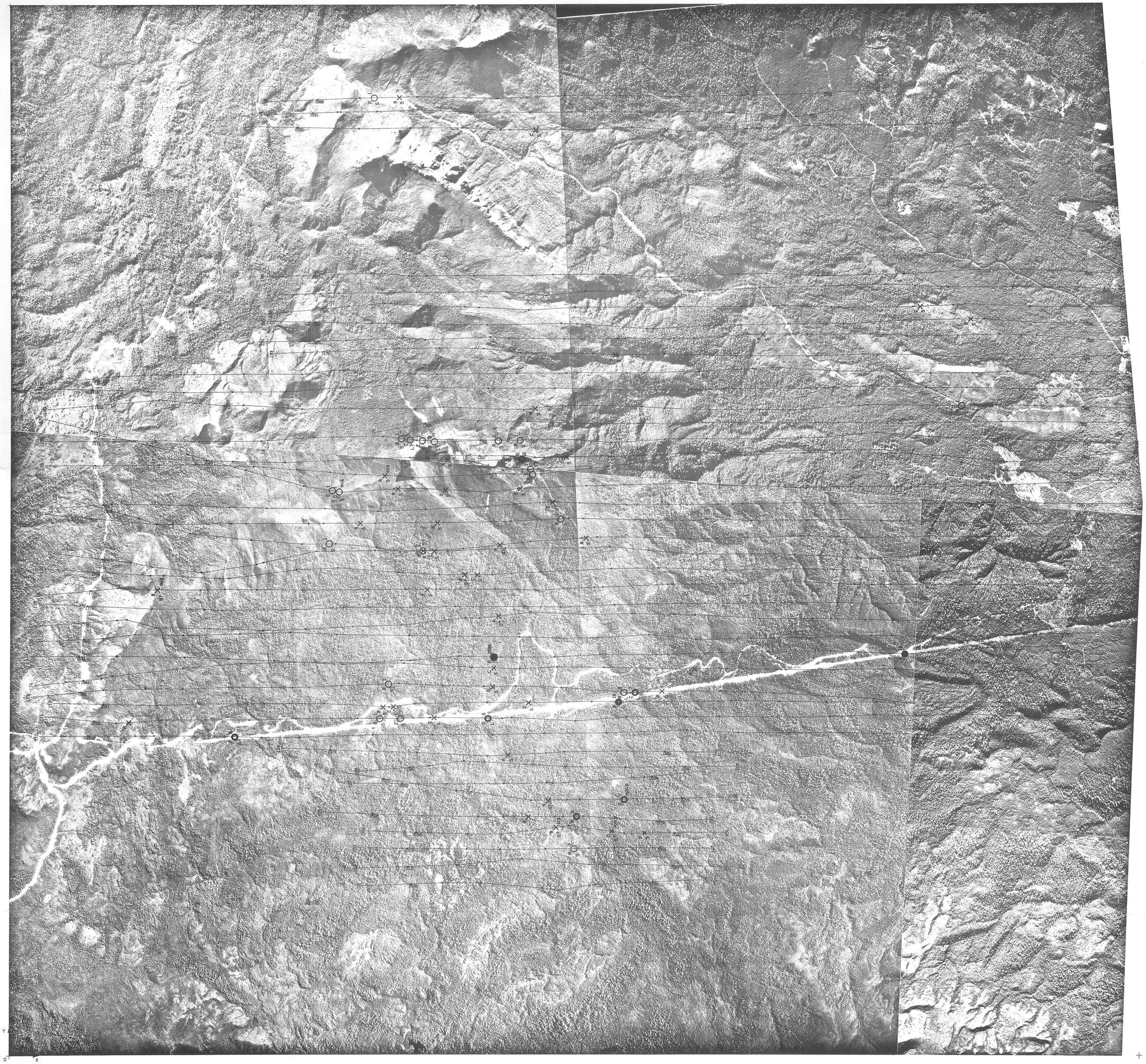
100
75
56
42
31
23
17
13
10

Note

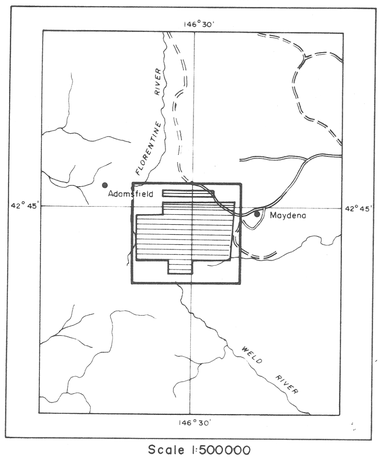
The numbers face in the direction of increasing value.

916060

058



LOCATION MAP



Scale 1:500000

DIGHEM^{II} SURVEY

ADAMSFIELD, TASMANIA

ELECTROMAGNETICS

FOR

BROKEN HILL PROPRIETARY CO. LTD.

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

Flight line

2566

Fiducials and numbers

2566

5 cm

SCALE 1 : 25,000

1 0 1 2 Kilometres

1/2 0 1 Miles

916061

ANOMALY GRADE	EM GRADE SYMBOL	MHO RANGE
6	●	⩾ 100
5	✱	50 — 99
4	●	20 — 49
3	◉	10 — 19
2	○	5 — 9
1	○	⩽ 4
	×	Possible conductor

DIGHEM anomalies are divided into six grades of conductivity – thickness product. This product in mhos is the reciprocal of resistance in ohms. The mho is a measure of conductance, and is a geologic parameter. Most swamps yield Grade 1 anomalies but highly conducting clays can give Grade 2 anomalies. The multi-coil anomaly shapes often allow surface conductors to be recognized, and these are indicated by the letter S on this map. The remaining Grade 1 and 2 anomalies could be weak bedrock conductors. The higher grades indicate increasingly higher conductances. Examples: The ore bodies of the Magusi River camp yield Grade 4 anomalies, while Mattabi and Whistle give Grade 5. Graphite and sulphides can span all grades but, in this survey area, field work may show that the different grades indicate different types of conductors.

identifier → C 38 ← mho value

Depth is greater than
50 feet
100 feet
150 feet
200 feet

Inphase and Quadrature of Standard coil is greater than
5 ppm
10 ppm
15 ppm
20 ppm

Refer to list of anomalies in survey report for the actual ppm values for all coils, and for conductor depths.

The actual mho value is plotted beside the EM grade symbol. The letter is the anomaly identifier. The horizontal rows of dots indicate anomaly amplitude on the flight record, and the vertical column gives the estimated depth. This depth may be unreliable because the stronger part of the conductor may be deeper or to one side of the flight line, or because of a shallow dip or conductive overburden effects.

	Conductor axis
S	Probable surface response
S?	Possible surface response
L	Probable line (power, telephone, pipe, or fence)
L?	Possible line
?	Questionable anomaly
	Apparent thickness > 10 m
	Dip
100γ	Direct magnetic correction of 100 gammas

DIGHEM maps are designed to provide a correct impression of conductor quality by means of the conductance grade symbols. The symbols can stand alone with geology when planning a followup program. The actual mho values are plotted for those who wish quantitative data. The anomaly ppm and depth are indicated by inconspicuous dots which should not distract from the conductor patterns, while being helpful to those who wish this information. The map provides an interpretation of all conductors in terms of length, strike direction, conductance and depth. The accuracy is comparable to an interpretation from a ground EM survey having the same line spacing.

059

DIGHEM^{II} SURVEY

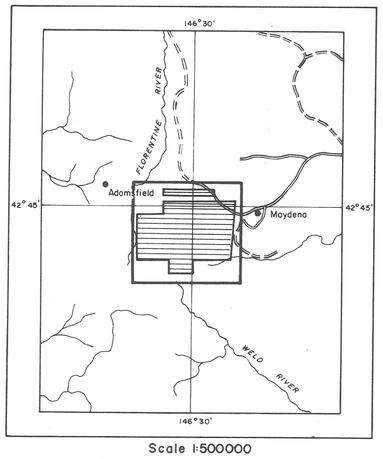
ADAMSFIELD, TASMANIA

ENHANCED MAGNETICS

FOR

BROKEN HILL PROPRIETARY CO. LTD.

LOCATION MAP



Scale 1:500000

REGISTERED PROFESSIONAL ENGINEER
D. C. FRASER
PROVINCE OF ONTARIO

SCALE 1 : 25,000

5 cm

1 0 1 2 Kilometres

1/2 0 1 Miles

Flight line

5521

Fiducials and numbers

5821

ISOMAGNETIC LINES

(enhanced field)

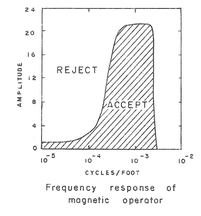
5000 ..... 5000 gammas

1000 ..... 1000 gammas

200 ..... 200 gammas

100 ..... 100 gammas

..... magnetic depression



Frequency response of magnetic operator

916062

060