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CRA EXPLORATION PTY. LIMITED
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Final And Third Annual Report For The Period Ending 16th April 1996 EL 35/92 Anderson's Creek, Tasmania

Author: S Maher

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Licence Holder: CRA Exploration Pty. Limited

Submitted to: Chief Geologist

Copies to: Tasmanian Industry Safety and Mines
CRAE ETIG Box Hill
CRAE Preston

Submitted by: for S Maher

Accepted by:

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Abstract

Due to disappointing results and a re-focus in CRAE strategy in Tasmania, EL 35/92 will be relinquished without further work.

EL 35/92 covers the Anderson's Creek ultramafic complex in north-central Tasmania, and was taken out to explore for low total sulphide nickel mineralisation by analogy with Honeymoon Well and Mt. Keith (Western Australia).

Work undertaken within the Licence area during the three years of tenure involved:

- identifying prospective stratigraphy
- testing this stratigraphy by geochemical sampling and IP/resistivity survey

Unweathered ultramafic underlying nickeliferous laterite at Barnes Hill has not been tested by drilling. Results from pisolite sampling and sampling of weathered serpentinite, testing for metal zonation of more immobile Ni-sulphide pathfinder elements, were disappointing, and downgrade potential for significant combined PGE-Ni-sulphide mineralisation.

IP data collected along a line profiling the ultramafic complex, including Barnes Hill, indicates the ultramafic has unusually high phase values (equivalent to chargeability) with areas regularly exceeding 50 mrad. Highest phase values occur within 300 m of the W and E contacts. The response is consistent with disseminated sulphides or magnetite at depth.

Petrophysical, geochemical, and petrological tests on fresh serpentinite core from 2 km north of the IP line indicated some high phase values can in part be attributed to significant disseminated magnetite. This result downgrades the high phase values in IP survey data. However, the rocks in drill core may not be equivalent with rocks exposed along the IP survey line, and high phase values in IP data occur over 2500 m.

Soil sampling over cumulate layered pyroxenite-gabbronorite with rare pyrrhotite-chalcopyrite-pentlandite returned only slightly elevated Ni-Cu values over 180 m (up to 676 ppm Ni) - downgrading the potential for significant near surface Ni-sulphide within the area sampled.

Soil sampling over the ultramafic complex and Cambrian host rock contact returned a maximum Au value of 0.4 ppm. This value was isolated and unsupported by other Au pathfinder elements. Results were generally disappointing and downgraded the potential for significant Au mineralisation. However, the widely spaced sampling traverses leave scope for modest-size untested near surface mineralisation.

The only surface disturbing activity undertaken by CRAE has been soil sampling and IP pits. Rehabilitation was done by infilling each hole and replacing the topsoil.

Contents

List of Plans

Plan No.	Title	Scale
Tv 668	Anderson's Creek EL 35/92 - Location Plan	1:100,000
Tv 669	Anderson's Creek EL 35/92 - Land Status Plan	1:25,000
Tv 884	Anderson's Creek EL 35/92 - Anderson's Creek Ultramafic Complex: Geological Plan	1:10,000
Tv 885	Anderson's Creek EL 35/92 - Anderson's Creek Ultramafic Complex: Diamond Drill Hole Location Plan	1:10,000
Tv 941	Anderson's Creek EL 35/92 - Compilation Plan	1:10,000
Tv 1020	Anderson's Creek EL 35/92 Line 10000N Geophysical and Geological Profiles and Sections	1:5,000

List of Appendices

Appendix I	Geochemical ledgers and laboratory reports
Appendix II	Petrophysical ledgers and laboratory reports
Appendix III	Petrology ledgers laboratory reports

List of Tables

Table 1	Location of deep drill holes.
Table 2	AMG - Grid - IP co-ordinate conversion table.

1. Conclusions & Recommendations

Work undertaken by CRAE has downgraded the potential for significant Ni-sulphide mineralisation within the Anderson's Creek ultramfic complex.

High phase values in IP data over 2500 m are consistent with disseminated sulphide or magnetite at depth. Petrophysical measurements of drill core 2 km N of the IP anomaly indicate that significant disseminated magnetite is the cause for high phase values in core samples and on balance is the likely cause of the IP anomaly.

A decision to relinquish EL 35/92 with no further work was made following a refocus of CRAE's strategy in Tasmania.

2. Introduction

EL 35/92 was taken out to explore the Anderson's Creek ultramafic complex for low total sulphide nickel mineralisation by analogy with Honeymoon Well (Western Australia). The ultramfic complex crops out or is covered or is covered by residual laterite over an area of 12 sq km. BHP airborne magnetic data shows the complex to have a strike extent of 19 km (Newman, 1965), covered to the north and south by post-Cambrian sediments. Laterite developed over the ultramafic complex is nickeliferous. Despite extensive drilling of this laterite, the underlying rocks are relatively untested.

EL 35/92 was granted to CRA Exploration Pty. Limited (CRAE) on the 17th of April, 1993 for an initial tenure of one year over an area of 65 sq km. Two one year renewals of the EL were granted giving an expiry date of 16th April, 1996.

EL 35/92 is located on the Tamar 8215 1:100,000 map sheets (Plan Tv 668). Its geographic centre is approximately 5 km west of Beaconsfield. The location of RAP areas, Australian Heritage Act Registered Entry areas, and other important land status classifications within EL 35/92 are shown on Plan Tv 669.

The aim of this report is to describe work undertaken during the third twelve month period and to provide a final report on activities.

3. Review of Previous Work

3.1 Prior to Current Tenement

The ultramafic complex has a long history of mining. The Tasmanian Charcoal Iron company first mined iron ore from ferruginous laterites on the summits of Scotts Hill, Mt. Vulcan, and Tattersall Hill in 1872. Additionally, asbestos, serpentinite, chromite and ochre have been mined for short periods. Chromite was extracted from Cenozoic sediment at Barnes Hill.

Nickel in the Beaconsfield area was first recorded by Thereau (1883) from the old Victoria mine. This was later confirmed by Twelvetrees (1903), but no further investigations were undertaken until 1955.

1955-57 Ben Lomond Mining Co
The Ben Lomond Mining Co. sampled Ni bearing serpentine from outcrop and pits sunk to hard rock. They discovered an "enormous area of nickeliferous plastic clay of deep brown or yellowish colour with 1.75% Ni" derived from the decomposition of serpentinite. In 1957, they entered into an agreement with Enterprise Exploration to investigate this mineralisation.

1957-58 Enterprise Exploration Co. Pty. Ltd. (Enterprise)
Enterprise produced a geology plan of the ultramafic complex. Mapping showed outcrop of garnierite bearing serpentinite restricted to the area bounded by Hinds Road to the south, Ordovician quartzite to the east, and the Barnes Hill laterite to the north. Rodingite dykes are common in this area.

Enterprise bored 147 auger holes in traverses across "unconcealed ultrabasics". 57 holes were augured into the garnierite bearing serpentinite area. Holes were located at 30 m intervals along three traverses. A further 90 holes were augured into other areas within the ultramafic complex at 60 m intervals along traverses totalling 4.8 km. Auguring sampled soil derived from the serpentinite; and where present, quartzite and laterite cover. With two exceptions, holes bottomed in hard rock. Whole samples were recovered and assayed for Ni, Fe, and Co (10 samples only) over selected intervals.

Best assay results were of samples taken from the garnierite bearing serpentinite area:

Line 1 (420 m)	16 holes	Best interval 1.25 m @ 1.83% Ni Average assay 0.96% Ni
Line 2 (465 m)	18 holes	Best interval 1.5 m @ 0.83% Ni Average assay 0.41% Ni
Line 3 (675 m)	23 holes	Best interval 1.25 m @ 1.3% Ni Average assay 0.52% Ni

Assay results of auger lines in other areas averaged below 0.3%. The best assay result was 0.5% Ni.

Enterprise concluded "It is unlikely that the body of soil within the garnierite bearing serpentinite area exceeds 0.5 Mt @ 1% Ni. Ni mineralisation observed is a secondary accumulation formed in the soil profile over nickeliferous zones of the ultramafic complex.".

CSIRO and Department of Mines - Tasmania
Following mineralographic studies by the CSIRO, the Department of Mines drilled a single 49 m diamond hole to test the nickel-rodingite association. It was shown that elevated nickel values were due to the presence of garnierite generally associated with rodingite.

1965-? *BHP*
In May 1965, AMEG Pty. Ltd. conducted an airborne proton magnetometer survey over an area including the ultramafic complex for BHP (Newman, 1965). Airborne magnetic data show a long line of large amplitude north trending anomalies coincident with mapped ultramafics and laterite. BHP interpreted several bodies of moderate susceptibility underlying surface material at shallow depth (Anon., 1966?). A follow-up ground magnetometer survey profiled laterite at Barnes Hill. This data showed the laterite cover was strongly and non-uniformly magnetised.

A 4000 gamma aeromagnetic anomaly coincident with Scotts Hill was investigated by ground magnetic survey and a single diamond drill hole, Scotts Hill1. Drilling intersected serpentine with minor asbestos and magnetite veining from 95 m to 207 m (EOH). Ni-sulphide mineralisation was not observed. Magnetite veining, although uneconomic, was sufficient to account for the magnetic anomaly.

A drainage sediment sampling survey was undertaken by BHP over an area of 325 sq km - including the ACC. Samples were assayed for leachable Cu, Zn, Ni and for total Mo (only one sample above background).

Nickel and Cr bearing laterite developed over the ultramafic complex was drilled and costeaned.

Mt Vulcan	4 bores	3 excavations
Scotts Hill	2 bores	2 excavations
Barnes Hill	5 bores	11 excavations

Holes were bored to depths between 6 and 25 m, and where possible bottomed in bedrock. Samples were taken at 1.5 m intervals and assayed for Fe, Ni, Cr2O3 and Co. Excavations were between 2 and 6 m deep, and generally bottomed in laterite. Samples were taken from lithologically defined intervals and assayed for Ni and Co.

Chromite bearing Cenozoic gravel was tested by pitting. 99 pits were excavated along 17 lines. Pits were up to 3.5 m deep and where possible bottomed in bedrock. 315 samples were taken from lithologically defined intervals. Samples were assayed for Ni, Co, Pt (assay results not recorded), and Cr_2O_3.

1967-? *King Island Scheelite (1947) Limited (King Island Scheelite)*
King Island Scheelite undertook a detailed sampling program of laterite overlying the ultramafic complex. 37 diamond drill holes defined four areas of mineralisation totalling 6 Mt @ 1% Ni (0.7% Ni cut-off) and 0.06% Co. Mineralogical studies indicated the Ni to be bound to smectite clays and iron oxides within the saprolite zone.

1971-72 *Allstate Exploration N.L. (Allstate Exploration)*
Allstate Exploration drilled 15 diamond drill holes totalling 2000 m to test for asbestos serpentine witrhin the ultramafic complex - also several thousand metres of trenching.

3.2 During Current Tenement

3.2.1 Review of Drilling

A review of previous drilling was undertaken to identify mineralised or prospective stratigraphy within the ultramafic complex. This included inspection and selective geochemical sampling of drill core held by Tasmanian Industry Safety and Mines. A detailed account of this work is given in Maher (1995) - Appendix I. Table I and Plan Tv 885 summarise this work. Significant results were:

- Unweathered ultramafic rocks underlying nickeliferous laterite at ***Barnes Hill*** (481000mE 5437000mN) have not been tested by drilling
- Selective sampling of the *faulted ultramafic complex and Cambrian quartzite-slate-chert sequence contact* intersected in DDH Scotts Hill1 returned a best assay of 3 m @ 0.94 (1.04) g/t Au. Except for DDH Scotts Hill1, this contact has not been drill tested along its 8 km extent.
- No significant Ni-sulphide was observed in drill core. Best Ni assay from selective sampling was 1950 ppm.

3.2.2 Geological Mapping and Rock Chip Geochemistry

A program of reconnaissance rock chip sampling and mapping was undertaken over a 13 sq km area covering the ultramfic complex.

In areas where the ultramafic is not covered by laterite or alluvium, systematic traverses across stratigraphy were undertaken with the objective of identifying horizons/zones prospective for Ni-sulphide mineralisation. Geology was compiled at 1:10,000 scale and is shown in Plan Tv 884.

72 rock chip samples were collected for geochemical analysis. Sample locations are shown on Plan Tv 941. Sample ledgers with assay results are included in Maher (1994) - Appendix I and Maher (1995) - Appendix II.

Eight rock chip samples submitted for geochemical analysis were also submitted for petrological description. Petrological laboratory reports are included in Maher (1995) - Appendix III and Maher (1994) - Appendix II.

CRA EXPLORATION PTY. LIMITED ANDERSON'S CREEK EL35/92 LOCATION OF DEEP DRILL HOLES

HOLE	LOCATION	EL	COMPANY	REP	DATE	COLLAR INFORMATION					
						EAST AMG	NORTH AMG	AZIM. AMG	INCL.	DEPTH m	COMMENTS
SCOTTS HILL DDH NO.1	SCOTTS HILL	EL3/65	BHP	67-465	1966	479800	5439700	230	-45	205	Location v. approximate.
1	BARNES HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	481610	5435785		-90	18.7	
2	BARNES HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	481660	5436070		-90	13.3	
3	BARNES HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	481310	5437060		-90	21	
4a	BARNES HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	481485	5437050		-90	13	
5	BARNES HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	481180	5437125		-90	11.4	
6	BARNES HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	480860	5437120		-90	16.2	
7b	BARNES HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	481285	5436750		-90	13.3	
8	BARNES HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	481500	5437200		-90	28.9	
9	BARNES HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	481795	5436995		-90	6.7	
10	BARNES HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	481850	5437295		-90	21	
11	BARNES HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	481700	5436385		-90	5.7	
12	BARNES HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	481360	5437280		-90	27.6	
13	BARNES HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	481680	5437320		-90	18.4	
14	SCOTTS HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	479775	5439705		-90	21.9	
15	SCOTTS HILL	EL7/67	KIS (1947) LIMITED	67-483	1967	479825	5439970		-90	27.3	
16	MT VULCAN	EL7/67	KIS (1947) LIMITED	67-483	1967	479945	5439230		-90	24.1	
17	THE FLAT	EL7/67	KIS (1947) LIMITED	67-483	1967	480395	5438105		-90	10.2	
18	SCOTTS HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	479985	5439940		-90	5.4	
19	SCOTTS HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	479650	5439750		-90	14.6	
20	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	481245	5436520		-90	14.3	
21	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	480985	5436745		-90		
22	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	481375	5437355		-90	21	
23	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	481620	5436850		-90	10.5	
24	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	480445	5437110		-90		
25	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	480460	5437240		-90		
26	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	480600	5437225		-90		
27	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	480400	5436885		-90		
28	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	480355	5436745		-90		
29	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	481445	5436880		-90	14.3	
30	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	481245	5437215		-90	8.3	
31	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	481515	5437335		-90	21.6	
32	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	480960	5436445		-90		
33	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	480600	5435795		-90		

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Table 1. Location of deep drill holes.

CRA EXPLORATION PTY. LIMITED ANDERSON'S CREEK EL35/92 LOCATION OF DEEP DRILL HOLES

HOLE	LOCATION	EL	COMPANY	REP	DATE	COLLAR INFORMATION					
						EAST AMG	NORTH AMG	AZIM. AMG	INCL.	DEPTH m	COMMENTS
34	BARNES HILL	EL7/67	KIS (1947) LIMITED	69-544	1968	480500	5436490		-90		
35	MT VULCAN	EL7/67	KIS (1947) LIMITED	69-544	1968	480110	5439210		-90		
36	MT VULCAN	EL7/67	KIS (1947) LIMITED	69-544	1968	480150	5437500		-90	19	
37	MT VULCAN	EL7/67	KIS (1947) LIMITED	69-544	1968	480300	5437500		-90	12.7	
A4		EL33/71	ALLSTATE E. N.L.	72-922	1971	480680	5439140	228	-45	244	
A5		EL33/71	ALLSTATE E. N.L.	72-922	1971	480645	5439500	34	-45	244	
A6		EL33/71	ALLSTATE E. N.L.	72-922	1971	480600	5439900	283	-45	244	
A7		EL33/71	ALLSTATE E. N.L.	72-922	1971	480720	5439520		-90	134	
A8		EL33/71	ALLSTATE E. N.L.	72-922	1971	480800	5439500		-90	142	
A9		EL33/71	ALLSTATE E. N.L.	72-922	1971	480700	5439310		-90	139	
A10		EL33/71	ALLSTATE E. N.L.	72-922	1971	480585	5439330	283	-45	137	
A11		EL33/71	ALLSTATE E. N.L.	72-922	1971	480815	5439285	283	-45	138	
A12		EL33/71	ALLSTATE E. N.L.	72-922	1971	480650	5438650	283	-45	123	
A13		EL33/71	ALLSTATE E. N.L.	72-922	1971	480310	5438590	283	-45	56	
A14		EL33/71	ALLSTATE E. N.L.	72-922	1971	480275	5438560	103	-45	91	
A15		EL33/71	ALLSTATE E. N.L.	72-922	1971	480550	5439750	225	-45	91	
A16		EL33/71	ALLSTATE E. N.L.	72-922	1971	479960	5438885	78	-45	76	
A17		EL33/71	ALLSTATE E. N.L.	72-922	1971	479900	5438700	88	-45	76	
A18		EL33/71	ALLSTATE E. N.L.	72-922	1971	480050	5438715	103	-45	78	
SL1	MT VULCAN		DOM	NYE, 1930	1929	479800	5438690		-90	168	
ANDERSON'S CREEK 1			DOM	HUGHES, 1961	1961	481300	5435700	270	-50	48	
AC1			DOM	ISM LEDGER LIB.	1970	481100	5435300		-90	153	
AC2			DOM	ISM LEDGER LIB.	1970	481100	5435350		-90	126	

Results from this work were:

- At two locations within the layered *gabbronorite-pyroxenite sequence*, fine grained, intercumulus textured pyrrhotite-pentlandite-chalcopyrite was observed. The gabbronorite-pyroxenite sequence is exposed over 1.5 sq km in the NW and W of the ACC (479500mE 5441000mN), and has not been tested by drilling. Best results from analysis of rock chip samples of the sulphide bearing gabbronorites are 171 ppm Ni, 40 ppm Co, and 125 ppm Cu.

- A sample of weathered magmatic magnetite schlieren outcrop returned a best assay of 3155 ppm Ni and 119 ppm Co.

- Intensely silicified and ferruginous slate, and slate with rare quartz veinlets from the *Cambrian quartzite-slate-chert sequence* assayed up to 248 ppm As. Au values were low.

3.2.3 Soil Geochemistry

Results from a program of C-horizon soil sampling (39 samples) across the faulted *ultramafic complex and Cambrian quartzite-slate-chert sequence contact* were generally disappointing, and downgraded the potential for significant Au mineralisation. However, the widely spaced sampling traverses leave scope for untested near surface mineralisation. Structurally controlled Au mineralisation at this position is a valid target given:

- DDH Scotts Hill1 intersected 3 m @ 0.94 ppm Au at this contact
- except for DDH Scotts Hill1, the target is unexplored
- significant Au mineralisation, possibly related to the ultramafic complex, occurs nearby at Beaconsfield

Sample locations are shown on Plan Tv 941. Sample ledgers with assay results are included in Maher (1995) - Appendix IV.

Results from this work were:

- A sample taken at the contact 400m south of DDH Scotts Hill1 assayed 0.4 ppm Au. Adjacent (25 m interval) samples lack elevated Au and Au pathfinder element results.
- A weak 20 m >22 ppm As anomaly corresponds to a silica flooded zone at the contact (478800mE 5441400mN).
- Several samples with elevated As occur within the Cambrian host sequence. The best anomaly is 151-217 ppm As over 30 m (open to W) at 478900mE 5440250mN.
- Samples of ultramafic derived soil have a relatively high Co-Ni-Fe tenor.

Results from a soil sampling traverse (18 samples) across observed Ni-sulphide mineralisation within the *gabbronorite-pyroxenite sequence* (479500mE 5441000mN) were disappointing, and downgraded the potential for significant near surface Ni-sulphide within the area sampled. Sample locations are shown on Plan Tv 941. Sample ledgers with assay results are included in Maher (1995) - Appendix IV.

Results from this work were:

- A 180m wide zone of slightly elevated Ni-Cu corresponds to the area where Ni-sulphides were observed.
- Best soil assay was 676 ppm Ni, however, Mn scavenging (1989 ppm Mn) is probably responsible for this and several other elevated Ni and Cu results.

3.2.4 Orientation Pisolite Geochemistry

Barnes Hill
Results from pisolite sampling (31 samples) at *Barnes Hill* testing for metal zonation of more immobile Ni-sulphide pathfinder elements were disappointing, and downgrade potential for significant combined PGE-Ni-sulphide mineralisation.

Sample locations are shown on Plan Tv 941. Sample ledgers with assay results are included in Maher (1995) - Appendix IV.

Results from this work were:

- Best PGE values were 0.8 ppb Pd and 1.2 ppb Pt.
- 100 m wide zone with slightly elevated Pt (unsupported by Pd Au Ni)

3.2.5 IP-Resistivity Survey

Barnes Hill
IP data collected along a 3.5 km line profiling the ultramafic complex (Plan Tv 941), including *Barnes Hill*, indicates the ultramafic has unusually high phase values (equivallent to chargeability) with areas regularly exceeding 50 mrad. The response is strongly horizontally stratified, suggesting the cause is not exposed at surface. Highest phase values occur within 300 m of the W and E contacts. The response is consistent with disseminated sulphides or magnetite at depth.

IP data is shown on Tv 1020. Table 2 lists conversions between AMG, Grid, and IP co-ordinates.

ANDERSON'S CREEK EL35/92
IP GRID

AMGE=Grid East+400000
AMGN=Grid North+5430000

		Corresponding co-ordinates used for IP & ground magnetic surveys		
Grid East	Grid North	IP East	IP North	Grid Bearing
79175	7045	5400	10000	90 AMG
79225	7045	5450	10000	90 AMG
79275	7045	5500	10000	90 AMG
79325	7045	5550	10000	90 AMG
79375	7045	5600	10000	90 AMG
79425	7045	5650	10000	90 AMG
79475	7045	5700	10000	90 AMG
79525	7045	5750	10000	90 AMG
79575	7045	5800	10000	90 AMG
79625	7045	5850	10000	90 AMG
79675	7045	5900	10000	90 AMG
79725	7045	5950	10000	90 AMG
79775	7045	6000	10000	90 AMG
79825	7045	6050	10000	90 AMG
79875	7045	6100	10000	90 AMG
79925	7045	6150	10000	90 AMG
79975	7045	6200	10000	90 AMG
80025	7045	6250	10000	90 AMG
80075	7045	6300	10000	90 AMG
80125	7045	6350	10000	90 AMG
80175	7045	6400	10000	90 AMG
80225	7045	6450	10000	90 AMG
80275	7045	6500	10000	90 AMG
80325	7045	6550	10000	90 AMG
80375	7045	6600	10000	90 AMG
80425	7045	6650	10000	90 AMG
80475	7045	6700	10000	90 AMG
80525	7045	6750	10000	90 AMG
80575	7045	6800	10000	90 AMG
80625	7045	6850	10000	90 AMG
80675	7045	6900	10000	90 AMG
80725	7045	6950	10000	90 AMG
80775	7045	7000	10000	90 AMG
80825	7045	7050	10000	90 AMG
80875	7045	7100	10000	90 AMG
80925	7045	7150	10000	90 AMG
80975	7045	7200	10000	INFLECTION POINT
81024	7034	7250	10000	103 AMG
81072	7023	7300	10000	103 AMG
81121	7011	7350	10000	103 AMG
81170	7000	7400	10000	103 AMG
81219	6989	7450	10000	103 AMG
81267	6978	7500	10000	103 AMG
81316	6966	7550	10000	103 AMG
81365	6955	7600	10000	103 AMG
81413	6944	7650	10000	103 AMG
81462	6933	7700	10000	103 AMG
81511	6921	7750	10000	103 AMG
81560	6910	7800	10000	103 AMG
81608	6899	7850	10000	103 AMG
81657	6888	7900	10000	103 AMG
81706	6876	7950	10000	103 AMG
81755	6865	8000	10000	103 AMG
81803	6854	8050	10000	103 AMG
81852	6843	8100	10000	103 AMG
81901	6831	8150	10000	103 AMG
81949	6820	8200	10000	103 AMG
81998	6809	8250	10000	103 AMG
82047	6798	8300	10000	103 AMG
82096	6786	8350	10000	103 AMG
82144	6775	8400	10000	103 AMG
82193	6764	8450	10000	103 AMG
82242	6753	8500	10000	103 AMG
82290	6741	8550	10000	103 AMG
82339	6730	8600	10000	103 AMG
82388	6719	8650	10000	103 AMG
82437	6708	8700	10000	103 AMG
82485	6696	8750	10000	103 AMG
82535	6685	8800	10000	103 AMG

Table 2. AMG-Grid-IP co-ordinate conversion table.

4. Exploration Completed in the 12 Months Ending 16th April, 1996

4.1 Sulphide Indicator Sampling

Results from sampling of weathered serpentinite underlying nickeliferous laterite testing for metal zonation of relatively immobile sulphide indicator elements were disappointing. 12 half core samples from King Island Scheelite drilling at ***Barnes Hill***, Scotts Hill, Mt. Vulcan and The Flat were analysed by ALS for Ag Cu Pb Zn Ni Co Fe Mn by IC586, and Au Pt Pd by (FA) PM223. Geochemical sample ledgers and laboratory reports are included in Appendix I.

Best result was 19 ppb Pt. Pt results were unsupported by Pd Au Ni, and do not define coherent anomalies.

4.2 Petrophysical Analysis of Drill Core

Petrophysical, geochemical, and petrological tests on fresh serpentinite core from 2 km north of the IP line indicate some high phase values can in part be attributed to significant disseminated magnetite. This result downgrades the high phase values in IP survey data.

Results from petrophysical analysis of fresh ultramafic (8 samples), acquired to aid interpretation of data from the IP survey, are included in Appendix II. Samples are half core from BHP and Allstate Exploration drilling. Limited geological information does not allow correlation between these rocks and rocks exposed along the IP survey line

6 samples were additionally analysed by ALS for S by LECO (Appendix I). The S value of sample 3989189 indicates total sulphide abundances well below that required to source the corresponding high phase lag values. Petrology (Appendix III) failed to identify "conventional" sources (sulphide, ilmenite, graphite, etc.) for the high phase lag values of samples 3989189 and 3989849. These samples have particularly abundant (~5%) spinel - which may be in part responsible for the high phase lag values.

5. Rehabilitation

A 3.5 km grid line was cut to allow collection of IP data. 1.0 x 0.8 x 0.3 m hand dug IP pits, spaced at 50 m intervals along the grid line, were rehabilitated by replacing top soil on completion of the survey.

6. References

Anonymous,	1966?	Report to Tasmanian Mines Department on EL's 3/65 and 14/65. Broken Hill Proprietary Co. Ltd.
Anthony, P.J.,	1967	Report No.1 - Beaconsfield nickel prospect, Tasmania. King Island Scheelite (1947) Limited.
Anthony, P.J.,	1967	Report No.2 - Beaconsfield nickel prospect, Tasmania. King Island Scheelite (1947) Limited.
Anthony, P.J.,	1968	Report No.3 - Beaconsfield nickel prospect, Tasmania. King Island Scheelite (1947) Limited.
Anthony, P.J.,	1969	Beaconsfield nickel prospect, Tasmania - a progress report. P.J. Anthony & Partners.
Clayton, J.M., Lawler, J.W., Turner, A.R., & Wilmshurst, R.E.	1968	Report on the evaluation of the Beaconsfield nickel prospect. International Technical Services Limited.
Elliot, C.G., Woodward, N.B. & Gray, D.R.	1993	Complex regional fault history of the Badger region, northern Tasmania. Australian Journal of Earth Sciences 40, p. 155-168.
Gee, L.G. & Legge, P.J.	1979	Geological atlas 1 mile series. Zone 7, Beaconsfield, edition 2: Tasmanian Geol. Survey, Expl. Pert. Sheet 30 (8215N).
Green, D.H.	1959	Geology of the Beaconsfield district, including the Anderson's Creek Ultrabasic Complex. Queen Victoria Mus. Rec. Launceston, New Series, 10, p. 1-25.
Hughes, T.D.	1965	Nickel mineralisation in Tasmania. In Eighth Commonwealth Mining and Metallurgical Congress 1, p. 523-524
Knight, C.L.	1958	Beaconsfield nickel deposit. Enterprise Exploration Company Proprietary Limited.
Maher, S.	1994	EL 35/92 Anderson's Creek, Tasmania. Annual report for the period ending 16th April, 1994. CRAE Report No. 19644.

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Newman, J.K.	1965	Airborne proton magnetometer survey Beaconsfield area, Tasmania. AMEG Pty. Ltd.
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Summons, T.G. Green, D.C., & Everard, J.L.	1981	The occurrence of chromite in the Anderson Creek Area, Beaconsfield, Tasmania: Econ. Geol. 76, p. 505-518.
Thureau, G.	1883	Beaconsfield and Salisbury mining district, house of Assembly Pap. Tasm. 1883 (51).
Twelvetrees, W.H.,	1903	Report on the Mineral Resources of Beaconsfield and Salisbury, Mines Department, Tasmania.
Zeissink, H.E.,	1969	The mineralogy and geochemistry of a nickeliferous laterite profile (Greenvale, Queensland, Australia): Mineralium Deposita, 4, p. 25-36.

7. Location

Launceston	1:250,000	SK55-4
Tamar	1:100,000	8215

8. Keywords

Nickel, Laterite, Cambrian, Rock Geochemistry, Ultrabasic, Chemical Analysis, Literature Review.

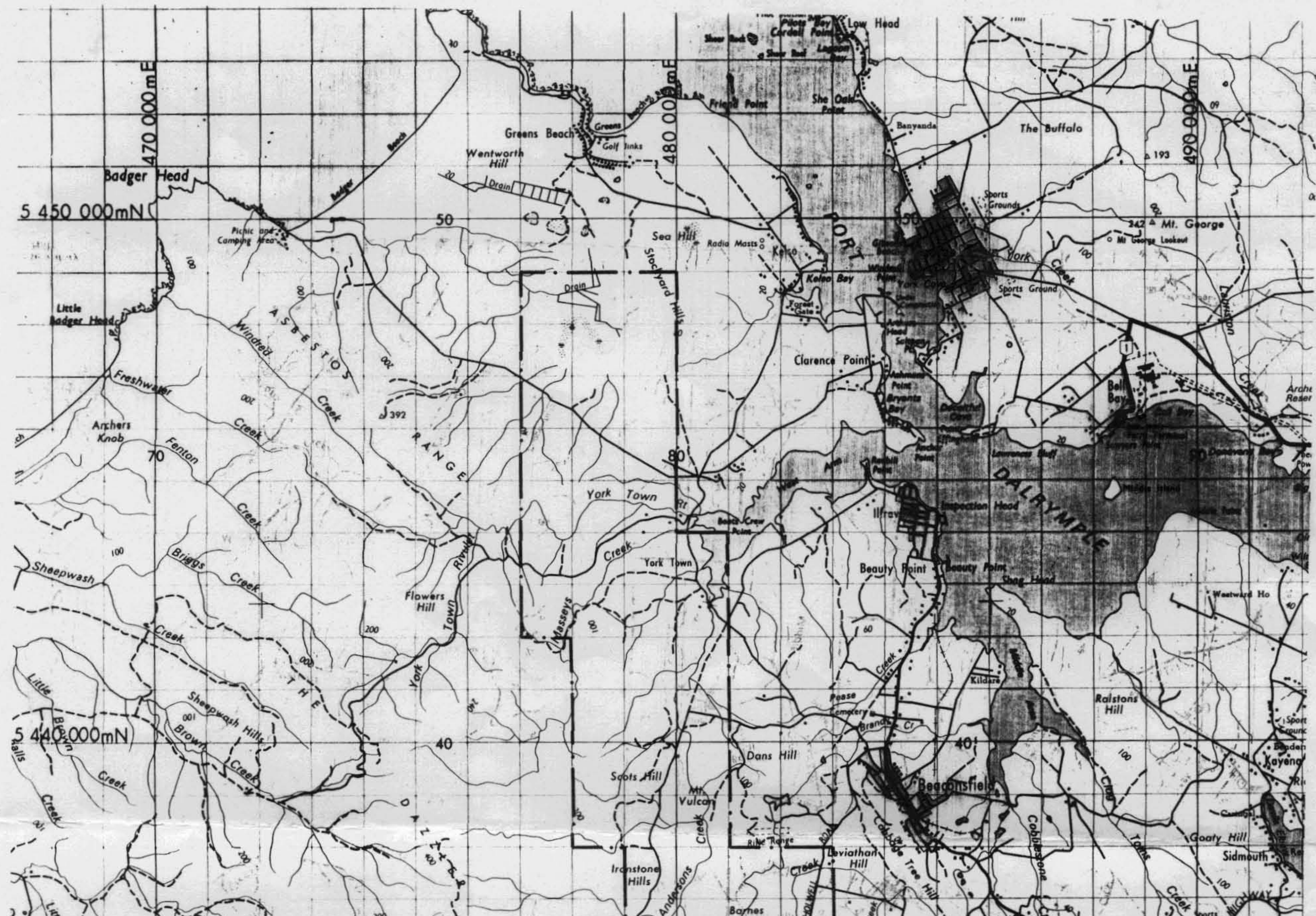
9. DPO Register

77235, 77236, 77237.

CRA Exploration Pty Limited
DPO Register

EL 35/92 Anderson's Creek

DPO Number	LAB Batch Number	Lab Name	Lab Location	Office Date	Geologist	Tenement Number	Tenement Name	Sample Type	Number of Samples	250,000 Map Sheet	100,000 Map Sheet
77235		Don Emerson	Portland	03/07/1995	S Maher	EL 35/92	Anderson's Crk	Petrology	8	SK55-4	8215
77236	BE3136	ALS	Bendigo	21/8/95	S Maher	EL 35/92	Anderson's Crk	Drill Core	18	SK55-4	8215
77237		Mason Geoscience	Greenhill	23/8/95	S Maher	EL 35/92	Anderson's Crk	Petrology	3	SK55-4	8215



707018

CRA EXPLORATION PTY. LIMITED

ANDERSON'S CREEK
EL 35/92
LOCATION PLAN

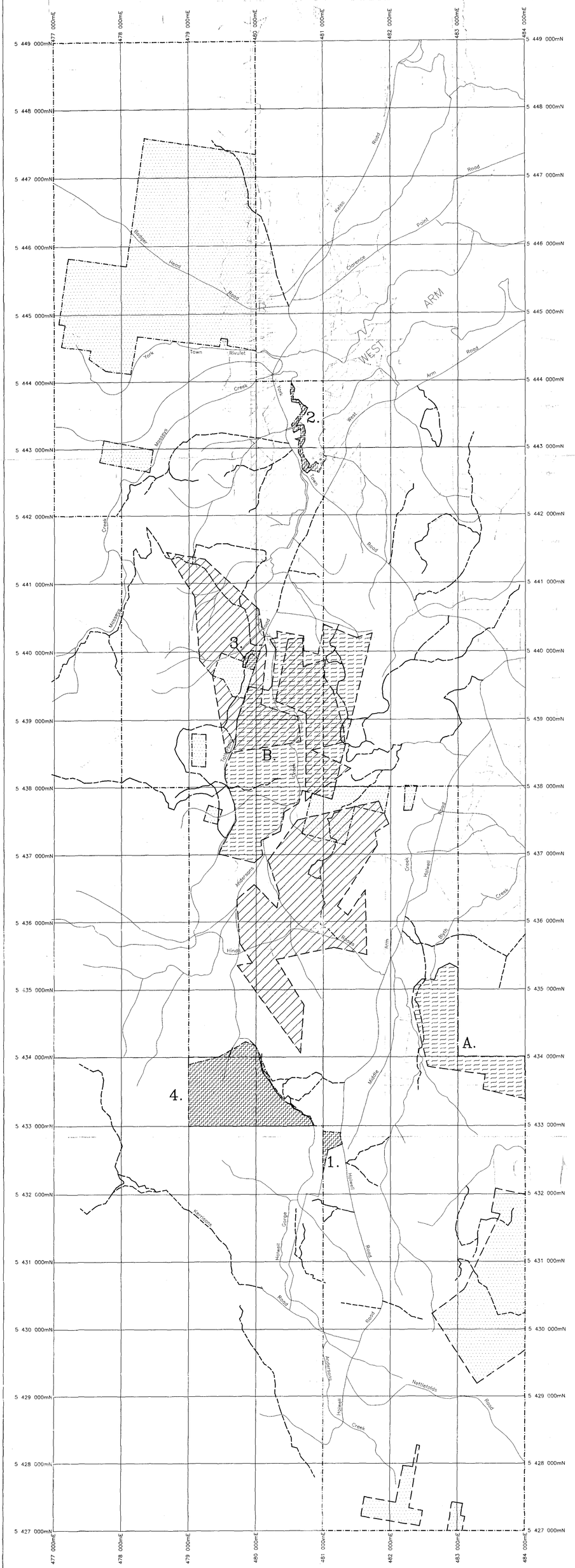
Ref.: SK55-04	Scale: 1:100 000
Author: S. Maher	Report No.: 21114
Drawn: S. Brook	Plan No.: Tv 668

0 1 2 3 4 5 6 7 8 9 10km

5 cm

Mar. 1994

96-3867
FINAL AND THIRD ANNUAL REPORT TO APRIL 1996 EL 35/92 ANDERSONS CREEK - CRA - MAHER S



EL BOUNDARY :

EXCLUDED AREAS :

Mining Leases

1. Holwell Gorge State Reserve
2. West Arm State Recreation Area
3. Crown Reserves
4. Holwell Gorge RAP

RAP AREAS :

A. Peaked Hill RAP
B. Dans Hill RAP

OTHER :

Mt. Vulcan Simmonds Hill Australian Heritage Act Registered Entry

AMG North
Mag. North
12.7

707019

5 cm

96-3867

FINAL AND THIRD ANNUAL REPORT TO APRIL 1996 EL 35/92 ANDERSONS CREEK - CRA - MAHER S

CRA EXPLORATION PTY. LIMITED

ANDERSONS CREEK EL 35/92 Land Status Plan

Ref.: Launceston SK55-04	File: Tv669
Scale: 1 : 25 000	Date: Mar '94 / May '95
Author: S. Maher	Report No.: **21114**
Drawn: S. Brook / T. Sargeant	Plan No.: Tv 669

GEOLOGICAL LEGEND

Quaternary	Qa	River alluvium and marsh deposits.
	Qt	Gravel talus.
Tertiary	Cc	Partially consolidated conglomerate.
	Ts	Sand, clay and gravel.
	TPI	Pisolitic ironstone.
		Unconformity.
Permian	Pl	Masseys Creek Group – mudstone, pebbly siltstone and sandstone.
		Unconformity.
Ordovician	Oct	Cabbage Tree Formation – quartz sandstone.
Cambrian	€s	Slate (✕ – hornfels with andalusite).
Proterozoic	P	Badger Head Group – sandstone, slate and phyllite.

Anderson's Creek Ultramafic Complex.

Cambrian	Cpy	Serpentinite, localised pyroxenite and gabbro norite.
	Hg	Hornblende gabbro
	A	Albitite.
	R	Rodingite.
	ms	Included Septum of metamorphic rocks.

- 50 ⊥ Strike & dip of layering (bedding).
- 50 ⊥ Strike & dip of strain foliation.
- Geological boundary – position accurate.
- Geological boundary – position approximate.
- Fault – position accurate.
- Fault – position approx.
- EL boundary

Geology modified from :

Gee, R.D. and Legge, P.J. 1979. Geological atlas 1 mile Series. Zone 7, Beaconsfield, edition 2 : Tasmanian Geol. Survey, Expl. Pert. Sheet 30 (8215N).

Summons, T.G., Green, D.C. and Everard, J.L. 1981. The occurence of chromite in the Anderson's Creek area, Beaconsfield, Tasmania. Econ. Geol. 76, 505–518.

Elliot, C.G. Woodward, N.B. and Gray, D.R., 1993. Complex regional fault history of the Badger Head region, northern Tasmania. Australian Journal of Earth Sciences 40, 155–168.

Mapping and drill core inspection by S. Maher, 1994.

pitted, ferruginous quartz fault zone

pyrrhotite, pentlandite, chalcopyrite bearing layered gabbro float

chalcopyrite bearing gabbro

felsite

trace ?pentlandite bearing layered pyroxenite–gabbro

Cumulate layering. Increasing number of A, R, Hg ?dykes and gabbro norite inter layers.

dominantly pyroxenrites

talus

tectonised serpentinite

silicified, ferruginous zone

mafic, ?volcaniclastic interbeds

talc–magnesite development

crysotile veins replaced by magnetite

prominent asbestos veining in serpentinite

dominantly pyroxenite

coarse pyroxenite

cumulate layering gabbro norite interlayers

conformable spinel schleiren

boudined tectonised serpentinite

Hg, R, A interlayers and dykes

schist subcrop

relict laterite cover

AMG North

Magnetic North

12.7°

5 cm

0 200 400 600 800 metres

707020

96-3867

FINAL AND THIRD ANNUAL REPORT TO APRIL 1996 EL 35/92 ANDERSONS CREEK - CRA - MAHER S

CRA EXPLORATION PTY. LIMITED

ANDERSONS CREEK EL 35/92

Andersons Creek Ultramafic Complex : Geological Plan

Ref.: Launceston SK55–04	File: Tv884s
Scale: 1 : 10,000	Date: November, 1994
Author: S. Maher	Report No.: **21114**
Drawn: S. Brook	Plan No.: Vv Tv 884

5 442 000mN
5 441 000mN
5 440 000mN
5 439 000mN
5 438 000mN
5 437 000mN
5 436 000mN
5 435 000mN
5 434 000mN
478 000mE
479 000mE
480 000mE
481 000mE
482 000mE
483 000mE

0–91m Quartzite–slate–chert.
91–94m Sulphidic fault zone. 3m @ 0.92g/t Au, 2.4% Zn.
94–205m Orthocumulate textured dunite with magnetite veining. No sulphides observed.

Blue black alteration zones with brassite. Trace sulphides in chrysotile–magnetite veins.

Trace pyrrhotite in chrysotile–magnetite veins.

Rare gabbronorite ?dykes. Trace pyrrhotite in chrysotile – magnetite veins.

Rare carbonate veining.

Trace sulphides in chrysotile–magnetite veins. Possible sulphide disseminations in blue–black alteration zones.

Sandstone and quartzite.

Trace sulphides in chrysotile–magnetite veins.

Rare gabbronorite ?dykes. Trace pyrrhotite in chrysotile– magnetite veins.

Rare ?gabbronorite dykes with mauve alteration halos.

Tested rodingite dyke.
6m @ 0.43% Ni in unweathered serpentinite (?garnierite).
Rare sulphides (veinlet) in alteration halo about dykes.

Tested for laterite beneath Permian cover. Did not test fresh serpentinite.

LEGEND

- BHP Diamond drillhole location. Hole tested aeromagnetic anomaly. Core not assayed.
- Department of Mines Diamond drillhole location.
- King Island Scheelite (1947) Limited Diamond drillhole location. Holes tested Ni grade in laterite profile.
  0.64/0.01: %Ni/%Co in fresh serpentinite at hole bottom.
- Allstate Explorations N.L. Diamond drillhole location. Holes tested asbestos development and type. Core not assayed.
- EL boundary

96-3867

FINAL AND THIRD ANNUAL REPORT TO APRIL 1996 EL 35/92 ANDERSONS CREEK - CRA - MAHER S

AMG North
Magnetic North
12.7

0 200 400 600 800
metres
5 cm

707021

CRA EXPLORATION PTY. LIMITED

ANDERSONS CREEK
EL 35/92
Andersons Creek Ultramafic Complex : Diamond Drillhole Location Plan

Ref.: Launceston SK55–04	File: Tv885s
Scale: 1:10 000	Date: November, 1994
Author: S. Maher	Report No.: 21114
Drawn: S. Brook	Plan No.: Vv Tv885

5 442 000mN
478 000mE
479 000mE
480 000mE
481 000mE
482 000mE
483 000mE
5 441 000mN
5 440 000mN
5 439 000mN
5 438 000mN
5 437 000mN
5 436 000mN
5 435 000mN
5 434 000mN

3989493...
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3989165
3530532
3989164
3989173
3989302
3989301
3530533..4
3530535
3989163
3530537
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3989448
3989447
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3989432
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3530540
3530555..6
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3989184
3530542..3
3530549
3530550
3989315...
...3989319
3530544
3530545
3989185
3989186
3530551
3989182
79175 Grid E 7045 Grid N
5400 IP E 10000 IP N
3989178..81
...3989413
3989401...
...3989414
3989431...
80975 Grid E 7045 Grid N
7200 IPE 10000 IP N
3530509..11
82535 Grid E 6685 Grid N
8800 IP E 10000 IP N
3530524
3530558
3530519
3530523
3530527
3530521..2
3530520
3989183
...3989323
3989320...
3530516
3530517
3530525
3530528
3530526
3530515
3530552
3530518
3530514
3530512..3

LEGEND

- × Soil Sample Location
- ○ Pisolite Sample Location
- ● Rockchip Sample Location
- —··—··— IP Resistivity Survey Location (AMG E = Grid E + 400000 AMG N = Grid N + 5430000)
- — · — · — EL boundary

707022

96-3867

FINAL AND THIRD ANNUAL REPORT TO APRIL 1996 EL 35/92 ANDERSONS CREEK - CRA - MAHER S

AMG North
Magnetic North
12.7

5 cm

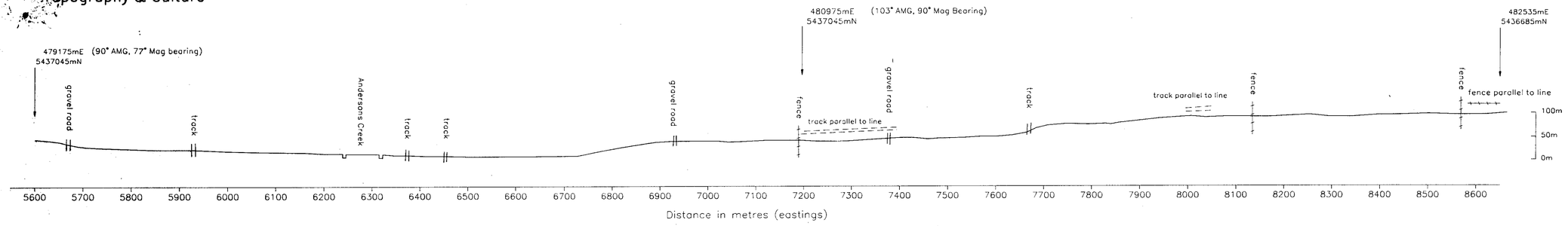
0 200 400 600 800
metres

CRA EXPLORATION PTY. LIMITED

ANDERSONS CREEK
EL 35/92
Compilation

Ref.: Launceston SK55-04	File: Tv941
Scale: 1:10 000	Date: September, 1995
Author: S. Maher	Report No.: **21114**
Drawn: T. Sargeant	Plan No.: Tv 941

Topography & Culture

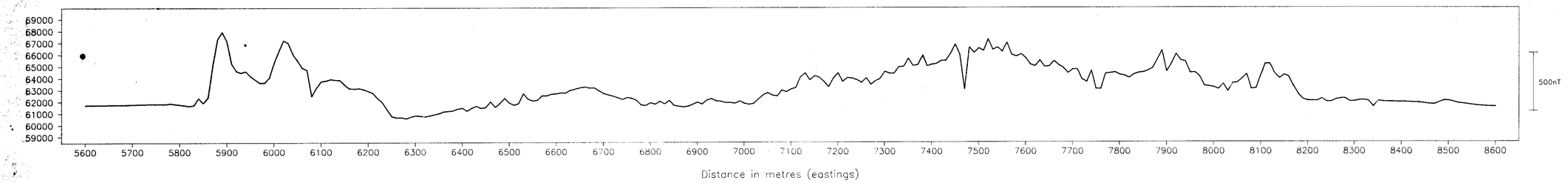


96-3867

FINAL AND THIRD ANNUAL REPORT TO APRIL 1996 EL 35/92 ANDERSONS CREEK - CRA - MAHER S

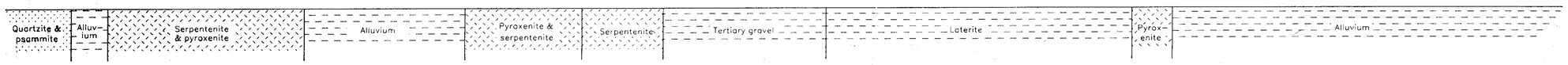
707023

Ground Magnetic Profile



Note: Outcrop topography obtained from S. Maher.

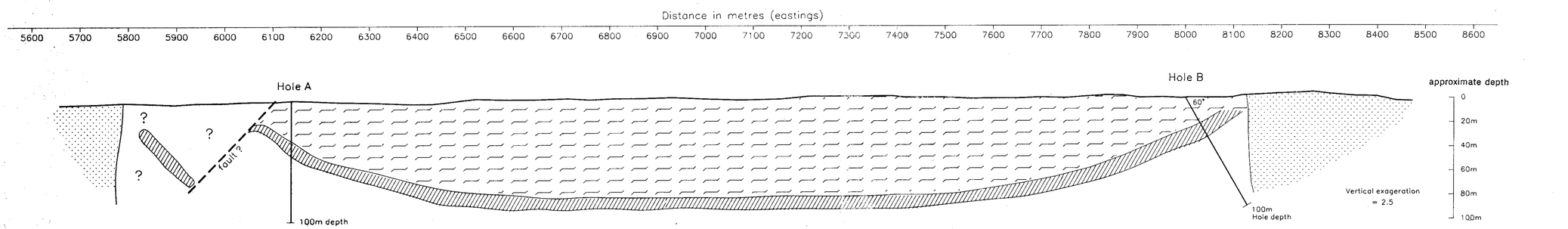
Outcrop



LEGEND

- Recent cover
- Ultramafics
- Metasediments

Geological Interpretation

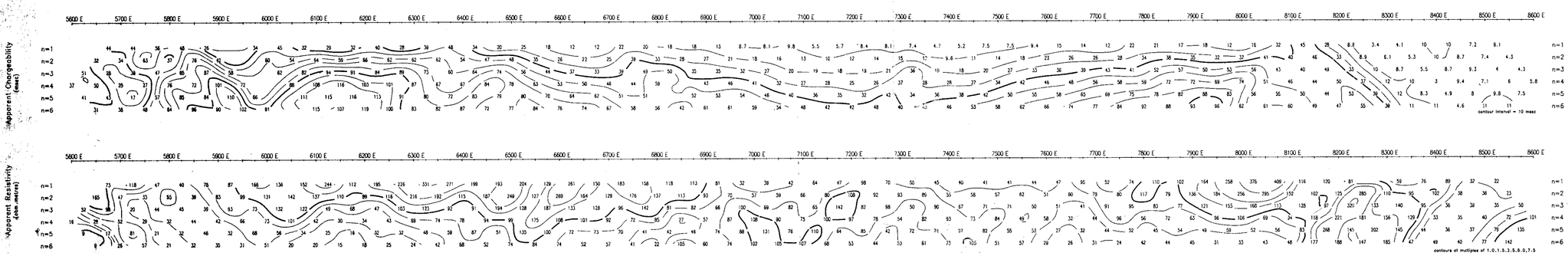


LEGEND

- Metasediments
- Layered ultramafic
- Chargeable (sulphide?) layer in ultramafics

5 cm

IP Pseudosection



LEGEND

Array	:Dipole - Dipole
Dipole Length	:50m
Surveyed by	:Zonge Engineering
Survey Date	:February 1995
Job #	:257
Transmitter	:GGT-10
Receiver	:Zonge GDP-16
Timing Sequence	:2 sec on / 2 sec off
Client	:CRA Exploration

50 0 50 100 (meters)

1:100000 ref map – Tamar 8215

CRA EXPLORATION PTY LIMITED

EL 35/ 92

Andersons Creek Prospect

Line : 10000N

Geophysical & Geological Profiles and Sections

AUTHOR	DRAWN	DATE	SCALE	REPORT
J Tessaldar	D Oliver	Nov 1995	1:5000	21114
REF. Tasmania NE SK-55		SUR-DIR	PLAN No. (Tie)	Tv1020

Appendix I

Geochemical Ledgers and Laboratory Reports

CRA EXPLORATION PTY. LIMITED Drill Sample Geochemical Ledger

Prospect	Hole	DFrom	DTo	Sampno	DPO	MRTLith	FieldID	Texture	Alt/Min	Colour	Comments
Allstate Exploration	A10	124.7	125.6	3989187	77225 77236	Epy	Ius	Fs	PyPo		1% sulphide lining serp.-Mt slick. k=100x10-5SI.
Allstate Exploration	A18	63.7	64.3	3989188	77225 77236	Epy	Iu				Pyroxenite w/ 1% ?garnet. k=200x10-5SI.
Allstate Exploration	A15	74.1	74.2	3989189	77225 77236	Epy	Ius	Ds	PyPo		Rare fine grained sulphide intergrown w/ 5% Ds spinel. k=8700x10-5SI
Allstate Exploration	A15	80.8	80.9	3989190	77225 77236	Epy	Ius	Fs	Py		Trace fine grained sulphide on Mt-serp. seams. k=20x10-5SI
Allstate Exploration	A16	63.7	63.8	3989191	77225 77236	Epy	Iu				Pyroxenite. Brassite may be sulphide. k=30x10-5SI
Allstate Exploration	A16	68.9	71.4	3989192	77225 77236	Epy	Iu				Pyroxenite w/ 1% ?garnet. k=1600x10-5SI
DOM	Anderson's Creek No.1			3989193	77225	Epy	Ius	Vn	Py		Alteration halo about rodingite dyke.
BHP	Scotts Hill No.1	94	94.2	3989194	77225	Epy	Of		Ovq		N carbonaceous material with quartz filled foliation.
BHP	Scotts Hill No.1	91	94	3989195	77225	Epy	Of	Vn	Ovq		Pitted, sulphidic carbonaceous buck quartz.
King Island Scheelite	4	13	13.1	4140850	77236	Epy	Ius		We Mn		3% Ds spinel. Asbestos-mt seams. k=1110x10-5SI.
King Island Scheelite	5	11.5	11.6	4140851	77236	Epy	Ius		We Mn		3% Ds spinel. Asbestos-mt seams. k=2660x10-5SI.
King Island Scheelite	6	16.2	16.3	4140852	77236	Epy	Ius				k=2030x10-5SI.
King Island Scheelite	7b	13.4	13.5	4140853	77236	Epy	Ius		Sl		k=1260x10-5SI.
King Island Scheelite	8	30	30.1	4140854	77236	Epy	Ius		We		1% Ds spinel. k=348x10-5SI.
King Island Scheelite	9	6.7	6.8	4140855	77236	Epy	Ius		We		Asbestos-Mt seams + Ds spinel. k=890x10-5SI.
King Island Scheelite	11	5.7	5.8	4140856	77236	Epy	Ius		We		Prom. serp.-Mt slicken.. k=2140x10-5SI.
King Island Scheelite	13	18.5	18.6	4140857	77236	Epy	Ius		We		Prom. serp.-Mt slicken.. k=2840x10-5SI.
King Island Scheelite	14	22	22.1	4140858	77236	Epy	Ius		We		k=2120x10-5SI.
King Island Scheelite	15	25.5	25.6	4140859	77236	Epy	Iu		We		Pyroxenite. k=20x10-5SI.
King Island Scheelite	16	24.2	24.3	4140860	77236	Epy	Ius		We Mn		k=80x10-5SI.
King Island Scheelite	17	10.2	10.3	4140861	77236	Epy	Ius		We Mn		k=50x10-5SI.

CRA EXPLORATION PTY. LIMITED Drill Sample Geochemical Ledger

Sampno	As ppm	Au ppm	Co ppm	Cu ppm	Fe%	Mn ppm	Ni ppm	Pb ppm	Pd ppm	Pt ppm	S%	Zn ppm
3989187	13		78	20	4.3	592	864	-5			0.78	45
3989188	20		60	16	3.9	1930	948	-5			-0.01	55
3989189	21		115	41	4.6	476	1780	-5			0.12	49
3989190	25		39	12	2	768	634	-5			0.02	16
3989191	11		32	15	4.5	2550	239	-5			0.02	41
3989192	24		99	15	3.4	355	1460	-5			0.03	42
3989193	15		78	10	3.7	188	1950	-5				34
3989194	7	0.43	42	14	3.6	893	1390	30	-0.01	-0.01		307
3989195	18	0.98	36	45	2.3	125	720	2150	-0.01	-0.01		24100
4140850		-0.001	84	-5	3.51	346	1380	-5	-0.001	-0.001		30
4140851		0.014	80	7	5.02	288	1460	7	-0.001	-0.001		41
4140852		-0.001	100	6	4.38	354	1570	-5	-0.001	0.011		27
4140853		0.003	75	6	3.45	503	1970	-5	-0.001	-0.001		36
4140854		0.004	65	6	3.24	147	2220	-5	-0.001	-0.001		33
4140855		-0.001	82	-5	2.07	250	2060	-5	-0.001	-0.001		30
4140856		-0.001	72	7	3.74	160	1820	-5	-0.001	-0.001		30
4140857		-0.001	88	6	3.79	205	2610	-5	-0.001	0.001		36
4140858		0.004	82	9	4.45	373	1740	-5	-0.001	0.018		37
4140859		-0.001	72	5	4.01	520	780	-5	-0.001	0.001		25
4140860		-0.001	51	12	1.53	288	2010	-5	-0.001	-0.001		31
4140861		-0.001	80	6	1.78	437	679	-5	-0.001	0.019		27

9207026

707027

AUSTRALIAN LABORATORY SERVICES P/L

A.C.N. 009 936 029

ANALYTICAL REPORT

CONTACT: MR S MAHER
CLIENT: CRA EXPLORATION PTY LTD
ADDRESS: P O BOX 8093
NORTHLAND CENTRE
VIC 3072

LABORATORY: BENDIGO
BATCH NUMBER: BE3136
SUB BATCH: 0
No. OF SAMPLES: 6
DATE RECEIVED: 24/08/95
DATE COMPLETED: 08/09/95

ORDER No.: 77236 SAMPLE TYPE: PULP PROJECT:

SAMPLE NUMBER	ELEMENT	S
	UNIT	%
	METHOD	G013
	L.O.R.	0.01
3989187		0.78
3989188		<0.01
3989189		0.12
3989190		0.02
3989191		0.02
3989192		0.03

COMMENTS:

• This is the Final Report which supersedes any preliminary reports with this batch number. • Results apply to sample(s) as submitted by client.

Alice Springs Laboratory
Phone: (089) 52 6020 Fax: (089) 52 6028
Bendigo Laboratory
Phone: (054) 46 1390 Fax: (054) 46 1389
Brisbane Laboratory
Phone: (07) 3243 7222 Fax: (07) 3243 7218
Charters Towers Laboratory
Phone: (077) 87 4155 Fax: (077) 87 4220
Cloncurry Laboratory
Phone: (077) 42 1323 Fax: (077) 42 1685
Kalgoorlie Laboratory
Phone: (090) 21 1457 Fax: (090) 21 6253
Mt Isa Laboratory
Phone: (077) 49 5545 Fax: (077) 49 5546
New Zealand Laboratory
Phone: (07) 575 7654 Fax: (07) 575 7641
Orange Laboratory
Phone: (063) 63 1722 Fax: (063) 63 1189
Perth Laboratory
Phone: (09) 249 2988 Fax: (09) 249 2942
Townsville Laboratory
Phone: (077) 79 9155 Fax: (077) 79 9729

All pages of this report have been checked and approved for release.

707028

AUSTRALIAN LABORATORY SERVICES P/L

A.C.N. 009 936 029

ANALYTICAL REPORT

CONTACT: MR S MAHER
CLIENT: CRA EXPLORATION PTY LTD
ADDRESS: P O BOX 8093
NORTHLAND CENTRE
VIC 3072

LABORATORY: BENDIGO
BATCH NUMBER: BE3136
SUB BATCH: 1
No. OF SAMPLES: 12
DATE RECEIVED: 24/08/95
DATE COMPLETED: 08/09/95

ORDER No.: 77236 SAMPLE TYPE: DRILL CORE PROJECT: 77236

SAMPLE NUMBER	ELEMENT UNIT METHOD L.O.R.	Cu ppm IC587 5	Pb ppm IC587 5	Zn ppm IC587 5	Ag ppm IC587 1	Fe % IC587 0.01	Mn ppm IC587 5
4140850		<5	<5	30	<1	3.51	346
4140851		7	7	41	<1	5.02	288
4140852		6	<5	27	<1	4.38	354
4140853		6	<5	36	<1	3.45	503
4140854		6	<5	33	<1	3.24	147
4140855		<5	<5	30	<1	2.07	250
4140856		7	<5	30	<1	3.74	160
4140857		6	<5	36	<1	3.79	205
4140858		9	<5	37	<1	4.45	373
4140859		5	<5	25	<1	4.01	520
4140860		12	<5	31	<1	1.53	288
4140861		6	<5	27	<1	1.78	437

COMMENTS:

• This is the Final Report which supersedes any preliminary reports with this batch number. • Results apply to sample(s) as submitted by client.

Alice Springs Laboratory
Phone: (089) 52 6020 Fax: (089) 52 6028
Bendigo Laboratory
Phone: (054) 46 1390 Fax: (054) 46 1389
Brisbane Laboratory
Phone: (07) 3243 7222 Fax: (07) 3243 7218
Charters Towers Laboratory
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AUSTRALIAN LABORATORY SERVICES P/L

A.C.N. 009 936 029

ANALYTICAL REPORT

CONTACT: MR S MAHER
CLIENT: CRA EXPLORATION PTY LTD
ADDRESS: P O BOX 8093
NORTHLAND CENTRE
VIC 3072

LABORATORY: BENDIGO
BATCH NUMBER: BE3136
SUB BATCH: 1
No. OF SAMPLES: 12
DATE RECEIVED: 24/08/95
DATE COMPLETED: 08/09/95

ORDER No.: 77236 SAMPLE TYPE: DRILL CORE PROJECT: 77236

SAMPLE NUMBER	ELEMENT UNIT METHOD L.O.R.	Co ppm IC587 5	Ni ppm IC587 5	Pt ppm PM223 0.001	Pd ppm PM223 0.001	Au ppm PM223 0.001	Au PM223 ppm CHECKS 0.001
4140850		84	1380	<0.001	<0.001	<0.001	<0.001
4140851		80	1460	<0.001	<0.001	0.014	0.013
4140852		100	1570	0.011	<0.001	<0.001	<0.001
4140853		75	1970	<0.001	<0.001	0.003	
4140854		65	2220	<0.001	<0.001	0.004	
4140855		82	2060	<0.001	<0.001	<0.001	
4140856		72	1820	<0.001	<0.001	<0.001	
4140857		88	2610	0.001	<0.001	<0.001	
4140858		82	1740	0.018	<0.001	0.004	
4140859		72	780	0.001	<0.001	<0.001	
4140860		51	2010	<0.001	<0.001	<0.001	
4140861		80	679	0.019	<0.001	<0.001	

COMMENTS:

• This is the Final Report which supersedes any preliminary reports with this batch number.

• Results apply to sample(s) as submitted by client.

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Appendix II

Petrophysical Ledgers and Laboratory Reports

sample		*drill hole*	*depth*	*lithology*	*sulph.*	*abund.*	*size*	*comments*	*spinel*	*mag.susc.*
CRAE No	*lab. No*		*m*			*%*	*mm*			*x10-5*
3989187	1	A10	124.7	serpentinite	py po	~1	thin films	lines serp.-mtt slick.		100
188	2	A18	63.7	pyroxenite				1% ?garnet		200
189	3	A15	74.1	serpentinite	py (po)	<<1	<1	intergrown w/ dissem. spinel	~5% dissem.	8700
190	4	A15	80.8	serpentinite	py	<1	<1	dissem. on mtt-serp. slick.		20
191	5	A16	63.7	pyroxenite				brassite may be sulphide		30
192	6	A16	68.9	pyroxenite				1% ?garnet		1600
4140848	7	Scotts Hill	151.8	dunite					2% 2mm dissem.	990
849	8	Scotts Hill	186.0	serpentinite	py	<<1	<<1	dissem.	~5% <1mm dissem. + seams	2600

Description of samples submitted for petrophysical analysis - DPO 77235.

PETROPHYSICAL RESULTS
MEASURED LABORATORY DATA

Systems Exploration (N.S.W.)
Pty Limited

Office:
"Coach Hill", River Rd
Lower Portland
N.S.W. 2756

Postal Address:
Box 6001
Dural Delivery Centre
N.S.W. 2158

Telephone: (045) 791 183
Facsimile: (045) 791 290

STUDY: CRAE Lot 95/5 (Job # 9559)

DATE: 12 August 1995 **AREA**: Tasmanian Ultramafic

REFERENCE: S Maher July 1995 (CRAE P.O. No.77235)

METHODS:

IP Time Domain and Frequency Domain for Samples 1 to 8

Samples vacuum saturated with fresh (50 ohm m) water
and measured in a four electrode water bath

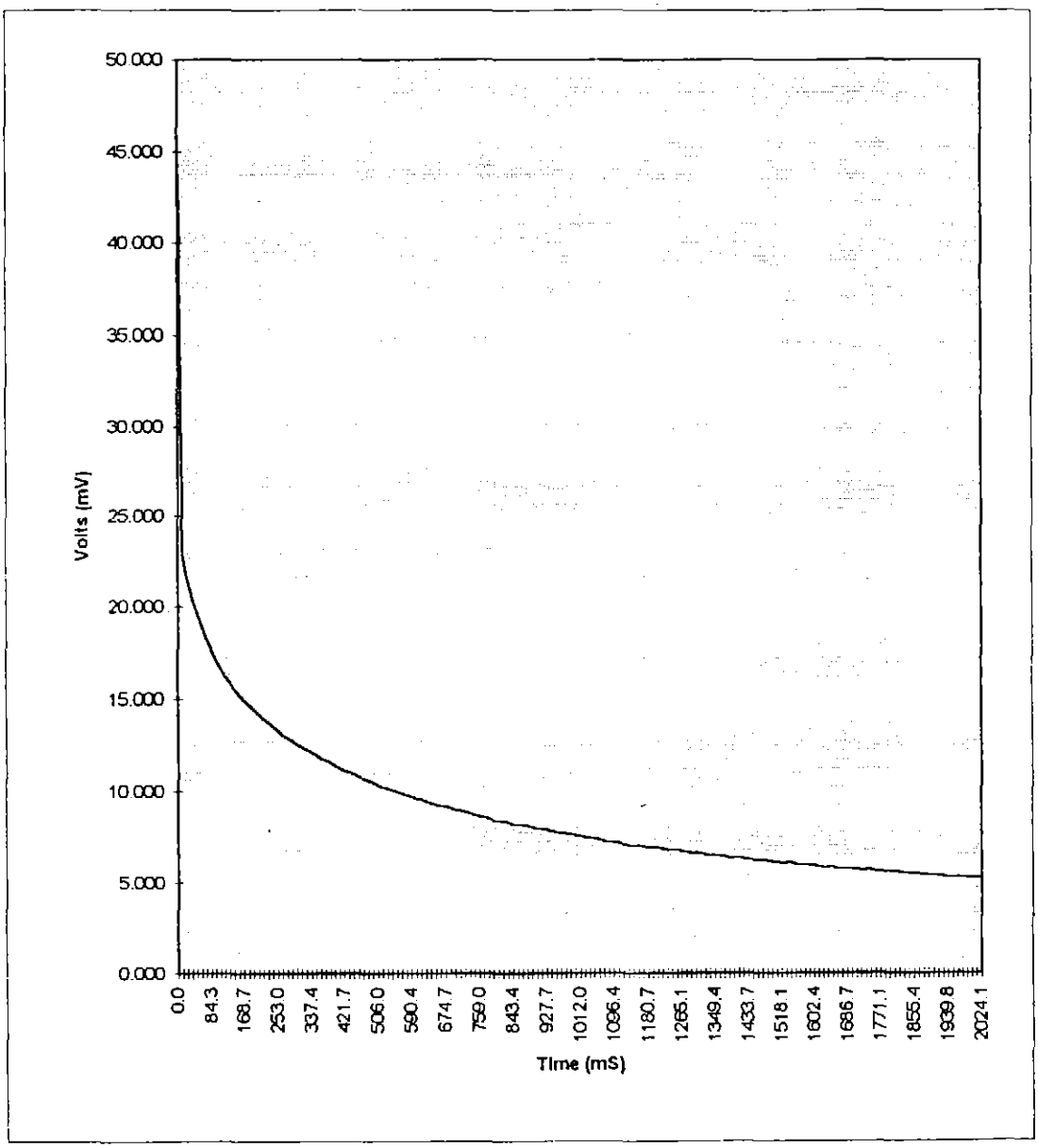
Important Note: These petrophysical data results relate to laboratory measurements on small samples. The extrapolation of these results to large masses of in situ material should take account of sampling statistics, rock texture, structure (e.g. jointing) and other relevant variables e.g. water saturation in electrical studies.

707033

SYSTEMS EXPLORATION (NSW) PTY LIMITED									Data Sheet 1 of 1
Office: "Coach Hill" River Road Lower Portland			Postal Address: Box 6001 Dural Delivery Centre NSW 2158						
			Telephone: (045) 791 183						Date 12 August 1995
			Facsimile: (045) 791 290						
STUDY CRA Lot 95/5 (Job #9559)									
TECHNIQUES IP samples saturated with fresh water & measured in a 4 electrode water bath									
REFERENCE S Maher 3.7.95 CRAE P.O. No. 77235									

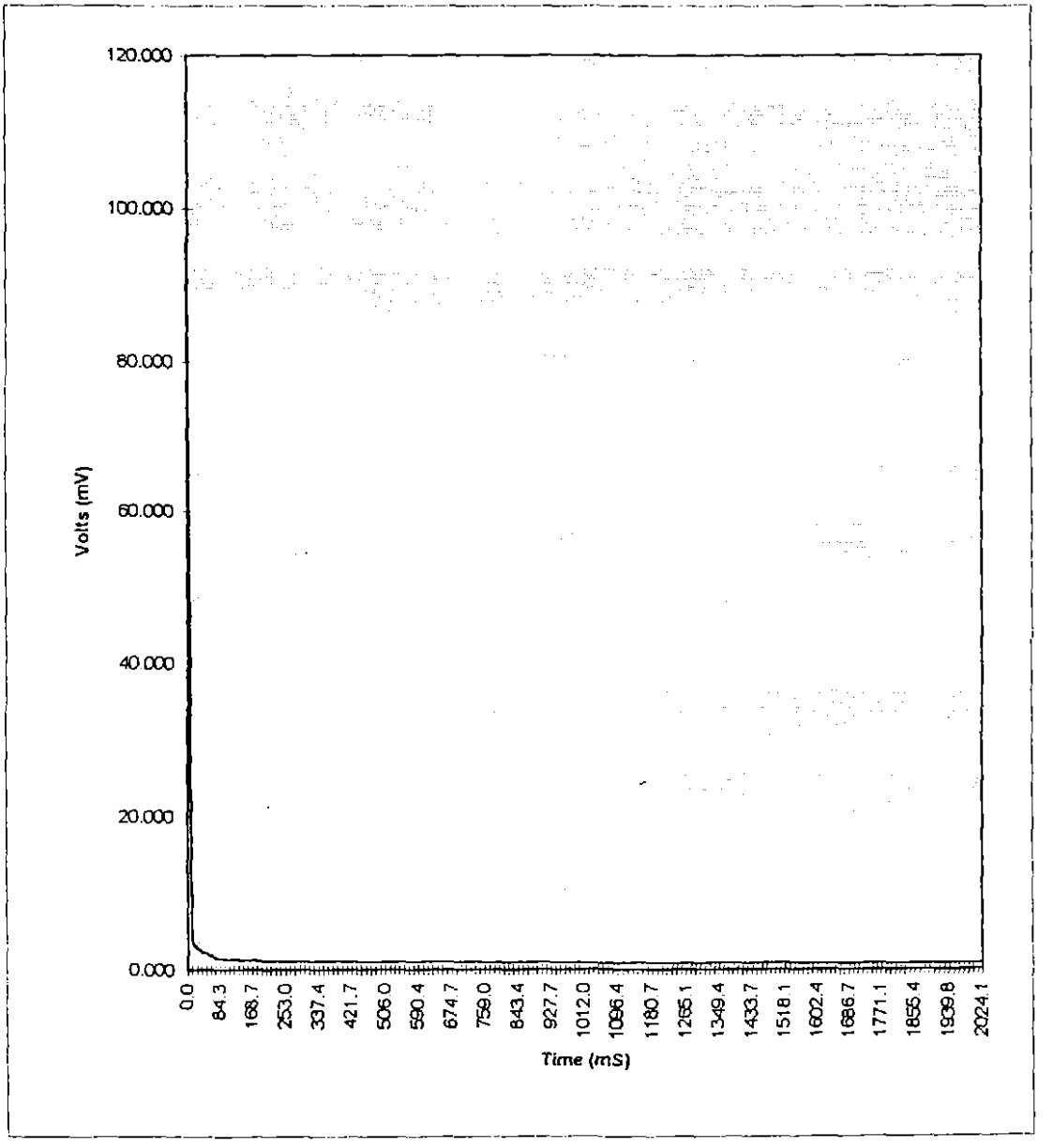
SAMPLES		PHYSICAL PROPERTIES				
split and shattered core		DC resistivity ρ ohm m	IP effect chargeability M ms (450-1150 msecs)	Mag. Susc. $\times 10^{-5}$ SI	Resistivity 20Hz ohm m	Phase Lag 20 Hz milli-radians
#						
1	serp. + mtt, po	104	133	100	86	142
2	serp.pyrox +rare slph in mtt vein	260	7	200	253	7
3	serp. dunite + mtt veins	32	143	8700	11	138
4	serp.pyrox. rare slph in mtt vein	101	3	20	98	6
5	serp. pyrox	399	4	30	392	5
6	serp. pyrox	1706	9	1600	1658	13
7	dunite (orthocum?)	231	6	990	228	12
8	serp. + mtt	286	13	2660	281	55

SPECIMEN No.	#1	of	CRA 95/5 (9559)	DATE:-	18/7/95
AREA =	6.94 sq. cms		LENGTH =	6.29	cms
				A/L =	1.10 cm+1
CURRENT I =	5 uA		J Current Density =	7.2E-07	amp/cm2
ρDC =	103.93 Ωm			7.20E-03	amp/m2
			CHARGEABILITY M =		
ΔV Primary =	47.1 mV		(0 - 2000 ms)	380.5	mV sec/ volt (msec)
Core ohms =	9420		(450 - 1150 ms)	133.00	mV sec/ volt (msec)



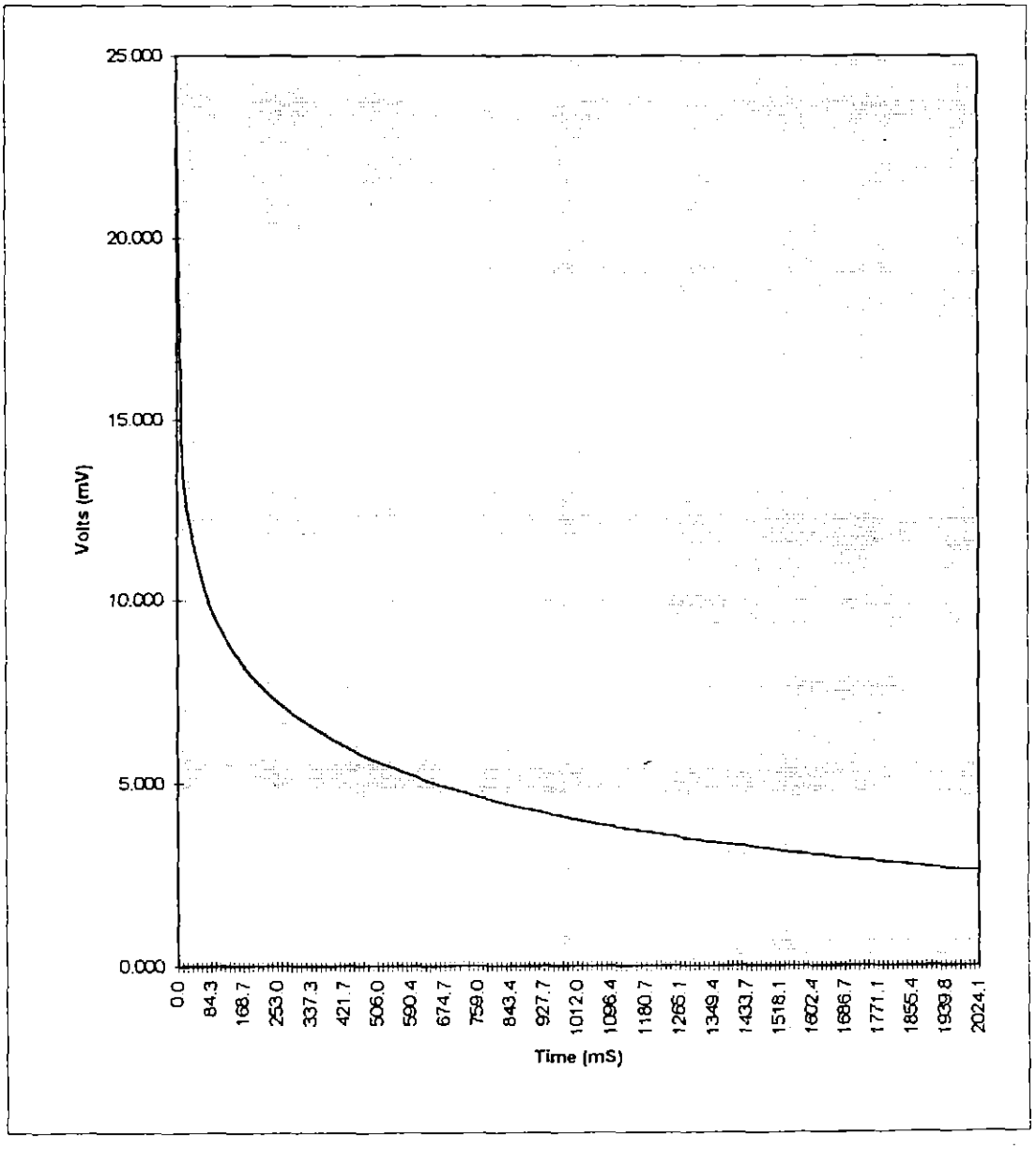
CRA559#1.OUT

SPECIMEN No.	#2	of	CRA 95/5 (9559)	DATE:-	18/7/95
AREA =	3.83 sq. cms		LENGTH =	3.04	cms
			A/L =	1.26	cm+1
CURRENT I =	5 uA		J Current Density =	1.31E-06	amp/cm2
ρDC =	259.53 Ωm			1.31E-02	amp/m2
			CHARGEABILITY M =		
ΔV Primary =	103 mV		(0 - 2000 ms)	25.6	mV sec/ volt (msec)
Core ohms =	20600		(450 - 1150 ms)	6.91	mV sec/ volt (msec)



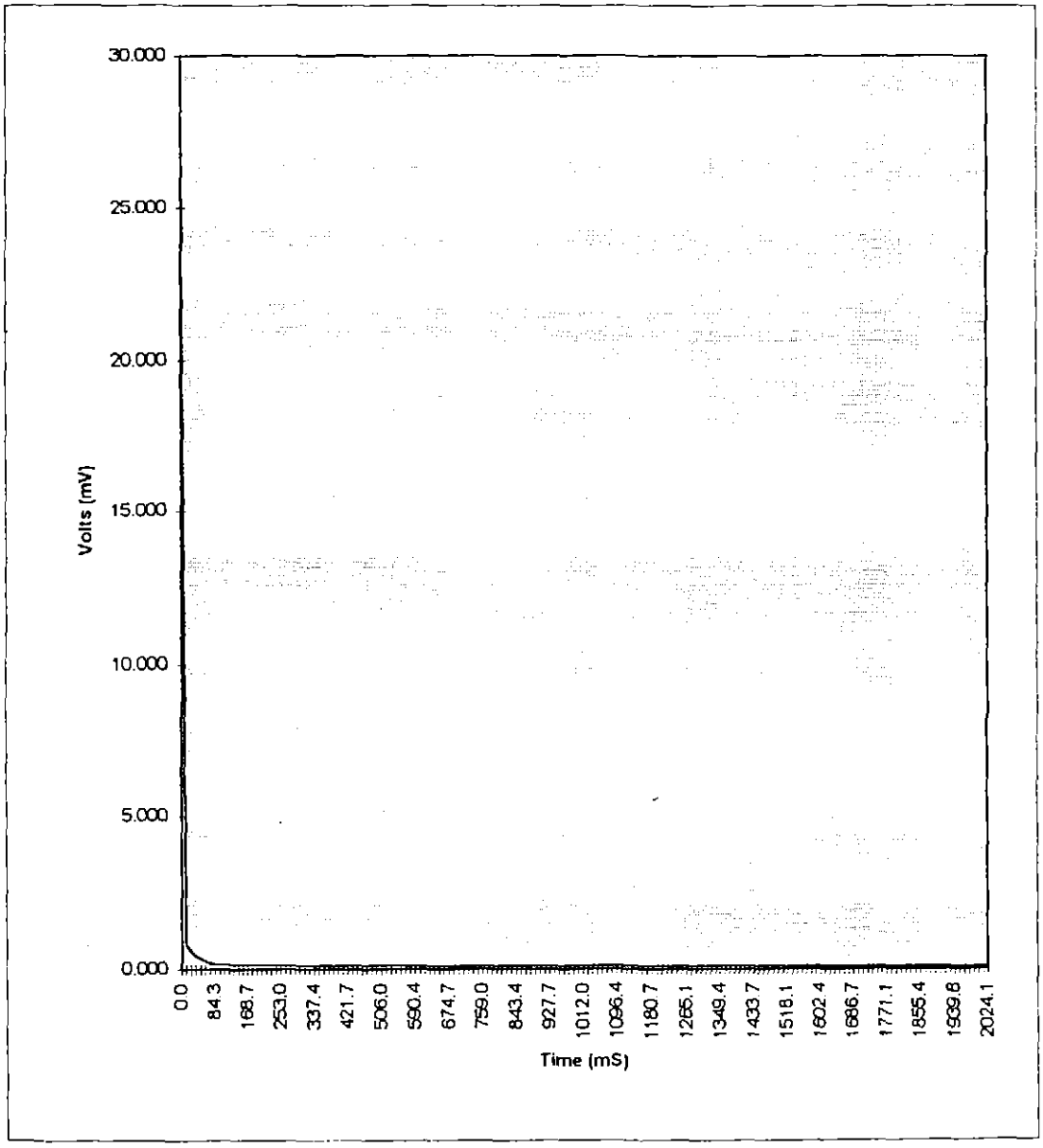
CRA559#2.OUT

SPECIMEN No.	#3	of	CRA 95/5 (9559)	DATE:-	18/7/95
AREA =	2.04 sq. cms		LENGTH =	2.96	cms
				A/L =	0.69 cm+1
CURRENT I =	5 uA		J Current Density =	2.45E-06	amp/cm2
ρDC =	32.39 Ωm			2.45E-02	amp/m2
ΔV Primary =	23.5 mV	CHARGEABILITY M = (0 - 2000 ms)		408.5	mV sec/ volt (msec)
Core ohms =	4700	(450 - 1150 ms)		142.87	mV sec/ volt (msec)



CRA559#3.OUT

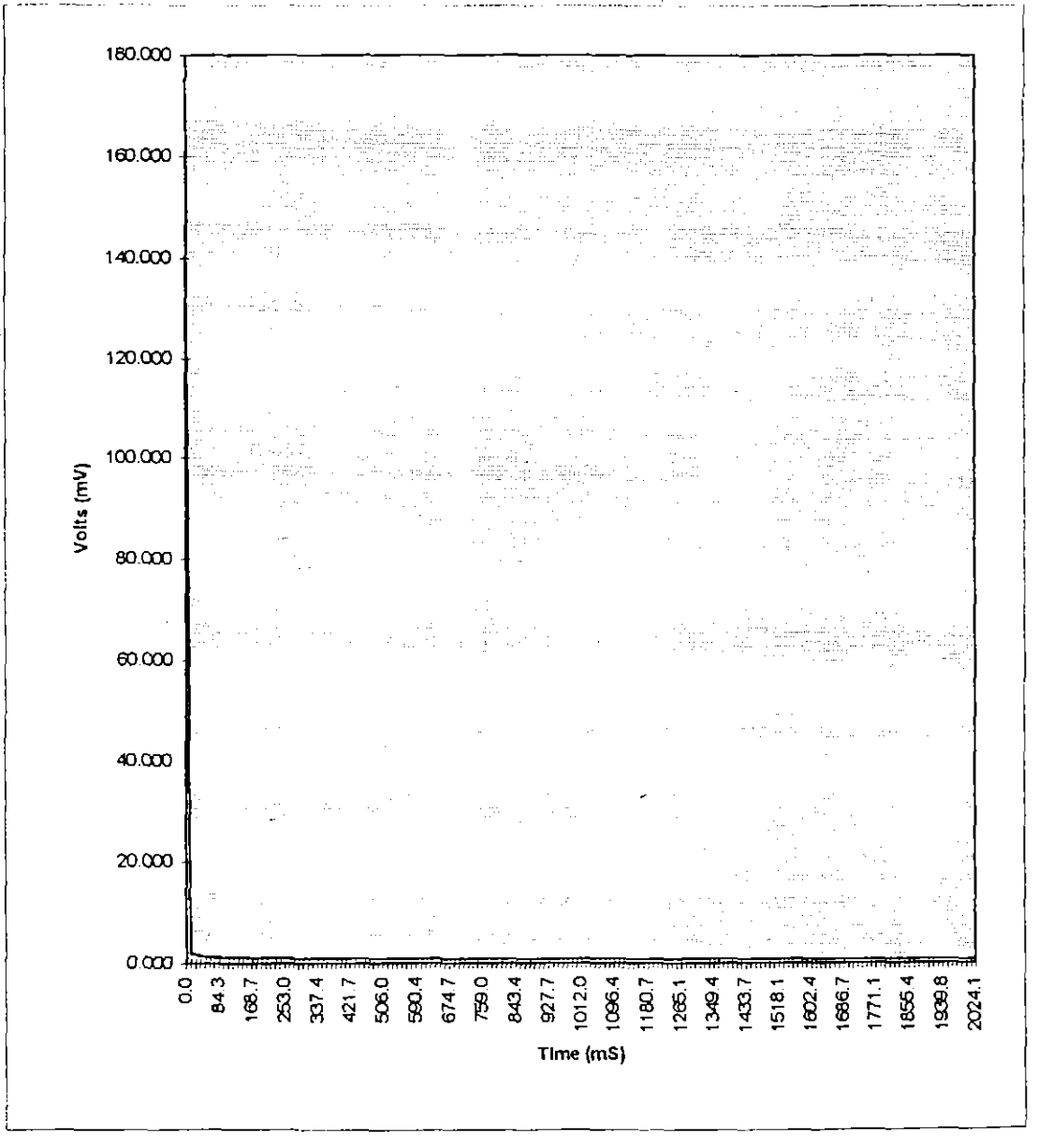
SPECIMEN No.	#4	of	CRA 95/5 (9559)	DATE:-	18/7/95
AREA =	4.04 sq. cms		LENGTH =	2.15	cms
				A/L =	1.88 cm+1
CURRENT I =	5 uA		J Current Density =	1.24E-06	amp/cm2
ρDC =	101.09 Ωm			1.24E-02	amp/m2
			CHARGEABILITY M =		
ΔV Primary =	26.9 mV		(0 - 2000 ms)	15.3	mV sec/ volt (msec)
Core ohms =	5380		(450 - 1150 ms)	3.12	mV sec/ volt (msec)



CRA559#4.OUT

707038

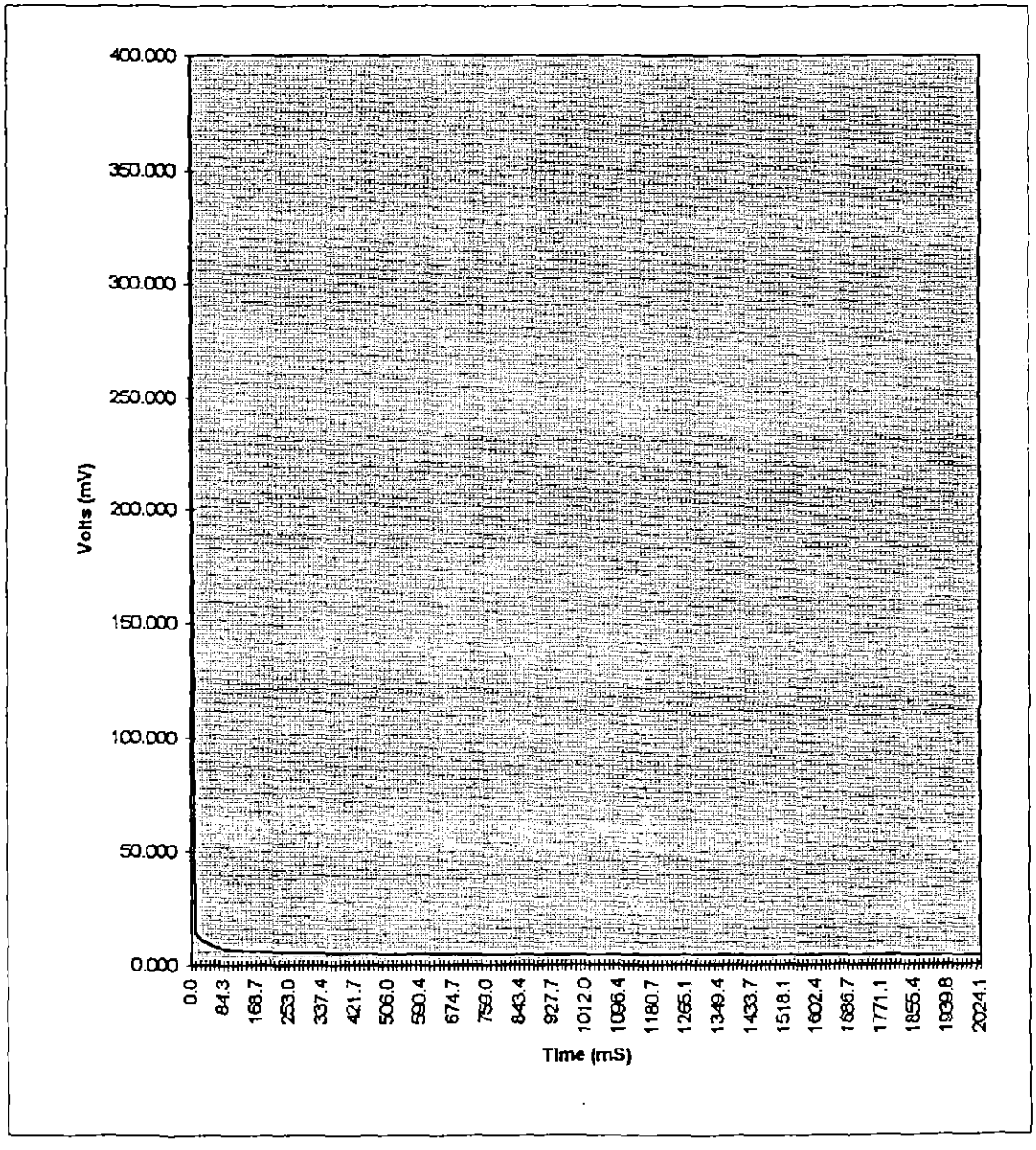
SPECIMEN No.	#5	of	CRA 95/5 (9559)	DATE:-	18/7/95
AREA =	2.85 sq. cms		LENGTH =	2.46	cms
				A/L =	1.16 cm+1
CURRENT I =	5 uA		J Current Density =	1.75E-06	amp/cm2
ρDC =	398.54 Ωm			1.75E-02	amp/m2
			CHARGEABILITY M =		
ΔV Primary =	172 mV		(0 - 2000 ms)	17.0	mV sec/ volt (msec)
Core ohms =	34400		(450 - 1150 ms)	3.90	mV sec/ volt (msec)



CRA559#5.OUT

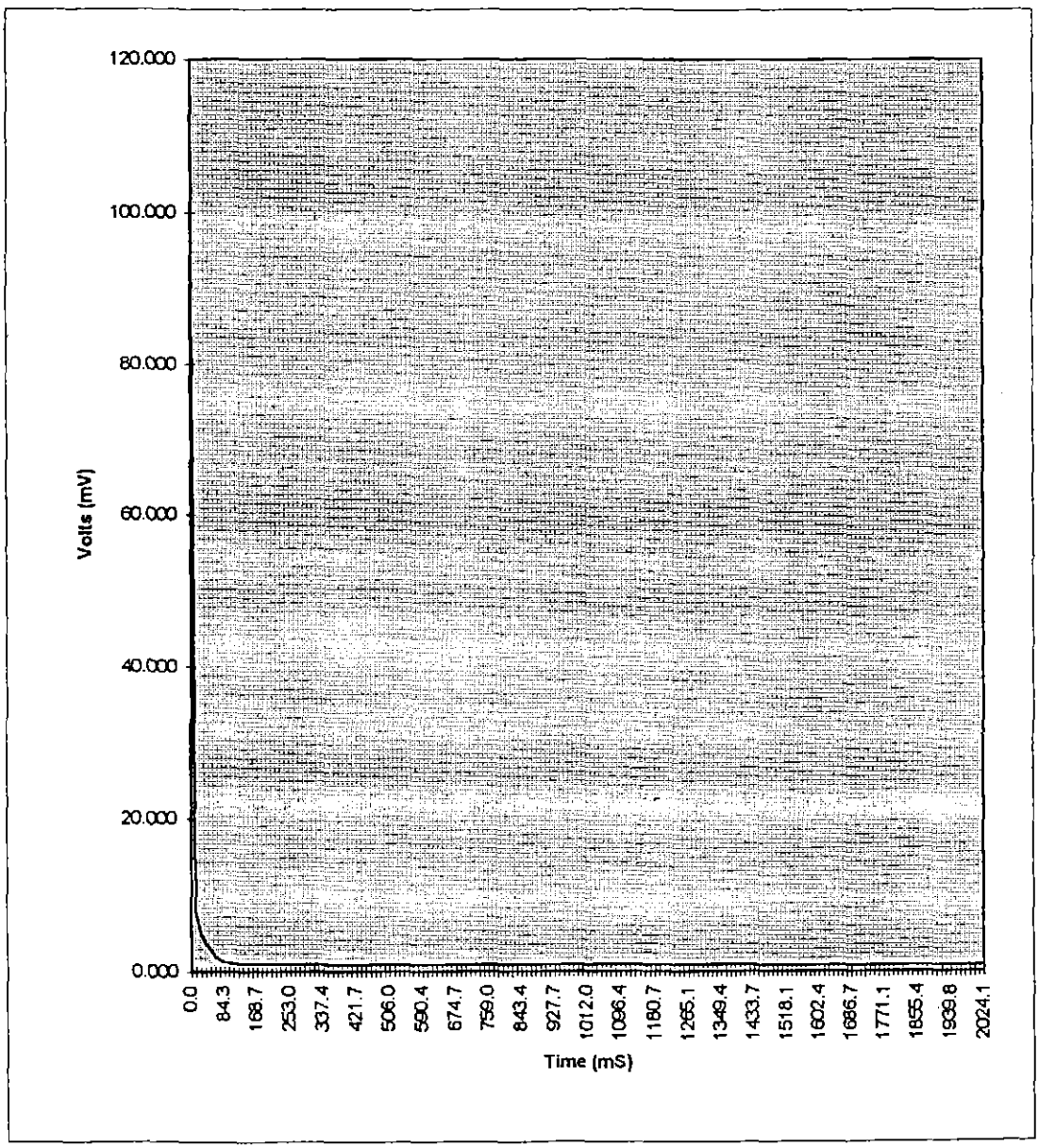
707039

SPECIMEN No.	#6	of	CRA 95/5 (9559)	DATE:-	18/7/95
AREA =	7.29 *sq. cms*		LENGTH =	3.18	cms
				A/L =	2.29 cm+1
CURRENT I =	5 uA		J Current Density =	6.86E-07	amp/cm2
ρDC =	1705.58 Ωm			6.86E-03	amp/m2
			CHARGEABILITY M =		
ΔV Primary =	372 mV		(0 - 2000 ms)	33.0	mV sec/ volt (msec)
Core ohms =	74400		(450 - 1150 ms)	9.42	mV sec/ volt (msec)



CRA559#6.OUT

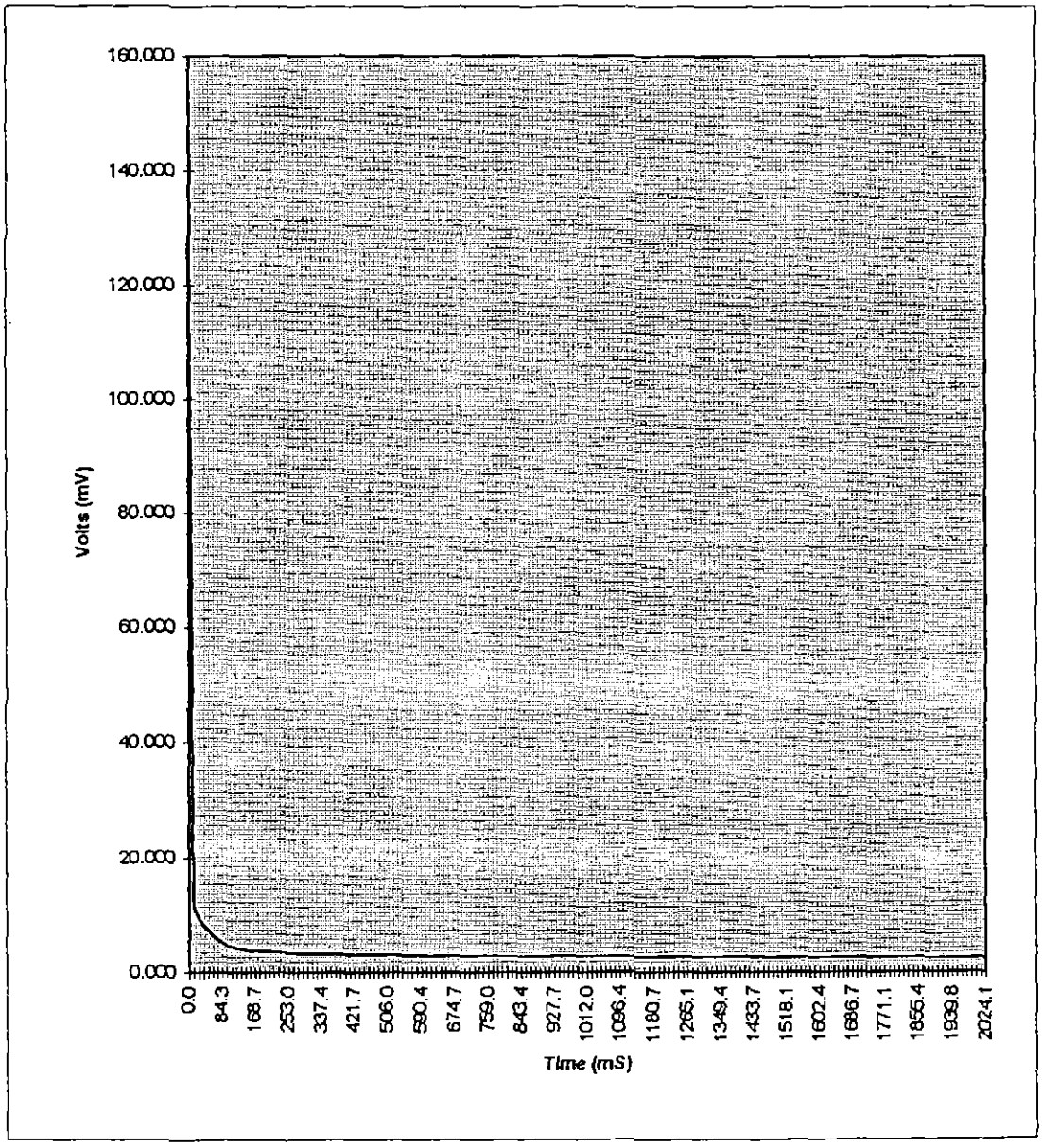
SPECIMEN No.	#7	of	CRA 95/5 (9559)	DATE:-	18/7/95
AREA =	3.53 sq. cms		LENGTH =	3.49	cms
				A/L =	1.01 cm+1
CURRENT I =	5 uA		J Current Density =	1.42E-06	amp/cm2
ρDC =	230.61 Ωm			1.42E-02	amp/m2
			CHARGEABILITY M =		
ΔV Primary =	114 mV		(0 - 2000 ms)	23.1	mV sec/ volt (msec)
Core ohms =	22800		(450 - 1150 ms)	5.63	mV sec/ volt (msec)



CRA559#7.OUT

707041

SPECIMEN No.	#8	of	CRA 95/5 (9559)	DATE:-	18/7/95
AREA =	2.04 sq. cms		LENGTH =	2.23	cms
				A/L =	0.91 cm+1
CURRENT I =	5 uA		J Current Density =	2.45E-06	amp/cm2
ρDC =	285.42 Ωm			2.45E-02	amp/m2
			CHARGEABILITY M =		
ΔV Primary =	156 mV		(0 - 2000 ms)	45.1	mV sec/ volt (msec)
Core ohms =	31200		(450 - 1150 ms)	13.26	mV sec/ volt (msec)



CRA559#8.OUT

Appendix III

Petrology Ledgers and Laboratory Reports

707043

C R A EXPLORATION PTY. LIMITED
ACN 000 057 125

UNIT 1. 23 BELL STREET. PRESTON. VICTORIA 3072. AUSTRALIA

P.O. BOX 8093
NORTHLAND CENTRE 3072
TELEPHONE: 480 1866
FAX: (03) 484 1375

MEMORANDUM TO: Dave Mason

FROM: Simon Maher

Re: DPO 77237

Samples 187, 189, and 849 were taken from the Anderson's Creek Ultramafic Complex - Tasmania. Petrophysical analysis results (*) and hand specimen descriptions for samples are shown in Table 1. Phase lag values (~chargeability) are consistent with significant sulphide or graphite for all samples. Please provide a detailed description of opaque mineralogy (incl. type, modal %, size, distribution) and a brief description of other mineralogy - with emphasis on determining the source of the high phase lag values.

sample	*lithology*	*sulph.*	*abund.*	*size*	*comments*	*spinel*	*mag.susc.*	*phase lag **	*Ni*
			%	*mm*			*x10-5*	*mrad*	*ppm*
3989187	serpentinite	py po	~1	thin films	lines serp.-mtt slick.		100	142	864
189	serpentinite	py (po)	<<1	<1	intergrown w/ dissem. spinel	~5% dissem.	8700	138	1780
849	serpentinite	py	<<1	<<1	dissem.	~5% <1mm dissem. + seams	2600	55	-

Table 1. Description of samples submitted for petrological description.

Please return off-cuts and slides.

Simon Maher.

707044

Mason Geoscience Pty. Ltd.
ACN 063 539 686

Petrological Services for the Minerals Exploration and Mining Industry

PO Box 78, Glenside SA 5065, Australia
141 Yarrabee Road, Greenhill SA 5140, Australia
Ph: 08-390-1507 Fax: 08-390-1194
e-mail :drmason@interconnect.com.au

REPORT TITLE	**Petrographic Descriptions of Three Serpentinites (Anderson's Creek Ultramafic Complex, Tasmania)**
REPORT #	2159
CLIENT	CRA Exploration Pty. Ltd.
ORDER NO.	77237
CONTACT	Mr. Simon Maher

REPORT BY Dr. Douglas R. Mason

SIGNED

for Mason Geoscience Pty. Ltd.

DATE 19 September 1995

Petrographic Descriptions of Three Serpentinites (Anderson's Creek Ultramafic Complex, Tasmania)

SUMMARY

1. Rock Samples

- Three rock samples from the Anderson's Creek Ultramafic Complex (Tasmania) have been studied using petrographic and mineragraphic methods.

2. Brief Results

- Rock names are summarised in Table 1.

TABLE 1: ROCK NAMES

SAMPLE	ROCK NAME
3989187	Veined serpentinite
3989189	Serpentinite (serpentinised chromite peridotite)
3989849	Serpentinite (serpentinised chromite peridotite)

- The primary rock type of all samples was chromite peridotite. It presumably formed by cumulus igneous processes, forming weakly layered assemblages of medium-grained ?olivine ± ?pyroxene + minor chromite.

- Hydration alteration (serpentinisation) has resulted in almost complete alteration of the primary minerals and textures:

  - Serpentine meshwork completely replaced all precursor ferromagnesian silicate mineral/s, and also filled thin fractures and veins.

  - Magnetite partly replaced chromite, formed disseminated granular aggregates, and was concentrated along discontinuous fractures or veinlets.

  - A trace of sulphide formed in all rocks, but in different sites. Some pyrrhotite formed as thin fillings in fractures. Very fine-grained pyrite or pentlandite formed variably as small granular ovoid aggregates, as granular intergrowths with magnetite, and as micron-sized disseminated granules in selvedges of thicker serpentine veins. Optical identification of this latter sulphide is difficult owing to fine grain size, but the relatively Ni-rich geochemical environment supports pentlandite.

- Higher phase lag values (142,138) in the first two samples may be attributed to two features:

  - Higher total sulphide abundance.

  - Sulphide occurrence as disseminated clean grains or aggregates, or as fillings along fractures. In contrast, sulphide in the last sample occurs as intimate intergrowths with magnetite.

1. INTRODUCTION

A collection of three (3) rock samples from the Anderson's Creek Ultramafic Complex (Tasmania) was received on 24 August 1995 from Mr. Simon Maher (CRA Exploration Pty. Ltd., Preston, Victoria).

Particular requests were:

i) To prepare a polished thin section and combined petrographic and mineragraphic description for each sample.

ii) To provide comments on the nature and abundance of sulphide minerals that may be responsible for petrophysical anomalies (such as high phase lag values).

The summary of this report was provided to Mr. Maher by facsimile on 15 September 1995. This report contains the full results of this work.

2. METHODS

The samples were examined in hand specimen and marked for section preparation. Polished thin sections were obtained from an external commercial laboratory (Pontifex & Associates Pty. Ltd., Rose Park, South Australia).

At Mason Geoscience Pty. Ltd., conventional transmitted and reflected polarised light microscopy was used to prepare the petrographic and mineragraphic descriptions.

3. PETROGRAPHIC AND MINERAGRAPHIC DESCRIPTIONS

The combined petrographic and mineragraphic descriptions are provided in the following pages.

SAMPLE : 3989187

SECTION NO. : 3989187

HAND SPECIMEN : The drill core rock sample represents a very fine-grained, dark greenish grey massive rock that is cut by a cm-thick paler green vein of somewhat irregular thickness.

ROCK NAME : **Veined serpentinite**

PETROGRAPHY AND MINERAGRAPHY:

A visual estimate of the modal mineral abundances gives the following:

Mineral	Vol.%	Origin
Serpentinite		
Chromite	Tr	Relict igneous
Serpentine	98	Alteration
Pyrite(/?pentlandite)	<1	Alteration
Pyrrhotite	Tr	Alteration
Serpentine vein		
Serpentine	97	Vein-filling
Phlogopitic mica	<1	Vein-filling
Magnetite	1	Fracture-filling
Pyrrhotite	<1	Fracture-filling
Pyrite (/?pentlandite)	Tr	Fracture-filling
Carbonate	Tr	Fracture-filling

In polished thin section, this sample displays massive alteration textures in both wall rock and vein, with somewhat coarser grain size in the vein.

Serpentinite wall rock is composed almost entirely of exceptionally fine-grained, randomly oriented flecks of serpentine that forms a massive mosaic. Rare large subhedral grains of chromite ~0.6 mm in size display their characteristic dark reddish brown colour in transmitted light, and thin microcracks through the chromite are filled by serpentine.

Tiny equant grains of sulphide are sparsely disseminated throughout the massive serpentine. In places they are loosely concentrated in small areas ~0.2-0.4 mm in size, which may represent a relict primary crystalline texture. The sulphide grains are very small, mostly ~1-5 μm. At such small grain sizes, optical identification is difficult; most appear to by either pyrite or pentlandite (only one phase appears to be present), but some small grains of pyrrhotite have been positively identified.

The sulphide granules in the wall rock are most abundant in proximity to the serpentine vein (see next).

Serpentine vein is composed mostly of serpentine plates, many of which are ~0.1-0.6 mm in size, but some finer-grained patches are present. The vein clearly is coarser-grained than the wall rock. The serpentine plates are randomly oriented, and some display curved and subradiating structures. It has a slightly pale yellow tinge compared with the colourless wall rock serpentine.

Moderately well-crystallised flakes of phlogopitic mica ~0.4 mm in size tend to be concentrated near wall rock contacts. The flakes display pleochroism in very pale buff browns.

Pyrrhotite occurs as fine-grained dense fillings in thinner fractures within the vein structure. Some of these fractures cut wall rock as well. The pyrrhotite displays its typical pale brownish cream bireflectance and moderately strong anisotropism. The pyrrhotite may be intergrown with serpentine or carbonate in these fractures.

Pyrite (or possibly pentlandite) occurs in trace amount as small ragged grains intergrown with ragged magnetite in some thin fractures. Magnetite also occurs as very thin smears along fractures.

INTERPRETATION:

This sample represents an ultrabasic igneous rock that has suffered pervasive hydration, generating abundant replacement serpentine after precursor ferromagnesian minerals (?olivine, ?pyroxene). Little or no primary textural features have been preserved; minor scattered chromite grains represent the only preserved primary mineral, and faint preservation of a crystalline texture is evident in places.

During alteration, vein- and fracture-fillings formed. Thicker veins were filled mainly by serpentine, with traces of phlogopite near wall rock margins. Thinner fractures were filled by varied assemblages of serpentine, carbonate, pyrrhotite, magnetite, and pyrite/pentlandite. Micron-sized granules of pyrite/pentlandite and pyrrhotite formed in the wall rock as a diffuse selvedge near the thicker serpentine vein margins.

SAMPLE : 3989189

SECTION NO. : 3989189

HAND SPECIMEN : The drill core rock sample is uniformly fine-grained, massive, and waxy yellowish green in colour. Small opaque grains are disseminated throughout, and also are entrained along thin fractures which form a widely-spaced network through the rock.

ROCK NAME : **Serpentinite (serpentinised chromite peridotite)**

PETROGRAPHY AND MINERAGRAPHY:

A visual estimate of the modal mineral abundances gives the following:

Mineral	Vol.%	Origin
Chromite	2	Relict igneous
Serpentine	95	Alteration / fracture-filling
Magnetite	2	Alteration / fracture-filling
Pyrite(/?pentlandite)	<1	Alteration / fracture-filling
Fuchsite	Tr	Fracture-filling

In polished thin section, this sample displays a massive fibrous meshwork alteration texture, with minor thin fracture-fillings, and relict igneous cumulate texture in the form of scattered chromite crystals.

Serpentine dominates the rock. Most occurs as fibrous aggregates that form an indistinct meshwork throughout the rock. Primary igneous cumulate texture has been almost completely destroyed by the serpentine, with concentration of thin microcracks that poorly define the primary blocky closely-packed crystals ~0.5-1.0 mm in size. Some serpentine is concentrated along thin fractures that pervade the rock.

Chromite occurs in minor amount as anhedral grains ~0.4-1.0 mm in size, scattered more-or-less uniformly through the rock. All grains display their typical dark red colour in plane transmitted light. All have suffered partial replacement around grain margins and along microcracks by magnetite and serpentine.

Magnetite occurs in different forms:

i) Some occurs as replacements around margins and along microcracks in relict primary chromite grains.

ii) Some occurs as subhedral grains concentrated along fractures that cut the rock.

Pyrite (or possibly pentlandite) occurs as very fine-grained ovoid bodies ~0.1-0.2 mm in size, sparsely disseminated throughout the rock. Optical identification is difficult, but a Ni-rich phase (i.e. pentlandite) is supported by the geochemical environment. Similar small ovoid bodies have been observed within microcracks in altered chromite, and small elongate sulphide aggregates may occur in some of the thin serpentine-rich fractures.

A colourless to very pale green white mica occurs in trace amount along some thin continuous fractures. Its optical features and environment suggest it is a Cr-rich muscovite (fuchsite).

INTERPRETATION:

This sample represents a cumulate ultramafic igneous rock that was originally composed of abundant ferromagnesian grains (?olivine, ?pyroxene) and lesser chromite.

Subsequent alteration of the rock body resulted in virtually complete hydration (serpentinisation). Serpentine completely replaced the ferromagnesian silicate mineral/s. Magnetite formed as replacements of chromite grains, and as discrete grains concentrated along thin fractures. Minor sulphide formed as disseminated ovoid microcrystalline aggregates; identification is difficult owing to very fine grain size, but it is likely to be pyrite or pentlandite (the latter is preferred owing to the Ni-rich geochemical environment).

SAMPLE : 3989849

SECTION NO. : 3989849

HAND SPECIMEN : The drill core rock sample is a fine-grained, massive, dark greenish grey rock cut by widely spaced veins filled by pale yellowish green serpentine.

ROCK NAME : **Serpentinite (serpentinised chromite peridotite)**

PETROGRAPHY AND MINERAGRAPHY:

A visual estimate of the modal mineral abundances gives the following:

Mineral	Vol.%	Origin
Chromite	4	Relict igneous
Serpentine	94	Alteration / fracture-filling
Magnetite	2	Alteration / fracture-filling
Pyrite(/?pentlandite)	Tr	Alteration

In polished thin section, this sample displays a massive fibrous alteration texture with indistinct fracture fillings, and poorly-preserved igneous cumulate texture.

Serpentine dominates the rock, and occurs in two principal forms:

i) The great bulk occurs as a fibrous meshwork that forms a mosaic throughout the rock. Very little of the precursor texture has been preserved.

ii) A small amount of serpentine occurs as coarser, better-crystallised flakes concentrated along fractures that cut the rock.

Chromite occurs as anhedral to subrounded grains ~0.2-1.0 mm in size (average size ~0.4 mm). They are distributed more-or-less uniformly through the rock, but display a tendency to be slightly concentrated in bands of cm thickness (best observed by inspection of section held up to light). A slight preferred orientation of the more elongate grains is subparallel to the weak mineral banding, and defines primary igneous layering in the precursor cumulate rock.

Magnetite occurs in different sites:

i) Some occurs as thin marginal replacements around chromite grains, and along microcracks that cut chromite grains.

ii) Small granular aggregates of fine-grained magnetite are sparsely disseminated through the rock, and appear to have formed by replacement within precursor ferromagnesian grain sites.

iii) Thin fractures are filled discontinuously by tiny magnetite grains and slightly larger ragged aggregates.

A sulphide phase (pyrite or possibly pentlandite) occurs as sparsely scattered small aggregates ~0.2 mm in size. They are invariably intimately intergrown with fine-grained magnetite.

INTERPRETATION:

This sample represents a cumulate ultramafic igneous rock that was originally composed of weakly layered ferromagnesian mineral/s (?olivine, ?pyroxene) and lesser chromite. The rock was a weakly layered chromite peridotite.

Subsequent alteration was essentially that of an hydration event. Serpentine formed by complete replacement of precursor ferromagnesian silicate phase/s, and also filled thin fractures through the rock. Minor magnetite formed by partial replacement of chromite, and also formed as disseminated fine-grained aggregates and concentrations along fractures. A trace of sulphide (pyrite or possibly pentlandite) formed as sparsely disseminated small aggregates intergrown with magnetite. The sulphide is more likely to be pentlandite, given the relatively Ni-rich geochemical environment.