

000

400001

Prospect 602

CSR LIMITED - ALUMINIUM, MINERALS & CHEMICALS DIVISION
EXPLORATION GROUP

DRAINAGE SAMPLING 1982-1983

DUNDAS, E.L. 15/76

WEST TASMANIA

EMR 21/84

MICROFILMED

FORM	A.O.	C.G.	E.O.	D.S.M.
				Registrar
G. DIR.	- 3 JUL 1984			E & IL
	DEPT. OF MINES			
REF. No.	6661/84			

SYDNEY
March 1984

P.M. MACNAMARA

100

400002

COPY NO.

DISTRIBUTION

	<u>Copy</u>
LIBRARY)	Original
EXPLORATION MANAGER)	
SUPERVISING GEOLOGIST)	
TASMANIA DEPARTMENT OF MINES	1
P.D. ELLIS	2
P.M. MACNAMARA	3

CONTENTS

	<u>PAGE NO.</u>
1. INTRODUCTION	1
2. SUMMARY	3
3. PROBLEMS WITH DRAINAGE GEOCHEMISTRY	7
4. CUNI	9
5. NEVADA-SOUTH CUNI GRIDS	12
6. RAZORBACK AREA	13
7. CARBINE EAST GRID	16
8. CLIMIE AND COMET CREEKS AREA	18
9. HOWARDS ROAD AREA	22
10. BRICKFIELD FAULT AREA	26
11. BANNOCKBURN-SUNNY CORNER	27
12. ANALYTICAL PRECISION	29
13. REFERENCES	31

APPENDICES

- I DRAINAGE PANNED CONCENTRATE ANALYSES
- II -20 MESH DRAINAGE SAMPLE ANALYSES
- III HEAVY MINERAL CONCENTRATES MINERALOGY
602651C-602740C
- IV HEAVY MINERAL CONCENTRATES MINERALOGY
602761C-602917C
- V HEAVY MINERAL CONCENTRATES MINERALOGY
A140007C-A140371C

003

400004

LIST OF ILLUSTRATIONS

<u>FIGURES</u>		<u>FACING PAGE NO.</u>
1	LOCATION MAP E.L. 15/76, DUNDAS	1
2	CONTOURED AEROMAGNETICS, E.L. 15/76, DUNDAS	5
 <u>TABLES</u>		
1	HOWARDS ROAD PANNED CONCENTRATE ANALYSES	6
2	ANALYTICAL VARIATION IN ANALYSES OF STANDARD SAMPLES	29
3	SITE VARIATION : DIFFERENT SAMPLES FROM THE SAME SITE	30
4	ANALYSES OF DUPLICATES (-20 MESH) : SPLIT SAMPLES ANALYSED BY DIFFERENT LABORATORIES	31
 <u>PLANS (in pocket)</u>		 <u>SCALE</u>
K555-44	DRAINAGE SAMPLE LOCATIONS E.L. 15/76, DUNDAS, TASMANIA	1:25,000
K555-45	DRAINAGE SAMPLES AND GEOLOGY E.L. 15/76, DUNDAS, TASMANIA	1:25,000

KEYWORDS

TASMANIA

K 55-5

1982

EXPLORATION

GEOCHEMISTRY

STREAM SEDIMENT

HEAVY MINERAL

MINERALOGY

SULPHIDE

EXHALITE

TIN

COPPER

ZINC

LEAD

SILVER

GOLD

CHROMIUM

COBALT

NICKEL

CARBONATE

MOLYBDENUM

ARSENIC

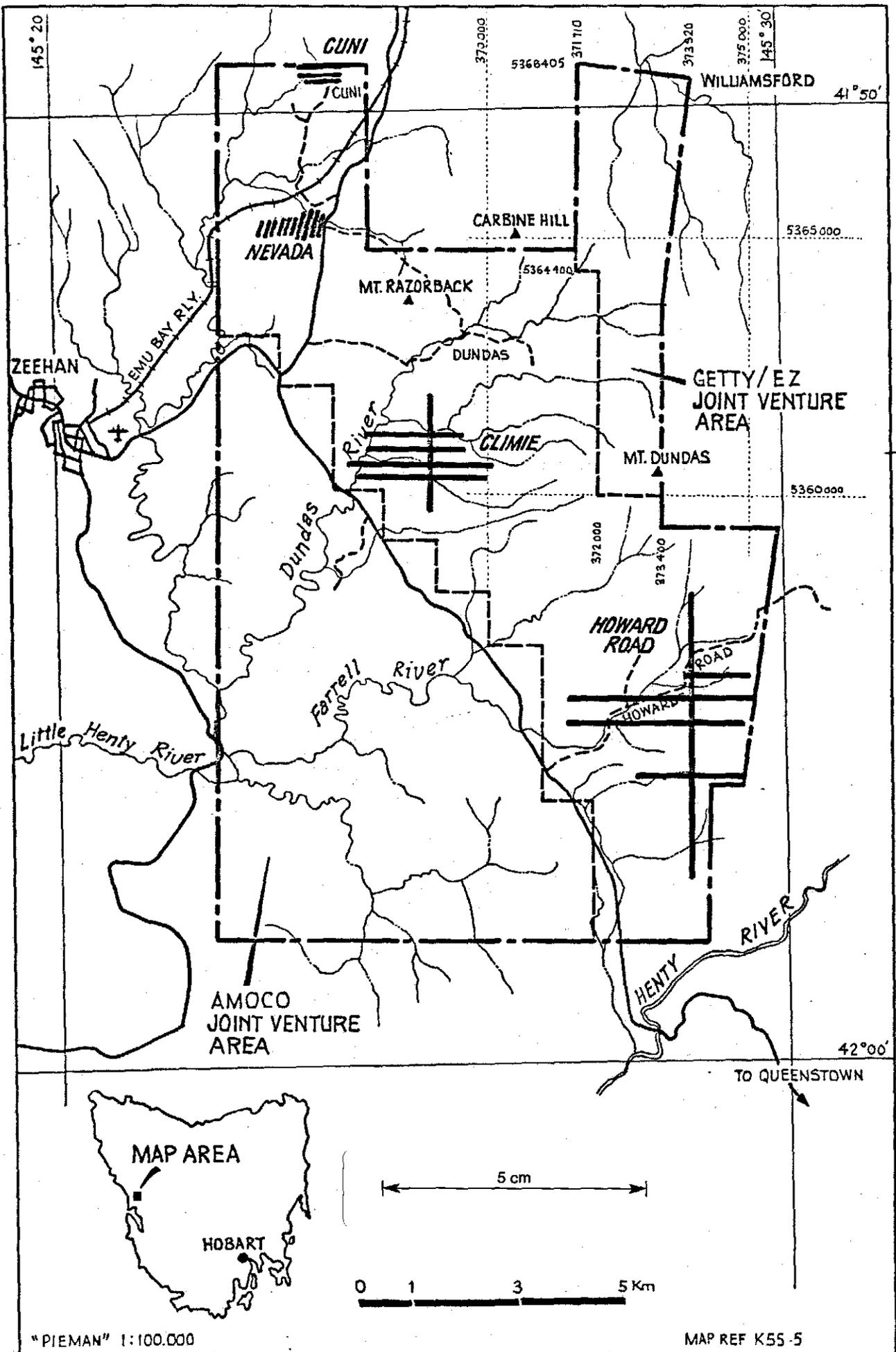


FIG. 1. LOCATION MAP E.L. 15/76 DUNDAS, TASMANIA SHOWING JOINT VENTURE AREAS & GSR 1982 GRIDS

006

1. INTRODUCTION

- 1.1 Following on from drainage sampling within E.L. 15/76, Dundas, reported in Macnamara (1979) and Macnamara (1980b), further drainage testing was completed in the 1981-1983 period over the E.L. (Figure 1). This involved sieved (-20 mesh) samples collected at several hundred sites and panned concentrates from a large number of these locations. The panned concentrates were examined by binocular microscopy and reports are attached (Appendices III-V). Chemical analyses of sieved and panned concentrate samples are listed in Appendices I and II. Sample locations are shown on DRG K555-44 and sample locations related to geology on DRG K555-45.
- 1.2 The work was aimed at locating and closing off Sn-Cu-Zn-Pb-Ag-Au-Ni mineralised areas prior to soil sampling and also follow-up of previously located drainage anomalies in some areas using access along widely spaced survey lines.
- 1.3 This report lists chemical analyses of 1981 samples labelled 602760-602917 and 1982 samples A140001-A140370, plus some earlier samples numbered between 602650 and 602760. Minus 20 mesh samples have been labelled with an "A" suffix, e.g. A140270A, referred to in the text usually as sample "270A". Panned concentrate samples have been given the suffix "C", e.g. sample 602911C, referred to as sample "911C". Chemical analyses of sieved samples are in Appendix I and panned concentrates in Appendix II.
- 1.4 This report deals mainly with tin anomalies, most of which lies north of Dundas River, and with gold anomalies most of which occur around Howards Road in the SE part of the E.L. In addition, the strong response due to Pb-Zn-Ag(-Cu?) mineralisation of the old Dundas and Cuni mining areas is also touched on.

007

Data on these and other anomalies such as Cuni-type Ni-Cu, and various Cu, Zn-Pb-Ag and Au anomalies, that were not mentioned specifically in the text, can be obtained from scanning appendices data such as chemical analyses.

Detailed multivariate analyses have not been attempted because of the intensive, "follow-up" nature of most of the sampling. Also, the re-distribution of values by glacial processes and contamination by numerous workings are problems not easily amenable to normal statistical manipulations.

(Not to mention the variety of rock types in the area!)

2. SUMMARY

- 2.1 Sieved and panned concentrate sampling was aimed at typing, outlining and closing-off mineralised areas, and minimising the amount of grid soil sampling within large anomalous zones by closely spaced sampling. However, this approach, together with access difficulties due to dense bush cover, created problems in achieving a uniform sample coverage.
- 2.2 Difficulties in interpreting geochemical data occur due to:
- (1) Quaternary morainal redistribution of anomalous values (especially Sn and Au).
 - (2) Contamination of drainages from numerous Pb-Zn-Ag and Cu-Ni workings in the Dundas and Cuni areas.
 - (3) Flat areas with marsh and gravel cover, especially along major drainages and in the Cuni area.

A number of indicated anomalies may prove to have been transported from nearby to distant mineralised zones via morainal dispersion. These morainal deposits occur sporadically, the larger being mapped. In addition, along large drainages such as the Dundas River, contamination has affected tributary creeks near their junctions with the main creek. This may be due to overbank flooding of waste eroded off recent workings, or to older gravel deposits derived in part from upstream mineralised zones.

- 2.3 With respect to tin and gold, pan concentrate sampling has indicated two main domains. Tin

anomalies occur mainly to the north of the Dundas River (e.g. Razorback and Carbine East Grid), in the Cuni-Nevada Grid area along the western part of the E.L. on post-Cambrian sediments near Brickfields Fault, the Zeehan/Queenstown Highways junction and the Mariposa-Bannockburn areas. Gold is common in panned concentrates in the SE part of the E.L. around Howards Road. Glacial redistribution has affected both domains, especially the gold anomalies in the SE part of the E.L.

- 2.4 Strong Pb-Zn-Ag and Cu-Ni anomalies occur, mainly associated with former workings. Weaker Cu, Sn, Au, Co, etc. anomalies occur, close to stronger mineralisation such as Sn-, Pb-Zn-Ag, Ni-Cu, etc. The main emphasis of this report, however, is on the Sn anomalies, with particular interest in the Carbine East Grid, North Razorback and Cuni areas and gold anomalies in the Howards Road area.
- 2.5 On the Carbine East Grid, just above the junction with Concert Creek, panned concentrate A140336A yielded (in ppm) 3700 Sn, 310 Cu, 1950 Zn, 3250 Pb, 36 Ag, 720 W, 840 As, 450 Sb and 8 Mo. Associated samples and those upstream show elevated Pb-Zn-Ag values and molybdenite was reported in some heavy mineral samples.

The contact between the Donah Quartzite/Crimson Creek Formation possibly involves a graben structure. Carbonate rocks have been sighted in the area with a Sn(-Mo) and Pb-Zn-Ag association. The 366C anomaly needs to be followed-up by detailed drainage sampling, possibly using additional pathfinders such as Mo, As, F, W, etc. (see Section 7).

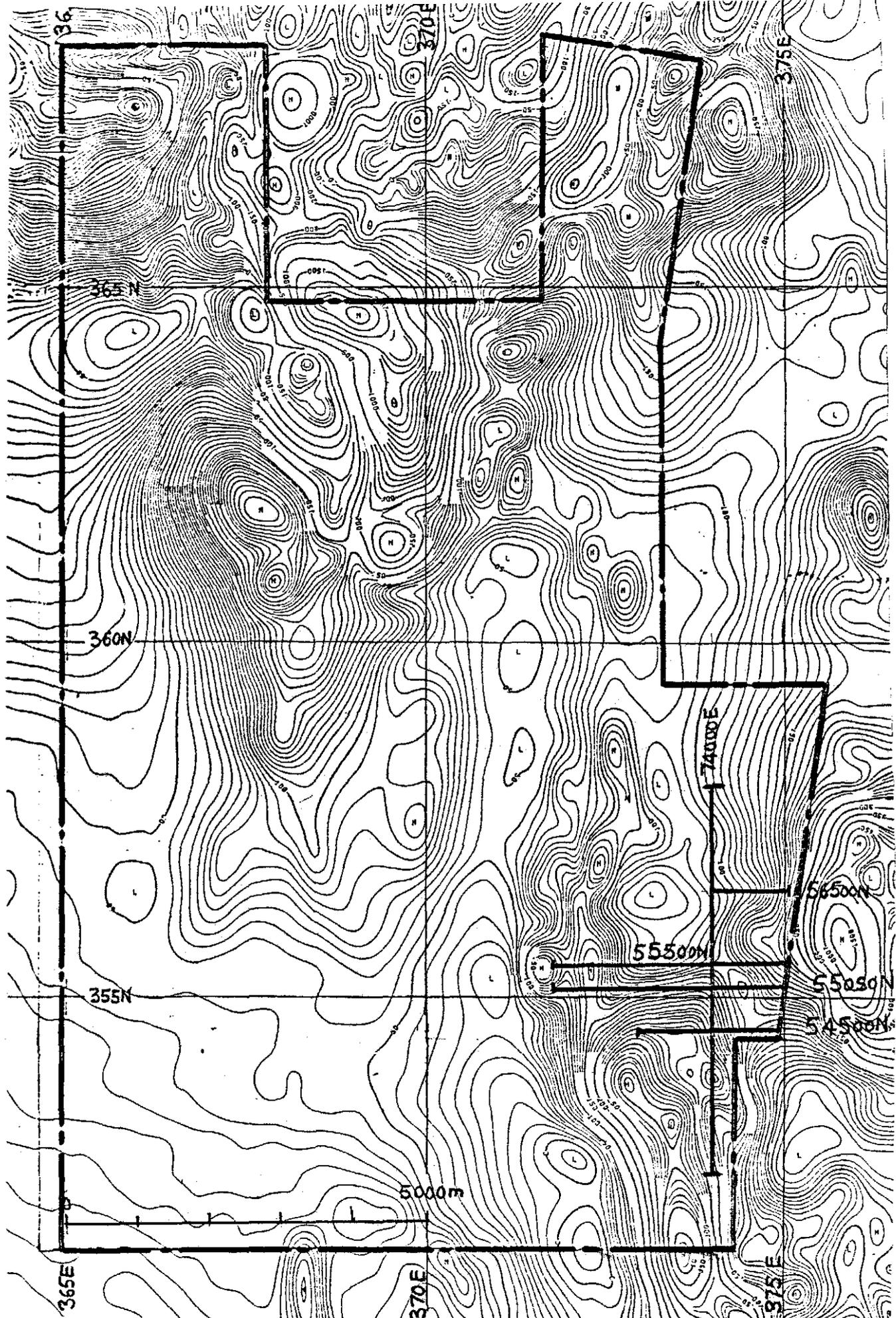


FIG. 2 CONTOURED AEROMAGNETICS E.L.15/76
DUNDAS, TASMANIA

- 2.6 Panned concentrate tin anomalies occur to the southwest of Mt. Razorback and, probably more importantly, to the north. The latter are apparently associated with the Razorback-Grand Prize "line of lode" or parallel structures. The anomalies deserve to be followed-up. The northern anomalies could be checked by grid sampling and assessed as possible drilling targets (see Section 6).
- 2.7 Macnamara (1983c) discusses the results of grid testing on the Cuni Grid and indicates the location of a number of Zn-Pb-Ag(-Cu-Sn-Au) anomalies. Magnetic features suggest the possibility of a granitoid at depth (see also Figure 2). Panned concentrate samples from drainages indicate the presence of a number of Sn, Au and Pb-Zn-Ag anomalies. The drainage, soil, magnetic, VLF-EM and geological data need to be compared with the view of drilling a possible Donah Quartzite/Crimson Creek Formation contact zone in a granite aureole (see Section 4).
- 2.8 A number of panned concentrate tin anomalies on post-Cambrian sediments in the west of the E.L. near Brickfield Fault, the Zeehan/Queenstown Highways junction and the Sunny Corner-Bannockburn area need to be assessed. The Brickfields Fault area involving sample 602811C (8200 ppm Sn) and other anomalous samples is suggested as a starting point (see Sections 10 and 11).
- 2.9 In the Howards Road Grid, panned concentrates of up to 114 ppm Au (602692C) have been located. The main panned concentrate anomalies are listed on Table 1. Heavy minerals include sillimanite, andalusite, kyanite, carbonate, vesuvianite, staurolite, garnet, fluorite, topaz, beryl, anhydrite, pyrite, etc. These indicate hydrothermal and/or calc-silicate

TABLE 1
HOWARDS ROAD PANNED CONCENTRATE ANALYSES

SAMPLE NO.	Ag (ppm)	Au (ppm)	VISIBLE Au PARTICLES	OTHER (ppm)
602877C	6.0	1.9	-	220 Sn, 1250 Pb, 140 W
682C	0.5	1.3	-	
707C	1.0	48	-	
879C	2.0	1.05	-	
775C	-	-	0.3 mm	
692C	4.0	114		
779C	-	-	1.5 mm	
801C	-	-	1.5 mm	
807C	-	-	2.9, 0.7 mm	
869C	4.0	23.5	-	115 Sn
829C	4.0	3.35	-	200 Sn
694C	6.0	3.7	-	
827C	2.0	14.2	-	40 Mo
A140017C	2.0	0.7	-	
602831C	3.0	5.0	-	65 W, 10 Mo
696C	0.5	1.0	-	
833C	1.0	4.5	-	
837C	1.0	0.30	-	1350 Cu, 85 W
867	3.0	0.02	0.1, 0.2 mm	1350 Cu (contam.?)
721C	0.5	6.3	-	
903C	1.0	0.8	-	
875C	1.0	0.02	1 mm	

activity. The sequence comprises tuffs, tuffaceous fine sediments and some basic and ultrabasic units.

Epithermal or exhalite gold deposits may be involved. Carbonate-rich units have been recorded in the past (Macnamara, 1983a) and a Carlin-type is a possibility, or alternatively, the quartz-pyrite-andalusite-kyanite-chloritoid-gold exhalite mineralisation similar to the Bousquet Mine, Abitibi Belt, Quebec.

3. PROBLEMS WITH DRAINAGE GEOCHEMISTRY

3.1 The response of drainage sampling within the E.L. is adversely affected by two main factors. These are:

- (i) contamination of creeks down-stream of numerous workings with material from dumps diluting excessively the response from unworked mineralised zones.
- (ii) Quaternary moraine, often occurring as unmapped remnants in the northern part of the E.L., contributing heavy minerals (including cassiterite, gold, skarn indicators, etc.) from sources outside the E.L. Morainal remnants are usually unmapped and hard to recognise with their heavy mineral content producing non-existent bedrock anomalies or masking any that are present.

3.2 Despite the above difficulties, the panned concentrate and sieved drainage sampling results are aimed at outlining and closing off anomalies of potential interest, and to eliminate large areas of the E.L. which would otherwise need testing by gridding and soil sampling.

The sampling of minor creeks at a higher density is aimed at partially off-setting the effects of contamination of major drainages by dump material.

3.3 The association of anomalous concentrations of mobile elements (Cu, Zn, etc.) with samples containing anomalous concentrations of metals typical of resistate heavy minerals should help distinguish transported h.m. concentrates from those originating from nearby sources, e.g. high Cu, Zn, Bi, etc values associated with high Sn values is more likely to occur near a

bedrock source than in an alluvial or morainal concentration of cassiterite.

- 3.4 Even contaminated creeks may indicate the presence of metals, possibly occurring in or near old workings, which were not previously suspected.
- 3.5 Some anomalies will need further field checking. This will possibly be assisted by testing for additional elements, especially mobile elements, not tested for in samples collected during the present programme, e.g. F, Mo, As, etc., the usual associates of tin mineralisation. Some problems arise due to the association of tin with galena (up to 700 ppm Sn) in Pb-Zn-Ag mineralisation - see Macnamara (1981a). (E.g., moderate Sn values have been also found in the vicinity of Ni-Cu mineralisation at Cuni).
- 3.6 In the SE of the E.L., the area around Howards Road is partially covered with morainal gravels and has been found to contain widespread detrital gold, with particles up to 1.5 mm size. Special geochemical techniques related to tracing morainal trains, fine-gold techniques (assuming only coarse gold is retained in the moraine) and rock geochemical methods involving pathfinders such as W, As, Sb, etc. may be applicable here.

4. CUNI

4.1 General

4.1.1 In the Cuni Area, soil sampling has indicated very high background and anomalous values, especially in Pb-Zn, in a tuffaceous sequence (Macnamara, 1983c). To a large degree further work on the Cuni Grid needs to take into account the recommendations in that report. The strong background values and presence of disseminated sphalerite shown by drilling (Macnamara, 1981a) indicate the possibility of volcanogenic Pb-Zn mineralisation, and possibly Pb-Zn-Ag veins zoned around a concealed granite. Aeromagnetism support the idea of a granitoid intrusion at depth (Figure 2). Geological mapping suggests the prospective Donah/Crimson Creek Formations contact dips into the area in the NW.

really! - why not try Pb-Zn-Ag?

4.1.2 Much of the Cuni area is flat. Main creeks tend to be contaminated by detritus from numerous Cu-Ni and Ag-Pb-Zn workings such as the Cuni and Lead Blocks mineralisation.

4.1.3 Quaternary moraine and derived gravels occur along most of the main drainages at, and possibly along minor creeks and as remnant caps on higher ground. These carry heavy minerals, such as cassiterite and gold, some of which is probably derived from east of the E.L. boundary where the Razorback-Grand Prize line of lodes occur. Other high Sn, Au, etc. values in heavy minerals are probably derived from residual sources within the Cuni Grid.

4.2 Cuni Northern Boundary

- 4.2.1 A number of creeks along the Cuni northern boundary were tested to see whether the Donah Quartzite/Crimson Creek Formation boundary to the NW had tin mineralisation associated with it. The creeks have gravels (morainal?) deposits associated.
- 4.2.2 Only 602823C (68 g) at 366.6E yielded any substantial h.m. content, and a slightly elevated tin value of 520 ppm Sn (see DRGS K555-44 and K555-45). Samples 602738C and 602740C yielded 30 ppm and 18 ppm Ag in the NW corner of the E.L. and these anomalies may link up with Pb-Ag prospects about 1.5 km to the south near sample 602761C at 5367.2N/365.1E. A cross-cutting magnetic feature (Figure 2) in the vicinity of these prospects may indicate a granitoid at depth (see Macnamara, 1983c).
- 4.2.3 Upstream of some workings, 602761C carried a 0.7 mm Au grain plus biotite and tourmaline.
- 4.2.4 The heavy minerals from creeks draining into the E.L. along its northern border at Cuni include vesuvianite, biotite, tourmaline, sillimanite, garnet, topaz, fluorite and beryl. Sample 602763C contains vesuvianite, 602771C (garnet, topaz) and 602773C (fluorite, garnet, beryl, topaz). These could be indicative of a hornfels zone upstream, but may be related to morainal heavy minerals.

Sample 602824A (15 ppm Sn, 110 ppm Cu and 20 ppb Au) is weakly anomalous and occurs near a Zn-Pb-Cu soil sampling anomaly (see Macnamara 1983c).

4.3 Lead Blocks Zone

Sample A124216C (370 ppm Sn, 56000 ppm Zn, 13900 ppm Pb, 58 ppm Ag) tests a drainage to the east of the Lead Blocks line, but west of DDH CG1. The panned concentrate contains ferruginous carbonate, tremolite and garnet. No actual workings are known above the sample site. DDH CG1 intersected narrow rich galena-sphalerite zones in a tuffaceous sandstone-black shale sequence, and the panned concentrate result confirms mineralised (narrow?) zones to the east of the main Lead Blocks Zone. Any further work in the area would need to consider the soil sampling and drilling results in Macnamara, 1981a and 1983c.

4.4 Cuni Copper-Nickel

Samples A140324A, 332A, 326A and 328A confirm high Cu values (215 to 1100 ppm) associated with the copper-nickel workings between 5366N and 5368N, adjoining the Cuni baseline. These deposits are apparently of little interest because, although grades of +5% Cu+Ni are common, the tonnages of bodies worked in the past have been low (i.e. up to tens of thousand tonnes only).

5. NEVADA-SOUTH CUNI GRIDS

In samples 602667-672 and 602753-756, values occur to 2600 ppm Sn and 1700 ppm Zn. Panned concentrate A140205C with 1800 ppm Sn, 1250 ppm Zn and 5 ppm Ag occurs in a minor tributary. Downstream, 602670C (560 ppm Sn) and 602669A (500 ppm Sn) are also anomalous.

Recent mapping at 1/25,000 by the Geological Survey of Tasmania indicated these samples occur near siliceous, cherty bodies interpreted as possible granite off-shoots, e.g. the red chert hill at approximate location 5365.5N/365.7E. Thus a local in-situ tin source may be involved although it is more probable that the high tin values are related to high level gravels derived from the Razorback-Grand Prize line of lode to the east, as is probable for A140202A (500 ppm Sn) to the south. Against this, the associated high Zn values tend to indicate a more immediate source (i.e. from the strong faulting within the area).

Sampling on the Nevada Grid (Macnamara, 1983) in 1981-1982 did not reveal any in-situ high Sn values.

These aspects need further checking, perhaps initially by sampling the siliceous bodies and surrounding rocks for tin and its associated elements.

6. RAZORBACK AREA

6.1 Razorback Geochemical Signature

The Mt. Razorback divide trends NW as a ridge of Razorback Conglomerate, with Razorback Mine to the east. It forms part of the Grand Prize-Razorback "line of lodes" recognised in early reports on the prospect. The current geochemical results suggest mineralisation may also occur on the west side of the Mt. Razorback divide.

Samples collected from Nevada Creek, contaminated by drainages from the Grand Prize Mine, illustrate the geochemical response. The samples set out below include two from Nevada Creek (172A, 302A) and one draining Razorback Tin Mine (218A).

Sample	Sn	Cu	Zn	Pb	Ag (ppm)
A140302A	1100	1600	1300	1000	5
172A	1000	2400	2000	1500	6
281A	350	55	210	450	1

6.2 Razorback Grid North

Anomalous Sn-Zn values occur in the headwaters of two minor creeks draining westwards across baseline 8000E between cross-line 4220N and Nevada Creek. The anomalous group of samples are 602735-736, 818-819 and 821.

Sample 602819C yielded 31,000 ppm Sn, 1050 ppm Zn and 100 ppm W, and the heavy minerals included biotite and tourmaline. Sample 602821C reported 210 ppm Sn.

On the eastern side of the Mt. Razorback divide, weak tin values were reported by Macnamara (1980b) in -20 mesh

021

samples 602743-752. These values are mainly in the 5-15 ppm Sn range but 602751A analysed at 250 ppm Sn.

Panned concentrates 602911C (290 ppm Sn and 1150 ppm Zn) and 602913C (180 ppm Sn and 290 ppm Zn) are strongly "diluted" with chromite and Fe minerals from the Razorback serpentinite.

Sample A140281A (350 ppm Sn and 450 ppm Pb) may be contaminated by Razorback Mine workings. Garnet and sillimanite occur in heavy minerals in 602911C and 913C.

The above values indicate mineralisation along and/or parallel to the Razorback-Grand Prize line. Also worth noting is the radial fracture pattern on DRG K555-45 centred at about 5365N/368.3E, which may indicate a granitoid at depth. The fault-lined creek sampled by 602913C is part of this radial system.

The anomalous zone needs testing by soil sampling to check for possible southward extensions of the Grand Prize mineralisation. Some drilling in the general area is believed to have been carried out by (?) Placer Development in the early 1970s.

6.3 Razorback Grid South

Anomalous tin, zinc and gold, associated with high chromite contents, occur in two creeks draining the southern part of the Razorback Grid.

Panned concentrate 602674C yielded 1000 ppm Sn, 1200 ppm Zn, 2 ppm Au and 30.5% Cr. It drains a faulted section of Brewery Junction Formation and Razorback Conglomerate.

Samples 602722-725 contain anomalous Sn-Zn-Pb values and occur near the 8000E Razorback Grid baseline, between cross-

lines 2560N and 6750E. Panned concentrate 602725C carries 10,700 ppm Sn, 1200 ppm Zn, and 220 ppm W. Sample 602723C yielded 2000 ppm Pb. Sieved sample 602722A is slightly anomalous, e.g. (in ppm) 80 Cu, 180 Zn, 280 Pb and 5 Ag, which may be related to a Pb-Zn-Ag fracture zone just west of baseline 8000E near 7970E - see Macnamara (1980a) and (1980b).

The above anomalies may be related to prominent fractures in the general area (DRG K555-45).

7. CARBINE EAST GRID

Macnamara (1980b, p 18) reported strong Pb-Zn values in drainages to the SE of Carbine Hill, in samples 602653-658. Panned concentrate samples 602654C and 602657C were reported to contain traces of molybdenite, tourmaline, zircon, rutile, garnetiferous schist and limonite lumps.

The general geology of the area comprises a contact between Crimson Creek Formation and Donah Quartzite, with a minor serpentinite in the former. This involves a NNE fault bounded structure (graben?) (DRG K555-45). Carbonate rocks also occur in places. A SSW trending airborne EM anomaly detected by a 1982 survey "tails out" in the general area.

As a check, the -20 mesh duplicates of previously collected samples were analysed, e.g. 602659AM (labelled A140191A), 602659M (A140190A), 602431M (A140156A) and 602430M (A140154A). Sample A140156A yielded 65 ppm Cu, 640 ppm Zn and 570 ppm Pb and 3 ppm Ag. Sample A140154A contained 20 ppm Sn, 150 ppm Cu, 1400 ppm Zn, 2900 ppm Pb and 23 ppm Ag.

in what creek?
Downstream, just above the junction with Concert Creek, sample A140335A yielded 65 ppm Cu, 420 ppm Zn, 910 ppm Pb and 4 ppm Ag. Associated panned concentrate A140336C yielded 3700 ppm Sn, 310 ppm Cu, 1950 ppm Zn, 3250 ppm Pb, 36 ppm Ag, 720 ppm W, 840 ppm As, 450 ppm Sb and 8 ppm Mo. Carbonate sediments occur upstream from these sample sites, carbonate, staurolite, corundum, tourmaline and tremolite report in the h.m.

Nearby, sample 602333C from Concert Creek is anomalous, with (in ppm) 105 Sn, 450 Cu, 1650 Zn, 5150 Pb, 1100 Bi, 22 Ag, 500 Cr, 340,000 Fe, 5 W, 2850 As, 1950 Sb and 16 Mo. This anomaly, however, (as well as the values

in the Dundas Creek sample 602339C) may be due to the Montezuma Grid sulpho-antimonide mineralisation. This aspect needs checking.

The high Sn-Cu-Zn-Pb-Ag-As-Sb mineralisation indicated by A140336C, draining the Carbine East Grid is a first order anomaly in a good geological situation. It deserves follow-up by detailed drainage sampling, possibly involving additional elements such as As, F, Sb, Mo, etc. as well as those more usually analysed. If an anomaly can be closed off within the E.L., grid sampling possibly using the existing grid could follow.

8. CLIMIE AND COMET CREEKS AREA

8.1 Probable Contamination

A number of anomalies were indicated initially in tributaries adjacent to the Dundas River in the vicinity of Climie Creek, between 5360N and 5361.5N approximately. These early samples are in the series 602XYZA and 602XYZC.

Subsequent sampling by samples in the sequence A140XYZA and A140XYZC indicates many of the early anomalies occur in the vicinity of Dundas River only. Such local anomalies are presumed to be due to overbank flooding of the contaminated Dundas River drainage and/or Qra gravels and possibly Quaternary morainal material occurring up to some distance from the river channel. Even away from the river, high level (Quaternary?) gravels occur above Climie Creek, and need to be kept in mind in assessing anomalies of those elements typical of heavy minerals.

8.2 Western Tributaries

A140101A at 5361.3N tests a western tributary of the Dundas River and appears to be uncontaminated by workings. It contains 310 ppm Sn but is low in mobile elements (Cu, Zn, etc.). It drains faulted Climie Formation and Dundas Group.

8.3 Climie Grid

To the south along Climie Creek, weakly elevated values occur only, e.g. A140142C (155 ppm Sn), 067C (1600 ppm Zn and 4 ppm Ag) and 20 ppb Au in each of 066A and 097A. The panned concentrate sample A140069C near the mouth of Climie Creek contains 50 ppm Mo but its weight is very low (3.8 g) and Sn was not determined.

North of Climie Creek near the Climie Grid baseline

69000E, panned concentrate 602909C contains 660 ppm Sn and 1500 ppm Zn. However, associated sample 602908A carries only background Cu, Zn, etc., while A140083A, 084A and 085A further upstream are background also. Immediately to the north, 602907C carries 1200 ppm Sn and 550 ppm Zn while associated sample 602906A is background. The elevated Sn values in 907C and 909C contrast with those in Adelaide Mine Creek nearby, e.g. 905C (55 ppm Sn, 290 ppm Cu) and downstream at 883C (28 ppm Sn, 300 ppm Cu). These Sn anomalies warrant further checking.

8.4 Comet Creek

Along Adelaide Mine Creek, Sn values are low but Cu, Zn, Pb and Ag are elevated due especially to the crocoite workings on M.F. Phelan's lease and the Adelaide Mine (DRG K555-45). High values of Cu, Zn, Pb and Ag report in sieved samples as well as in panned concentrates.

At the mouth of Comet Creek, sample A140111A contains (in ppm) 16 Sn, 120 Cu, 2200 Zn, 7000 Pb and 17 Ag, and drains the Adelaide Mine. Zn, Pb and Ag are strongly elevated and Cu is unusually high also. A140256C on Comet Creek below West Comet Mine shows low Sn (36 ppm Sn), but high Cu, Zn, Pb and Ag. Near Comet-Maestries Mines, sample A140268C in Comet Creek again shows low Sn (65 ppm Sn), and elevated Cu, Zn, Pb and Ag. Anomalous Zn, Pb and Ag values extend to headwaters sample 173A, but are strongest below 128A, especially downstream of the Comet-Maestries. Stronger Cu values appear in 315A (9100 ppm), 254A (320 ppm) and 251A (105 ppm).

Comet Creek does not appear to have much Sn potential, but a good potential for Pb-Ag-Zn(-Cu). However, panning of minor streams, especially those in the vicinity of faults, including the fault trending from West Comet to Razorback, is necessary to confirm that tin mineralisation is absent.

8.5 South Comet Creek

Above its junction with Adelaide Mine Creek within M.F. Phelan's lease, South Comet Creek shows moderately strong Zn-Pb-Ag response, but low Sn response. Near the junction, A140062C carries (in ppm) 46 Sn, 120 Cu, 68,000 Zn, 120 Pb, 52 Ag and 270 As, and at the same site sieved sample 061A carries 12 Sn, 50 Cu, 11,800 Zn, 4800 Pb and 12 Ag. Immediately upstream, 241C carries 80 Sn, 150 Cu, 62,000 Zn, 700 Pb and 45 Ag while associated sample 240A carries 12 Sn, 55 Cu, 6600 Zn, 4800 Pb and 12 Ag. Most of the Pb-Zn-Ag response is probably due to the mineralised zones of Phelan's lease and the Kosminski-South Comet workings.

Sn potential appears low.

8.6 Adelaide Mine Creek

Above its junction with South Comet Creek, Adelaide Mine Creek is tested by panned concentrates A140060C and 056C, each weighing 4.1 and 5.4 g respectively. The low weights were insufficient for an XRF tin determination, but the low content of concentrate suggests poor Sn potential. The following results (in ppm, mainly) are of interest:

Sample	Sn	Cu	Zn	Pb	Ag	Au
059A	2	20	480	260	1	-
060C	-	30	1600	40	4	-
055A	10	25	750	480	2	-
056C	-	150	4700	2000	8	3.9 (ppm)
057A	8	60	95	50	2	30 (ppb)
050A	4	60	480	145	-	-
132A	8	40	1500	1000	3	-
134A	6	30	500	380	2	-

028

400029

- 21 -

Sample A140132A and 134A in the headwaters of Adelaide Mine Creek are duplicate pairs of the early samples 602267M and 270M respectively. They indicate fairly strong Zn-Pb values in the headwaters (see Macnamara, 1979).

Sample 056C with 4700 ppm Zn, 2000 ppm Pb and 3.9 ppm Au indicates the possibility of Zn-Pb-Au mineralisation and needs checking. The 30 ppb Au value in sieved sample 057A is not exceptionally strong, but is certainly anomalous as most samples are usually less than 10 ppb. Other samples show some elevated Pb-Zn values.

029

9. HOWARDS ROAD AREA

9.1 Geology and Target Type

In contrast with panned concentrates elsewhere on the E.L., panning has indicated widespread detrital gold in the SE sector of E.L. 15/76. This area is mainly underlain by Cambrian Dundas Group volcanoclastics and tuffs plus minor ultramafic and basic bodies. Possibly 25% of the area is concealed by Quaternary morainal cover, which tends to be distributed on flat areas at changes of slope. While the moraine has probably been instrumental in redistributing gold from bedrock sources, the divide on the eastern edge of the E.L. may mark the eastern edge of any gold bedrock source stripped by the eroding action of the moraine.

Serpentinities occur along the eastern edge of the E.L. Carbonate-bearing, fine-grained siltstones and volcanoclastics have been recognised by previous workers. The target mineralisation is epithermal replacement type akin to Carlin-style, such as occur in acid volcanic-carbonate-serpentinite sequences. An alternative target is the exhalite type similar to the siliceous pyrite gold deposits of Bousquet Mine, Abitibi Belt, Quebec. These occur in altered mafic tuffs associated with hydrothermal pyrite, kyanite, andalusite, pyrophyllite, diaspore and chloritoids. Kyanite, andalusite, pyrite and other hydrothermal minerals have been identified in h.m. at Howards Road (see Appendices III, IV and V).

9.2 Grid and Drainage Sampling

Following drainage sampling reported in Macnamara (1980b), four cross-lines (5354.5N, 5355.05N, 5355.5N and 5356.5N) were cut across a baseline at 375E (Figure 1). These were soil sampled and magnetic and VLF-EM surveys conducted. Results were reported in Macnamara (1983a).

Figure 2 shows the aeromagnetic trends in the general area, including a magnetic high possibly related to an intrusion at the west end of lines 55500N and 55050N.

The soil sampling did not indicate the position of any strongly mineralised bedrock source. If much of the gold located by panning is coarser gold associated with the moraine and the finer gold has been flushed out, a technique involving selective digestion of fine gold may be useful for locating fine gold bedrock sources. Rock geochemistry, involving As, Sb, Mo, etc. may also be applicable.

Visual study and/or chemical analyses of panned concentrates have confirmed anomalous gold values in creeks adjacent to Howards Road, draining westwards towards the highway between Howards Road and the southern E.L. border, and in drainages in the SE corner of the E.L. Gold noted visually in panned concentrates does not always report in subsequent chemical analyses of these samples.

9.3 The Main Gold Anomalies

Table 1 lists anomalous samples in order of occurrence from east to west adjacent to Howards Road, then southwards adjacent to the highway and then eastwards near the southern E.L. border.

Sample 602869 (4 ppm Ag, 23.5 ppm Au) contains a moderate h.m. content (21.5 g) and was taken from Farrell Rivulet just east of the highway. Other strong values occur to the east and southeast, e.g. 602707C (48 ppm Au), 602692C (114 ppm Au), 602829C (3.35 ppm Au), 602694C (3.7 ppm Au), 602827C (14.2 ppm Au) and 602831C (5.0 ppm Au). This general area is at the western extremity of the soil sampled lines, near an aeromagnetic high (Figure 2) and adjacent to a base metal anomaly located in the early 1970s (see Macnamara, 1983c). A fairly strong result is also recorded on the

031

eastern margin of the E.L. near Howards Road by 602877C (6 ppm Ag, 1.9 ppm Au, 140 ppm W, 220 ppm Sn, 1300 ppm Zn and 1250 ppm Pb).

9.4 Hydrothermal Heavy Minerals

Apart from the usual suite of rock-forming heavy minerals (i.e. ilmenite, zircon, rutile, chromite, etc.), a number of "hydrothermal", skarn and "alteration" heavy minerals were also noted. These tend to be fairly widespread and do not indicate any particular zone as being a "hydrothermal" centre. The minerals include vesuvianite, biotite, sillimanite, garnet, andalusite, staurolite, ubiquitous tourmaline, fluorite, topaz, carbonate (siderite, dolomite, etc.), beryl, anhydrite, pyrite, (?)gadolinite, etc. Tourmaline, biotite and garnet are fairly widespread.

Most occur as "trace" minerals but some occur in greater concentrations as "minor" elements in the concentrate (while chromite, ilmenite, zircon, etc.) usually form the "major" mineral concentrations in the h.m. samples.

Vesuvianite is widespread as a trace mineral, but increases to minor quantities in the SE in 602903C (0.8 ppm Au), with trace pyritic hornfels, biotite, tourmaline, etc. In nearby 602875C, gold particles were noted during panning (but Au does not report in chemical analyses), garnet occurs as a minor mineral associated with trace tremolite, fluorite and tourmaline. These creeks drain an area of Quaternary gravels near gabbro and basalt. The higher-than-usual vesuvianite content may indicate a skarn zone. Sample 602865C carries trace vesuvianite, garnet and tourmaline.

Near Howards Road, 602801C, with a 1.5 mm Au particle, is associated with trace scheelite, dolomite and tourmaline. Nearby, 602779C, with a 1.5 mm Au particle, contains trace siderite, topaz, tremolite and biotite. Nearby, 602777C carries trace baryte, biotite, cordierite and andalusite,

602775C carries 0.3 mm Au particle and trace perovskite and tremolite, and 602692C, with 114 ppm Au, contained trace gold, beryl, garnet and tourmaline. To the south, 602872C (14.2 ppm Au and 40 ppm Mo) carries trace staurolite, garnet, biotite, beryl, topaz. The siderite, dolomite and baryte in the above samples (777C, 779C, 801C) may have been derived locally as the minerals are fairly soft. Baryte occurs also to the east in 602795C, near Howards Road.

Beryl reports in samples 602692C, 827C and 829C near the Howards Road/Queenstown Highway junction.

Blue fluorite was noted in 602877C on the eastern edge of the E.L. near Howards Road. This sample is also anomalous in Au (1.9 ppm), Ag (6 ppm), Sn (220 ppm), Pb (1250 ppm) and W (140 ppm). It contains minor vesuvianite, and trace fluorite, sillimanite, biotite, pyritic fragments and tourmaline. (It may be similar to 602903C in the SE corner of the E.L.).

9.5 Conclusions

In conclusion, the vesuvianite-rich drainages indicated by 602877C, 602903C and the zone near the Howards Road/Queenstown Highway junction, appear to have the best gold and indicator heavy mineral concentrates, possibly adjacent to local bedrock gold sources. It may be possible to check such areas by soil and rock geochemical methods, using Au, Ag, Mo, W, etc. If studies (including geomorphological) indicate the gold in panned concentrates, which is fairly coarse, is derived from morainal material, rock geochemical and selective fine-grained-gold dissolution techniques on drainage samples may be appropriate. Fine gold is unlikely to have concentrated in the morainal gravels. Reference is also made to the recommendations in Macnamara (1983a).

10. BRICKFIELD FAULT AREA, S.W. NEVADA GRID

Anomalous tin values occur in a creek draining NW from faulted Silurian-Devonian sediments at 5365N near the western border of the E.L. Samples 602667-668 and 602808-813 are all high in tin. No apparent morainal source material was seen.

Sample 602813C (5050 ppm Sn) and 602811C (8200 ppm Sn) are strongly anomalous, and also contain strong Cr values (no serpentinite is mapped in the drainage basin). Panned concentrate 602811C contained a 1.4 mm Au particle, plus cassiterite, biotite and tourmaline. The anomalies are similar to those in Silurian-Devonian rocks to the south, e.g. 602817C, east of the Zeehan-Queenstown Highway junction and 602845-859 in the vicinity of the Bannockburn and Sunny Corner prospects. They may be indicative of tin mineralisation in fractures, elevated Sn in Mariposa-Sunny Corner Pb-Ag mineralisation or morainal gravel dispersion and subsequent concentration. If the tin was Cambrian in age, it could concentrate in post-Cambrian sediments as h.m. bands with chromite. The Brickfields Fault area is worth further investigation as the anomaly occurs along a narrow valley in relatively steep country, amenable to geochemical follow-up.

Sample 602815C, near the highway at 5362.8N to the SE, contained 340 ppm Sn only but is reported to contain biotite, sillimanite, garnet, tourmaline and (?)tantalite.

11. BANNOCKBURN-SUNNY CORNER

The faulted zone around Balstrup Fault in the vicinity of the Bannockburn and Sunny Corner Pb-Ag Mines is underlain by Ordovician-Devonian sediments and Quaternary gravel remnants (DRG K555-45). A number of tin drainage anomalies in panned concentrates occur in tributaries of the Dundas River which are believed to be associated at Mariposa Mine with Pb-Zn-Ag mineralisation.

The anomalous panned concentrates listed over may have been derived from:

- (1) Quaternary morainal high level gravels derived from the north via the Dundas River Valley
- (2) local fracture systems
- (3) prospects similar to Bannockburn and Sunny Corner.

The low Pb content in most anomalous h.m. concentrates indicate Bannockburn-Mariposa type mineralisation is unlikely. Fracture-controlled mineralisation is possible, as the area is highly faulted. Tourmaline, topaz, sillimanite, biotite, beryl, garnet, siderite, phlogopite, tremolite, etc. occur in heavy minerals, suggesting a morainal concentration but possibly the h.m. (including cassiterite) are derived from the Ordovician-Devonian sediments.

The anomalous samples and values (in ppm) are:

035

Sample No.	Sn	Zn	Pb	Ag	Au	W
602845C	1350	1100	95	3	0.75	310
851C	2100	950	75	2	0.02	260
849C	1650	230	20	2	0.02	15
853C	830	3600	890	4.0	0.02	30
859C	690	2100	810	4.0	0.02	70
857C	150	2800	18	1.0	0.15	115
855C	1250	2700	230	2.0	0.02	60

Apart from the high tin values, W values are high in 845C and 851C. Zn values are high in 853, 855, 857 and 859C, possibly suggesting a local source.

Trace beryl with minor topaz occurs in 847C, adjacent to 845C. Phlogopite occurs with siderite, sillimanite and tourmaline in 853C. Phlogopite, topaz, beryl, fluorite, garnet, biotite and tourmaline occur in 859C, draining Ordovician rocks (fluorite is common in the top of the Gordon Limestone).

TABLE 2
ANALYTICAL VARIATION IN ANALYSES OF STANDARD SAMPLES

SAMPLE NO.	STANDARD	Sn	Sn1	Cu	Zn	Pb	Bi	Ag	Au1	Au2	Ni	Co	Cr	Cr1	Fe	Mn	Cd
<u>Analytical Variation</u>																	
<u>CSR GX1</u>																	
"A140022A"	GX1		5	80	40	15		1		2	55	5	40		26800	100	
"A140187A"	GX1		5	75	40	20		1		200	55	5	50		27100	115	
"A140367A"	GX1		2	75	35	15		0.5		35	50	5	40		24400	90	
<u>CSR GX-1H</u>																	
"A140046A"	GX-1H		2	80	35	10		1		70	55	5	40		26400	100	
"A140205A"	GX-1H		2	85	40	25		1		60	55	5	70		27600	105	
"A140336A"	GX-1H		2	75	35	15		0.5		45	50	5	35		24700	110	
<u>CSR GX9</u>																	
"A140092A"	GX9		20	2	2	5		0.5		5	2	2	85		1400	10	
"A140241A"	GX9		20	2	20	20		0.5		3	5	2	90		1500	50	
<u>CUNI</u>																	
A140141A	CUNI	14		150	770	200		2	2		175	65	350		31200	135	
A140155A	CUNI	2		160	800	195		2	2		180	65	390		32000	175	
A140168A	CUNI	2		150	830	200		2	2		185	70	430		34900	145	
A140306A	CUNI	6		150	790	190		2	2		180	65	280		31700	135	
A140314A	CUNI	8		145	780	190		2	2		180	65	310		31700	135	
A140365A	CUNI	6		145	770	185		1	2		175	65	300		30700	125	
Average (6)		6		150	790	193		2	2		179	66	343		32000	142	
Average of 8 other CUNI (Comlabs)				152	785	222	<4	<1	<0.005		174	63	296				

Note : The sample numbers applying to GX1, GX-1H and GX9 standards are those used elsewhere for panned concentrate samples (suffix "C") and in this case do not denote a sample site. All were from the same batch, analysed by ALS Laboratory.

037

12. ANALYTICAL PRECISION

12.1 Analytical Variability (Standards)

CSR GXA, GX-1H and GX9 are ground standard samples from P. Hellman's collection. CUNI is a -80 mesh field standard from the Cuni Grid, Dundas E.L.

Table 2 shows the results of analysing eight CSR standard samples and six CUNI standard samples, which were inserted in the batch of samples A140001A-A140367A. The six CUNI determinations have been averaged and results can be compared with the average of eight analyses carried out by Comlabs (see Macnamara, 1983b, Table 3).

In general, good analytical precision is shown by the results. Analytical variance is low for Cu, Zn, Pb, Ni and Co. It is probably low for Ag although the range of values is too small for the results to have demonstrated low variance. Sn and Cr, which occur in detrital minerals, show a higher analytical variance.

12.2 Site Variability

Table 3 shows the analyses of a pair of different samples from one sample site and five different samples collected within a small zone from another creek sample site. These were analysed to illustrate site variability.

The two sets of results show the metal content at each site shows small variance, the strongest variance being for Sn and Cr. While the number of sites checked and samples collected is limited, a preliminary conclusion is that in uncontaminated creeks, the drainage sample material is fairly homogeneous and shows fairly low metal content variance.

TABLE 3
SITE VARIATION : DIFFERENT SAMPLES FROM THE SAME SITE

SAMPLE NO.	STANDARD	Sn	Sn1	Cu	Zn	Pb	Bi	Ag	Au1	Au2	Ni	Co	Cr	Cr1	Fe	Mn	Cd
<u>Site 1</u>																	
A140059A	Same	2		20	480	260		1	2		40	25	25		49900	1700	
A140243	Site	2		20	420	250		1	2		35	20	25		41000	1700	
<u>Site 2</u>																	
A140171A	Same	8		5	25	25		0.5	2		15	5	65		11300	100	
A140193A	Site	16		10	25	20		0.5	2		15	5	65		10800	110	
A140312A	"	4		10	30	25		1	2		20	5	50		12300	105	
A140342A	"	18		5	30	25		0.5	2	5	15	5	100		12000	140	
A140347A	"	6		10	25	25		0.5	2		15	5	160		10600	100	

12.3 Analysis of Duplicates

Table 4 sets out a comparison between early ACS and ALS Laboratory analyses of samples (sequence 602XXXA) and subsequent ALS Laboratory analysis of the retained -20 mesh duplicate sample (sequence A140XXXA).

In general, the results indicate low variability at lower values but a greater divergence at higher values. The degree of variance is probably not high enough to prevent merging the 602XXX and 140XXX sequences for data treatment.

TABLE 4 : ANALYSES OF DUPLICATES (-20 MESH)
SPLIT SAMPLES ANALYSED BY DIFFERENT LABORATORIES

SAMPLE NO.	DUPLICATE	Sn	Sn1	Sn2	Cu	Zn	Pb	Bi	Ag	Au1	Au2	Ni	Co	Cr	Cr1	Cr2	Fe	Mn	Cd
A140190A 602659M	659M	4			20	265	180		0.5	2		90	20	70			31500	2500	
				1	20	190	140	10	1			80	20			10			
A140191A 602659AM	659Am	4			35	370	200		1	2		95	50	55			65000	5700	
				1	30	220	140	10	1			60	40			30			
A140192A 602660A	660A	6			20	150	90		1	2	10	30	30	30			29000	2100	
				1	20	130	100	10	0.5			40	20			10			
A140194A 602671A	671A	20			10	85	55		2	2		20	20	675			26300	930	
				1	10	80	60	10	0.5			40	10			100			
A140195A 602673A	673A	12			15	135	115		1	2		20	20	55			18200	1900	
				1	20	160	160	10	0.5			50	30			10			
A140196A 602677A	677A	6			20	110	75		1	2		55	25	30			36600	1600	
				1	20	100	80	10	0.5			70	30			10			
A140197A 602731A	731A	4			30	240	210		1	2		35	25	60			26900	3200	
				10	20	130	100	10	0.5			40	10			100			
A140198A 602733A	733A	2			20	250	90		1	2	3	115	35	270			54300	1900	
				1	20	180	80	20	0.5			90	20			10			
A140199A 602830A	830A	6			20	75	40		0.5	2	3	10	10	15			14300	400	
		10			20	90	45	5	1	5		20	20	400	890				1
A140200A 602838A	838A	4			30	130	30		1	2		25	40	15			34000	460	
		15			35	130	50	15	2	5		40	30	50	530				1
A140345A 602916A	916A	8			25	15	20		0.5	2		25	2	200			4400	20	
		10			10	20	20	2	0.5	5		20	10	160	790				0.5

TFOOF

13. REFERENCES

- BLISSETT, A.H., 1962 : Geological Survey Exploratory Report, K5SS-50, Zeehan 1-mile Geological Map. Tasmania Dept. of Mines
- CURTIS, P.J., 1982 : Mineralogical Examination of Heavy Mineral Drainage Samples from E.L. 15/76, Dundas, Tasmania. Minpet Services Report 45/82, December, 1983
- MACNAMARA, P.M., 1979 : Drainage Sampling 1977-78, E.L. 15/76, Dundas, W. Tasmania. CSR Report PMR 5/79
- MACNAMARA, P.M., 1980a : 1979 Soil Sampling. Cuni-Nevada-Razorback Grids, E.L. 15/76, Dundas. CSR Report EMR 20/80
- MACNAMARA, P.M., 1980b : 1979 Drainage Sampling, Dundas, E.L. 15/76, W. Tasmania. CSR Report EMR 60/80
- MACNAMARA, P.M., 1981a : Diamond Drilling, 1980. Lead Blocks-Cuni Area, E.L. 15/76, Dundas. CSR Report EMR 85/81
- MACNAMARA, P.M., 1981b : Soil Sampling 1979-81, Cuni-Nevada Grids, E.L. 15/76, Dundas. CSR Report EMR 138/81
- MACNAMARA, P.M., 1983a : Soil Sampling-Magnetics-VLFEM, Howards Road Grid. CSR Report EMR 24/83
- MACNAMARA, P.M., 1983b : 1982 Soil Sampling-Magnetics-VLFEM, Nevada Grid. CSR Report EMR 31/83

MACNAMARA, P.M., 1983c : Soil Sampling-Magnetics-VLFEM,
North Cuni Grid. CSR Report EMR 40/83

VALLIANT, R.I. and BARRETT, R.L., 1983 : Aluminium
Silicate-bearing Rocks and its relation to
Gold Mineralisation, Bousquet Mine, Bousquet
Township, Quebec. CIM Bull., February, 1983,
p 81-90

PMM/SGL
March 1984

043

400044

APPENDIX I

DRAINAGE PANNED CONCENTRATE ANALYSES

A140007C-370C AND 602651C-917C

Drainage panned concentrates : bromoform separated heavy
minerals (h.m.)

Sample Nos. : 602651C-602740C
602811C-602917C
A140007C-A140371C

(Note : 602761C-602809C were not chemically analysed)

Laboratory : Comlabs Job COM 830248, 7/3/83 (O/N 33326)
ALS Batch No. MD 38, 24/1/80 (O/N 20130)

Method

AAS : Cu, Zn, Pb, Bi, Ag, Au, Ni, Co, Cr, Fe, Mn
XRF : Sn, W, As, Sb, Mo

Detection Limit : all results in ppm (including Au).
Values of less than the limit of detection
are arbitrarily assigned a value of half
the limit of detection. Limits of
detection relevant are:
Cu (1), Ag (0.5), Au (0.02), W (5), Sb (2)

HMG : The column headed "HMG" gives the weight of
bromoform-separated heavy mineral (h.m.), in grams,
i.e. HMG. This refers to an original volume of about
0.02 m³ pebbly sand creek sample of about 6 kg
weight.

NNo : New (sample) Number, indicates the -20 mesh sample
number at the site of the panned concentrate sample,
e.g. panned concentrate sample 602811C at -20 mesh
sample site 602810A has a new number (NNo) 810C.

048

SAMPLE	AMGE	AMGN	N NO	SN	CU	ZN	PB	BI	AG	AU	NI	CO	CR	FE	MN	CD	N	AS	SE	MO	HMG
140007	37400	535424	006C	105.	18.	120.	110.	22.	2.0	0.02	34.	18.	1900.	96000.	1500.	0.	5.	0.	0.	0.	9.8
140009	37405	535331	008C	150.	18.	270.	80.	28.	1.0	0.02	55.	26.	44000.	83000.	1700.	0.	45.	0.	0.	0.	17.7
140015	37352	535457	014C	26.	18.	180.	60.	24.	1.0	0.15	70.	22.	10000.	78000.	750.	0.	15.	0.	0.	0.	19.2
140017	37314	535443	016C	32.	10.	90.	70.	16.	2.0	0.70	36.	10.	2100.	87000.	2800.	0.	5.	12.	14.	2.	0.0
140022	37453	535544	021C	14.	10.	160.	26.	12.	2.0	0.02	42.	20.	290000.	43000.	700.	0.	5.	0.	0.	0.	13.9
140025	37361	535543	024C	40.	12.	180.	42.	24.	1.0	0.02	65.	22.	95000.	57000.	1200.	0.	5.	0.	0.	0.	16.8
140033	37258	535538	032C	0.	0.	0.	0.	0.	0.0	0.00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	4.5
140036	37168	535543	037C	0.	50.	190.	75.	22.	1.0	0.00	30.	18.	1800.	130000.	990.	0.	0.	12.	12.	8.	4.4
140042	37087	535971	041C	155.	2.	300.	75.	24.	1.0	0.20	75.	48.	22000.	70000.	1500.	0.	120.	80.	20.	6.	39.7
140046	36919	535925	045C	135.	6.	480.	70.	22.	1.0	0.02	75.	60.	95500.	58000.	1200.	0.	150.	95.	16.	6.	23.2
140056	37062	536058	055C	0.	150.	4700.	2000.	34.	8.0	3.90	160.	60.	6200.	280000.	6900.	0.	0.	0.	0.	0.	5.4
140060	36979	536088	059C	0.	30.	1600.	40.	30.	4.0	0.02	150.	140.	9300.	338000.	3700.	0.	0.	0.	0.	0.	4.1
140062	36976	536103	061C	46.	120.	68000.	170.	50.	52.0	0.02	2100.	250.	37500.	220000.	56000.	0.	20.	270.	95.	6.	63.1
140067	36800	536052	066C	0.	34.	1600.	85.	60.	4.0	0.02	320.	220.	220000.	130000.	1200.	0.	0.	0.	0.	0.	7.8
140069	36797	536063	068C	0.	34.	1900.	340.	36.	3.0	0.02	210.	75.	21500.	160000.	1100.	0.	0.	42.	6.	50.	3.8
140090	36966	535989	089C	0.	0.	0.	0.	0.	0.0	0.00	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	5.1
140092	36922	536032	091C	0.	55.	2200.	150.	38.	2.0	0.00	310.	75.	40500.	230000.	760.	0.	0.	0.	0.	0.	3.8
140187	36972	535761	186C	0.	30.	2100.	60.	70.	3.0	0.00	200.	260.	220000.	80000.	1400.	0.	0.	0.	0.	0.	10.6
140189	36959	535772	188C	6.	60.	1600.	36.	55.	4.0	0.02	160.	200.	300000.	46000.	1000.	0.	35.	28.	6.	38.	22.8
140205	36608	536522	204C	1800.	12.	1250.	46.	75.	5.0	0.02	320.	330.	290000.	120000.	1200.	0.	10.	8.	2.	3.	305.2
140216	36724	536748	215C	370.	280.	56000.	13900.	32.	58.0	0.02	85.	26.	600.	270000.	88000.	0.	5.	0.	0.	0.	58.0
140218	36680	536737	217C	185.	10.	1350.	230.	44.	4.0	0.02	340.	230.	95000.	110000.	2000.	0.	20.	0.	0.	0.	84.0
140241	36934	536109	240C	80.	150.	62000.	700.	42.	45.0	0.02	2050.	220.	65000.	210000.	57000.	0.	5.	0.	0.	0.	27.1
140256	36986	536216	251C	36.	580.	7200.	122000.	42.	340.0	0.02	190.	70.	10000.	210000.	250000.	0.	5.	0.	0.	0.	80.1
140268	37108	536228	267C	65.	310.	2100.	1500.	34.	7.0	0.02	190.	130.	1100.	310000.	5800.	0.	5.	0.	0.	0.	9.7
140278	37012	536316	295C	260.	14.	940.	310.	40.	4.0	0.02	260.	180.	110000.	89000.	1400.	0.	5.	0.	0.	0.	68.0
140333	37137	536369	334C	105.	450.	1650.	5150.	1100.	22.0	0.02	130.	100.	500.	340000.	4050.	0.	5.	2350.	1950.	16.	12.9
140336	37135	536378	335C	3700.	310.	1950.	3250.	42.	36.0	0.02	145.	75.	2000.	320000.	8800.	0.	720.	840.	450.	6.	16.9
140339	37141	536341	338C	3650.	210.	860.	710.	38.	7.0	0.02	120.	70.	300.	350000.	1250.	0.	790.	0.	0.	0.	72.1
140341	36992	536349	340C	22.	22.	1650.	400.	60.	3.0	0.02	1150.	280.	255000.	160000.	1350.	0.	5.	46.	3.	4.	57.3
140370	36629	536526	370C	50.	24.	2100.	95.	70.	4.0	0.02	1050.	370.	285000.	150000.	1300.	0.	10.	0.	0.	0.	11.9
602651	36725	536341	652C	0.	10.	1200.	580.	60.	2.0	0.00	220.	240.	270000.	104000.	880.	6.	5.	0.	0.	0.	12.3
602661	37256	535894	660C	20.	10.	145.	55.	15.	0.5	0.02	45.	20.	3000.	40000.	520.	2.	0.	0.	0.	0.	26.0
602664	37272	535887	663C	0.	30.	540.	260.	35.	0.5	0.02	115.	80.	76000.	152000.	600.	4.	5.	0.	0.	0.	9.0
602666	37282	535890	665C	20.	10.	165.	180.	20.	0.5	0.02	50.	35.	2000.	88000.	2000.	4.	5.	0.	0.	0.	23.1
602668	36501	536521	667C	2600.	20.	1700.	95.	40.	4.0	0.02	290.	300.	375000.	100000.	1300.	6.	5.	0.	0.	0.	16.0
602670	36550	536548	669C	560.	20.	270.	135.	5.	2.0	0.02	60.	65.	35400.	124000.	1200.	3.	5.	0.	0.	0.	16.4
602672	36601	536521	671C	2200.	2.	1200.	50.	85.	1.0	0.02	200.	350.	383000.	120000.	1200.	6.	5.	0.	0.	0.	115.1
602674	36708	536307	673C	1000.	5.	1200.	175.	60.	0.5	2.00	210.	260.	305000.	120000.	1100.	6.	5.	0.	0.	0.	33.8
602676	37278	535881	675C	0.	15.	440.	150.	30.	0.5	0.02	85.	80.	38300.	136000.	3400.	4.	0.	0.	0.	0.	5.8
602678	37370	535713	677C	0.	50.	340.	130.	20.	0.5	0.00	65.	40.	12000.	88000.	1300.	3.	0.	0.	0.	0.	3.9
602682	37375	535711	681C	0.	2.	600.	80.	45.	0.5	1.30	100.	145.	120000.	72000.	1200.	4.	0.	0.	0.	0.	9.0
602684	37392	535623	683C	0.	55.	880.	350.	40.	1.0	0.02	120.	125.	48000.	256000.	1600.	5.	0.	0.	0.	0.	6.2
602686	37397	535630	685C	0.	15.	1100.	85.	60.	1.0	0.02	160.	220.	224000.	96000.	1300.	5.	0.	0.	0.	0.	6.3
602688	37326	535634	687C	0.	25.	1200.	160.	50.	2.0	0.02	165.	180.	165000.	104000.	1300.	6.	0.	0.	0.	0.	5.8
602690	37252	535551	689C	0.	35.	1100.	175.	30.	2.0	0.02	65.	85.	63000.	112000.	880.	6.	0.	0.	0.	0.	5.8
602692	37258	535554	691C	0.	20.	1000.	90.	55.	4.0	114.00	155.	190.	206000.	104000.	800.	5.	0.	0.	0.	0.	0.0
602694	37166	535423	693C	0.	15.	820.	110.	40.	6.0	3.70	85.	160.	147000.	64000.	1200.	4.	0.	0.	0.	0.	9.0
602696	37218	535337	695C	10.	5.	370.	105.	20.	0.5	1.00	35.	50.	52800.	40000.	960.	2.	5.	0.	0.	0.	50.4
602699	37243	535272	698C	10.	2.	145.	70.	20.	1.0	0.02	10.	20.	18000.	40000.	740.	2.	5.	0.	0.	0.	204.5
602701	37337	535569	700C	2.	5.	780.	65.	50.	0.5	0.10	160.	155.	187000.	80000.	880.	5.	5.	0.	0.	0.	31.6
602703	37376	535561	702C	0.	15.	1200.	115.	50.	3.0	0.00	125.	220.	187000.	96000.	920.	5.	0.	0.	0.	0.	5.0
602705	37388	535561	704C	0.	5.	1400.	80.	60.	5.0	0.02	240.	250.	245000.	104000.	1100.	6.	0.	0.	0.	0.	6.3
602707	37391	535531	706C	2.	2.	800.	50.	50.	1.0	48.00	195.	170.	216000.	80000.	840.	5.	5.	0.	0.	0.	44.6
602709	37381	535514	708C	5.	5.	185.	80.	25.	0.5	0.02	50.	40.	38300.	56000.	620.	4.	5.	0.	0.	0.	21.3
602711	37370	535513	710C	2.	15.	75.	75.	20.	0.5	0.02	50.	25.	4700.	48000.	600.	3.	5.	0.	0.	0.	82.7
602713	36835	535855	712C	0.	80.	2200.	105.	55.	0.5	0.02	160.	260.	270000.	88000.	1700.	6.	0.	0.	0.	0.	8.4
602715	36798	535929	714C	0.	30.	1200.	390.	30.	2.0	0.02	115.	110.	105000.	80000.	620.	5.	0.	0.	0.	0.	6.6
602717	37202	535371	716C	20.	5.	155.	115.	20.	5.0	0.20	25.	20.	18700.	40000.	960.	2.	5.	0.	0.	0.	26.8

400049

0470

602719	37266.	535239.	7180	25.	5.	600.	65.	40.	1.0	0.10	190.	120.	180000.	72000.	820.	4.	5.	0.	0.	0.	61.8
602721	37317.	535113.	7210	25.	10.	420.	60.	35.	0.5	6.30	150.	95.	120000.	64000.	720.	3.	5.	0.	0.	0.	55.3
602723	36814.	536323.	7220	0.	75.	1000.	2000.	30.	2.0	0.02	70.	60.	30500.	280000.	360.	7.	0.	0.	0.	0.	8.6
602725	36894.	536335.	7240	10700.	5.	1200.	70.	80.	1.0	0.02	150.	330.	420000.	104000.	1300.	6.	220.	0.	0.	0.	312.7
602728	36892.	536350.	7270	0.	2.	540.	95.	40.	0.5	0.02	160.	125.	144000.	64000.	460.	3.	0.	0.	0.	0.	10.4
602732	36773.	536404.	7310	0.	10.	1100.	440.	45.	1.0	0.02	180.	140.	135000.	104000.	720.	5.	0.	0.	0.	0.	5.2
602734	36746.	536460.	7330	50.	5.	800.	130.	40.	0.5	0.02	115.	120.	135000.	192000.	720.	4.	5.	0.	0.	0.	313.0
602738	36488.	536844.	7370	0.	25.	740.	800.	35.	30.0	0.00	125.	95.	90300.	104000.	460.	4.	0.	0.	0.	0.	3.9
602740	36542.	536827.	7390	0.	15.	310.	140.	20.	18.0	0.00	75.	50.	43500.	40000.	260.	2.	0.	0.	0.	0.	3.8
602811	36521.	536509.	8100	8200.	28.	1400.	18.	55.	4.0	0.02	160.	170.	174000.	55000.	830.	0.	35.	0.	0.	0.	31.5
602813	36505.	536514.	8120	5050.	12.	1200.	24.	55.	3.0	0.02	180.	190.	260000.	53000.	990.	0.	40.	0.	0.	0.	58.3
602815	36636.	536286.	8140	340.	10.	1100.	14.	44.	3.0	0.02	130.	145.	128000.	42000.	800.	0.	30.	0.	0.	0.	90.6
602817	36562.	536247.	8160	2600.	12.	1400.	22.	40.	2.0	0.02	140.	145.	175000.	54000.	740.	0.	30.	0.	0.	0.	325.9
602819	36723.	536482.	8180	31000.	28.	1050.	260.	44.	2.0	0.02	240.	150.	43000.	130000.	720.	0.	100.	0.	0.	0.	200.3
602821	36738.	536467.	8200	210.	70.	185.	20.	34.	2.0	0.02	36.	14.	1300.	350000.	125.	0.	5.	0.	0.	0.	225.6
602823	36656.	536825.	8220	520.	70.	700.	350.	26.	1.0	0.02	95.	42.	1600.	240000.	990.	0.	15.	0.	0.	0.	68.0
602827	37172.	535430.	8260	20.	20.	770.	90.	36.	2.0	14.20	160.	140.	108000.	130000.	9600.	0.	30.	20.	2.	40.	7.2
602829	37134.	535446.	8280	200.	26.	2400.	90.	48.	4.0	3.35	190.	180.	196000.	180000.	1700.	0.	20.	0.	0.	0.	8.8
602831	37202.	535382.	8300	46.	24.	1350.	90.	50.	3.0	5.00	200.	175.	174000.	110000.	7100.	0.	65.	42.	14.	10.	9.6
602833	37224.	535344.	8320	24.	40.	800.	90.	28.	1.0	4.50	85.	85.	23000.	56000.	5800.	0.	40.	34.	12.	10.	53.2
602835	37218.	535326.	8340	40.	24.	260.	140.	28.	1.0	0.00	55.	26.	17000.	64000.	7500.	0.	55.	0.	0.	0.	2.3
602837	37227.	535316.	8360	32.	1350.	110.	85.	34.	1.0	0.30	26.	12.	2400.	69000.	7100.	0.	85.	0.	0.	0.	4.3
602839	37244.	535284.	8380	22.	20.	150.	55.	24.	1.0	0.02	28.	10.	1600.	150000.	1250.	0.	30.	34.	6.	16.	43.7
602841	37264.	535229.	8400	14.	10.	270.	12.	18.	2.0	0.02	95.	38.	12500.	40000.	750.	0.	5.	0.	0.	0.	141.1
602843	37273.	535241.	8420	8.	12.	260.	40.	28.	1.0	0.02	130.	46.	8300.	140000.	1200.	0.	5.	22.	14.	10.	169.5
602845	36523.	535653.	8440	1350.	32.	1100.	95.	48.	3.0	0.75	180.	180.	200000.	60000.	950.	0.	310.	0.	0.	0.	8.4
602847	36513.	535655.	8460	0.	20.	860.	70.	20.	2.0	0.02	150.	120.	107000.	127000.	1200.	0.	0.	0.	0.	0.	0.6
602849C	36549.	535750.	8480	1650.	1.	230.	20.	8.	2.0	0.02	6.	6.	380000.	4000.	180.	0.	15.	0.	0.	0.	88.8
602851C	36537.	535738.	8500	2100.	20.	950.	75.	48.	2.0	0.02	160.	170.	290000.	59000.	1000.	0.	260.	0.	0.	0.	13.9
602853	36637.	535824.	8520	830.	48.	3600.	890.	55.	4.0	0.02	160.	160.	140000.	110000.	3900.	0.	30.	0.	0.	0.	3.6
602855	36700.	535815.	8540	1250.	36.	2700.	230.	70.	2.0	0.02	190.	240.	430000.	66000.	1300.	0.	60.	0.	0.	0.	11.4
602857	36731.	535821.	8560	150.	14.	2800.	18.	50.	1.0	0.15	190.	190.	81000.	54000.	880.	0.	115.	0.	0.	0.	38.3
602859	36703.	535805.	8580	690.	44.	2100.	810.	65.	4.0	0.02	220.	260.	410000.	72000.	1350.	0.	70.	0.	0.	0.	17.9
602862	36868.	535940.	8610	180.	22.	330.	100.	12.	0.5	0.15	70.	48.	76000.	60000.	1300.	0.	210.	0.	0.	0.	23.1
602865	37308.	535197.	8640	10.	14.	210.	34.	18.	1.0	0.02	75.	30.	148000.	47000.	1900.	0.	15.	16.	20.	14.	68.9
602867	37251.	535167.	8660	130.	1350.	570.	75.	20.	3.0	0.02	34.	34.	166000.	73000.	1500.	0.	45.	0.	0.	0.	11.5
602869	37101.	535544.	8680	115.	44.	680.	24.	44.	4.0	23.50	200.	120.	140000.	100000.	1200.	0.	10.	0.	0.	0.	21.5
602871	36795.	535924.	8700	140.	36.	1350.	60.	65.	3.0	0.02	250.	230.	68000.	130000.	1300.	0.	5.	0.	0.	0.	51.9
602873	36740.	536001.	8720	5050.	360.	11000.	35500.	32.	59.0	0.02	450.	60.	75000.	145000.	122000.	0.	5.	0.	0.	0.	309.1
602875	37449.	535189.	8740	18.	46.	280.	32.	22.	1.0	0.02	220.	120.	44500.	51000.	820.	0.	10.	14.	8.	16.	95.9
602877	37545.	535707.	8760	220.	36.	1300.	1250.	48.	6.0	1.90	320.	150.	150000.	60000.	4600.	0.	140.	0.	0.	0.	7.1
602879	37292.	535596.	8780	38.	8.	850.	70.	42.	2.0	1.05	220.	125.	178000.	63000.	1200.	0.	15.	0.	0.	0.	31.6
602881	36825.	536167.	8800	6750.	38.	350.	130.	40.	2.0	0.02	65.	60.	19000.	240000.	530.	0.	30.	0.	0.	0.	47.4
602883	36850.	536145.	8820	28.	300.	8600.	22500.	40.	36.0	0.02	1650.	200.	29000.	230000.	87000.	0.	5.	0.	0.	0.	150.3
602885	36862.	536149.	8840	50.	50.	1600.	3700.	42.	5.0	0.02	250.	85.	43000.	240000.	870.	0.	5.	0.	0.	0.	22.5
602887	36850.	536131.	8860	100.	14.	1050.	50.	60.	2.0	0.02	310.	250.	270000.	120000.	1300.	0.	5.	0.	0.	0.	45.9
602889	36825.	536137.	8880	830.	12.	1600.	360.	75.	3.0	0.02	340.	300.	230000.	125000.	1500.	0.	5.	0.	0.	0.	39.3
602894	36794.	536112.	8930	7600.	6.	660.	26.	50.	2.0	0.02	200.	190.	35000.	63000.	890.	0.	25.	0.	0.	0.	363.8
602896	36792.	536143.	8950	20500.	24.	320.	42.	28.	2.0	0.02	55.	80.	105000.	150000.	530.	0.	60.	0.	0.	0.	214.8
602898	36780.	536075.	8970	860.	34.	670.	490.	50.	3.0	2.30	180.	120.	64000.	240000.	1200.	0.	20.	0.	0.	0.	8.5
602901	36773.	536056.	9000	36000.	14.	890.	28.	70.	5.0	210.00	210.	240.	290000.	120000.	1200.	0.	85.	0.	0.	0.	18.6
602903	37324.	535148.	9020	48.	60.	450.	120.	36.	1.0	0.80	290.	190.	76000.	74000.	1500.	0.	25.	0.	0.	0.	10.3
602905	36894.	536121.	9040	55.	290.	9600.	41000.	42.	66.0	0.05	2800.	300.	60000.	270000.	90000.	0.	5.	0.	0.	0.	74.2
602907	36896.	536113.	9060	1200.	12.	550.	150.	44.	2.0	0.02	175.	140.	52000.	170000.	670.	0.	5.	0.	0.	0.	226.5
602909	36891.	536102.	9080	660.	32.	1500.	550.	46.	3.0	0.02	370.	145.	146000.	180000.	1300.	0.	35.	0.	0.	0.	13.3
602911	36858.	536444.	9100	290.	6.	1150.	18.	75.	2.0	0.21	350.	330.	51000.	150000.	1350.	0.	5.	0.	0.	0.	536.3
602913	36833.	536467.	9120	180.	12.	920.	18.	60.	2.0	0.02	880.	280.	78000.	130000.	1300.	0.	5.	0.	0.	0.	699.3
602915	36902.	536281.	9140	9300.	16.	210.	450.	26.	0.5	0.02	470.	28.	40000.	210000.	540.	0.	5.	0.	0.	0.	346.1
602917	36863.	535860.	9160	90.	44.	1700.	26.	65.	3.0	0.02	180.	230.	295000.	110000.	2900.	0.	10.	0.	0.	0.	29.1

400048

048

400049

APPENDIX II

-20 MESH DRAINAGE SAMPLE ANALYSES

A140001A-370A AND 602594A-916A

049

Drainage (-20 mesh) : suffix "A" following sample number

Sample Nos. : 602594A-916A
A140001-367A

Laboratory :

- (i) ACS Batch A2905 28/5/79
- (ii) ALS Batch B204 12/3/81
- (iii) ALS Batch K082, K082/1, K082/2 18/10/82 (O/N 33271)
- (iv) Comlabs Job COM 821156 14/7/82 (O/N 30661)

Method :

- (1) AAS : Cu, Zn, Pb, Bi, Ag, Ni, Co, Cr, Fe, Mn, Cd
Au1 (ppb), Au2 (ppb)
- (2) Emission Spec : Cr2, Sn2
- (3) XRF : Cr1, Sn, Sn1

Note : Cr2 and Sn are emission spectrograph results

Cr1 is an XRF value. Sn1 values are checks on analyses labelled "Sn"

All values are in ppm, except Au (ppb).

Detection Limit : Values below the limit of detection are assigned a value equal to half the limit of detection, e.g. Ag (0.5), Bi (2), (Co (1), Cd (0.5), Au (2), Sn (2)

SAMPLE	AMGE	AMGN	N NO	SN	SN1	SN2	CU	ZN	PB	BI	AG	AU1	AU2	NI	CO	CR	CR1	CR2	FE	MN	CD
140001	36716.	536825.	001A	6.	0.	0.	30.	220.	55.	0.	2.0	2.	0.	50.	20.	80.	0.	0.	50200.	800.	0.0
140002	36655.	536820.	002A	8.	0.	0.	25.	310.	85.	0.	2.0	2.	0.	80.	65.	120.	0.	0.	69700.	6400.	0.0
140003	36715.	536838.	003A	2.	0.	0.	20.	550.	330.	0.	3.0	2.	0.	90.	80.	90.	0.	0.	123000.	6100.	0.0
140004	36676.	536838.	004A	10.	0.	0.	75.	340.	290.	0.	2.0	2.	0.	60.	115.	100.	0.	0.	130000.	9400.	0.0
140005	37404.	535431.	005A	2.	0.	0.	35.	150.	50.	0.	2.0	2.	0.	70.	35.	65.	0.	0.	39700.	840.	0.0
140006	37394.	535426.	006A	4.	0.	0.	25.	160.	50.	0.	2.0	2.	0.	25.	20.	20.	0.	0.	40500.	500.	0.0
140008	37401.	535330.	008A	4.	0.	0.	35.	200.	55.	0.	2.0	2.	0.	40.	25.	30.	0.	0.	45100.	890.	0.0
140010	37394.	535271.	010A	6.	0.	0.	15.	130.	30.	0.	1.0	2.	0.	25.	20.	35.	0.	0.	33100.	980.	0.0
140011	37453.	535448.	011A	6.	0.	0.	40.	165.	65.	0.	2.0	2.	0.	105.	35.	130.	0.	0.	49800.	910.	0.0
140012	37411.	535446.	012A	2.	0.	0.	50.	400.	105.	0.	4.0	2.	0.	90.	35.	50.	0.	0.	56500.	1800.	0.0
140013	37357.	535447.	013A	4.	0.	0.	40.	185.	55.	0.	2.0	2.	2.	110.	35.	65.	0.	0.	43000.	320.	0.0
140014	37347.	535460.	014A	2.	0.	0.	40.	200.	50.	0.	2.0	2.	3.	135.	40.	70.	0.	0.	46400.	820.	0.0
140016	37319.	535447.	016A	6.	0.	0.	30.	250.	55.	0.	2.0	2.	3.	115.	40.	60.	0.	0.	47000.	1100.	0.0
140018	37384.	535501.	018A	8.	0.	0.	40.	170.	80.	0.	2.0	2.	3.	25.	55.	25.	0.	0.	42600.	2200.	0.0
140019	37369.	535502.	019A	2.	0.	0.	100.	160.	30.	0.	2.0	20.	20.	270.	65.	225.	0.	0.	68900.	1300.	0.0
140020	37275.	535501.	020A	12.	0.	0.	10.	50.	20.	0.	1.0	2.	3.	45.	10.	20.	0.	0.	22100.	125.	0.0
140021	37459.	535548.	021A	2.	0.	0.	10.	80.	35.	0.	1.0	2.	0.	75.	25.	220.	0.	0.	23100.	990.	0.0
140023	37451.	535543.	023A	4.	0.	0.	5.	65.	15.	0.	2.0	2.	0.	65.	15.	1500.	0.	0.	17600.	500.	0.0
140024	37359.	535548.	024A	2.	0.	0.	15.	130.	35.	0.	6.0	2.	0.	95.	25.	195.	0.	0.	26400.	420.	0.0
140026	37365.	535539.	026A	6.	0.	0.	10.	105.	15.	0.	2.0	2.	2.	90.	20.	260.	0.	0.	24900.	510.	0.0
140027	37350.	535541.	027A	6.	0.	0.	40.	170.	90.	0.	2.0	2.	0.	95.	40.	40.	0.	0.	42800.	1100.	0.0
140028	37341.	535549.	028A	10.	0.	0.	30.	140.	50.	0.	2.0	2.	0.	85.	25.	25.	0.	0.	36300.	340.	0.0
140029	37325.	535546.	029A	16.	0.	0.	50.	90.	50.	0.	2.0	2.	0.	80.	45.	35.	0.	0.	50300.	1400.	0.0
140030	37326.	535541.	030A	12.	0.	0.	55.	100.	50.	0.	2.0	2.	0.	85.	55.	40.	0.	0.	52500.	2100.	0.0
140031	37269.	535542.	031A	10.	0.	0.	5.	20.	20.	0.	1.0	2.	3.	10.	5.	35.	0.	0.	10100.	90.	0.0
140032	37256.	535540.	032A	12.	0.	0.	15.	80.	30.	0.	1.0	2.	3.	50.	10.	30.	0.	0.	26200.	200.	0.0
140034	37492.	535551.	034A	2.	0.	0.	10.	80.	40.	0.	1.0	2.	0.	105.	25.	140.	0.	0.	28800.	600.	0.0
140035	37238.	535545.	035A	2.	0.	0.	5.	35.	15.	0.	0.5	2.	0.	20.	5.	130.	0.	0.	13700.	115.	0.0
140037	37170.	535553.	037A	2.	0.	0.	5.	45.	25.	0.	1.0	2.	0.	15.	10.	25.	0.	0.	21800.	610.	0.0
140038	37436.	535504.	038A	4.	0.	0.	10.	135.	35.	0.	2.0	2.	0.	135.	30.	245.	0.	0.	36500.	890.	0.0
140039	37449.	535507.	039A	6.	0.	0.	10.	75.	25.	0.	2.0	2.	0.	90.	20.	185.	0.	0.	35700.	480.	0.0
140040	37461.	535508.	040A	2.	0.	0.	5.	90.	30.	0.	2.0	2.	0.	130.	20.	145.	0.	0.	34300.	580.	0.0
140041	37097.	535975.	041A	2.	0.	0.	2.	5.	5.	0.	0.5	2.	0.	2.	2.	25.	0.	0.	2200.	30.	0.0
140043	37051.	535965.	043A	10.	0.	0.	1.	5.	10.	0.	0.5	2.	0.	2.	2.	15.	0.	0.	1800.	15.	0.0
140044	36919.	535938.	044A	2.	0.	0.	1.	5.	10.	0.	0.5	2.	0.	2.	2.	40.	0.	0.	2500.	25.	0.0
140045	36910.	535929.	045A	10.	0.	0.	1.	5.	5.	0.	0.5	2.	0.	5.	2.	125.	0.	0.	2300.	30.	0.0
140047	36893.	535939.	047A	6.	0.	0.	5.	10.	15.	0.	0.5	2.	0.	5.	2.	55.	0.	0.	6900.	25.	0.0
140048	36872.	535950.	048A	6.	0.	0.	5.	15.	20.	0.	0.5	2.	0.	10.	5.	40.	0.	0.	7600.	70.	0.0
140049	37110.	536091.	049A	6.	0.	0.	20.	125.	45.	0.	1.0	2.	0.	20.	15.	25.	0.	0.	34500.	330.	0.0
140050	37102.	536092.	050A	4.	0.	0.	60.	480.	145.	0.	1.0	10.	5.	35.	35.	45.	0.	0.	61900.	6900.	0.0
140051	37107.	536084.	051A	6.	0.	0.	20.	175.	45.	0.	0.5	2.	0.	30.	15.	30.	0.	0.	30900.	420.	0.0
140052	37093.	536070.	052A	14.	0.	0.	15.	195.	190.	0.	1.0	2.	0.	25.	10.	20.	0.	0.	20900.	500.	0.0
140053	37083.	536064.	053A	10.	0.	0.	15.	220.	85.	0.	2.0	2.	0.	35.	10.	20.	0.	0.	27300.	510.	0.0
140054	37075.	536057.	054A	6.	0.	0.	30.	300.	80.	0.	1.0	2.	0.	35.	20.	20.	0.	0.	38300.	860.	0.0
140055	37054.	536056.	055A	10.	0.	0.	25.	750.	480.	0.	2.0	2.	0.	40.	25.	25.	0.	0.	50300.	3200.	0.0
140057	37044.	536062.	057A	8.	0.	0.	60.	95.	50.	0.	2.0	30.	3.	40.	70.	60.	0.	0.	63400.	1800.	0.0
140058	37021.	536059.	058A	14.	0.	0.	10.	190.	100.	0.	1.0	2.	0.	30.	10.	25.	0.	0.	21700.	260.	0.0
140059	36974.	536095.	059A	2.	0.	0.	20.	480.	260.	0.	1.0	2.	0.	40.	25.	25.	0.	0.	49900.	1700.	0.0
140061	36247.	535948.	061A	12.	0.	0.	50.	11800.	4800.	0.	12.0	2.	0.	150.	65.	660.	0.	0.	68400.	20200.	0.0
140063	36776.	536050.	063A	6.	0.	0.	5.	120.	80.	0.	3.0	2.	0.	10.	10.	25.	0.	0.	18100.	380.	0.0
140064	36785.	536068.	064A	14.	0.	0.	10.	25.	45.	0.	1.0	2.	0.	5.	2.	25.	0.	0.	8400.	55.	0.0
140065	36790.	536065.	065A	12.	0.	0.	10.	70.	40.	0.	1.0	10.	5.	20.	15.	45.	0.	0.	22400.	640.	0.0
140066	36797.	536058.	066A	2.	0.	0.	5.	20.	15.	0.	1.0	20.	3.	10.	5.	420.	0.	0.	9900.	80.	0.0
140068	36802.	536064.	068A	2.	0.	0.	10.	55.	35.	0.	1.0	2.	0.	15.	10.	25.	0.	0.	18900.	420.	0.0
140070	36763.	536033.	070A	4.	0.	0.	10.	40.	25.	0.	1.0	2.	0.	15.	5.	95.	0.	0.	28400.	85.	0.0
140071	36786.	536034.	071A	16.	0.	0.	5.	10.	10.	0.	1.0	2.	0.	5.	2.	290.	0.	0.	5000.	30.	0.0
140072	36810.	536033.	072A	10.	0.	0.	10.	45.	25.	0.	1.0	2.	3.	15.	15.	90.	0.	0.	30300.	390.	0.0
140073	36822.	536034.	073A	6.	0.	0.	5.	15.	10.	0.	1.0	2.	5.	10.	2.	50.	0.	0.	6100.	30.	0.0
140074	36842.	536035.	074A	8.	0.	0.	5.	5.	10.	0.	0.5	2.	5.	5.	2.	10.	0.	0.	2200.	20.	0.0

051

400052

140075	36856	536035	075A	10	0	0	35	15	15	0	0.5	10	20	5	2	35	0	0	3200	20	0.0
140076	36889	536036	076A	6	0	0	10	45	25	0	1.0	5	0	15	10	90	0	0	13200	170	0.0
140077	36898	536036	077A	4	0	0	15	85	50	0	1.0	2	0	20	10	25	0	0	24700	500	0.0
140078	36982	536039	078A	10	0	0	5	10	10	0	0.5	10	0	2	2	10	0	0	1900	20	0.0
140079	36957	536042	079A	4	0	0	2	10	10	0	0.5	2	0	2	2	70	0	0	4200	25	0.0
140080	36905	536033	080A	4	0	0	15	85	50	0	1.0	10	0	20	15	25	0	0	25200	780	0.0
140081	36907	536047	081A	2	0	0	15	95	55	0	2.0	2	0	25	35	80	0	0	46100	820	0.0
140083	36936	536068	083A	4	0	0	5	5	20	0	0.5	2	5	5	2	10	0	0	4400	30	0.0
140084	36923	536069	084A	6	0	0	5	20	25	0	0.5	10	10	5	2	95	0	0	3200	45	0.0
140085	36905	536079	085A	4	0	0	10	25	25	0	0.5	2	0	10	5	125	0	0	12500	70	0.0
140086	36907	536103	086A	2	0	0	20	70	60	0	1.0	2	0	25	20	125	0	0	38300	480	0.0
140087	36906	536097	087A	4	0	0	55	190	55	0	2.0	2	0	60	70	80	0	0	70200	2100	0.0
140088	36906	536011	088A	2	0	0	5	60	25	0	1.0	2	0	20	10	55	0	0	16100	135	0.0
140089	36960	535994	089A	2	2	0	15	105	70	0	1.0	2	0	20	20	20	0	0	28000	1200	0.0
140091	36915	536031	091A	4	2	0	10	40	25	0	1.0	2	5	15	5	330	0	0	16000	95	0.0
140093	36897	536135	093A	12	0	0	20	85	60	0	1.0	2	0	30	25	50	0	0	52300	420	0.0
140094	36806	536063	094A	4	0	0	10	60	25	0	0.5	2	5	15	15	45	0	0	41500	510	0.0
140095	36815	536064	095A	2	0	0	5	15	15	0	0.5	2	0	5	2	170	0	0	7000	40	0.0
140096	36827	536079	096A	10	0	0	15	55	40	0	0.5	2	0	15	15	35	0	0	14200	200	0.0
140097	36847	536065	097A	10	0	0	5	5	10	0	0.5	20	5	2	2	35	0	0	1800	15	0.0
140098	36768	536108	098A	26	0	0	10	60	40	0	1.0	2	0	25	10	200	0	0	32500	190	0.0
140099	36771	536111	099A	14	0	0	10	25	20	0	0.5	2	0	10	5	90	0	0	10000	125	0.0
140100	36817	536096	100A	12	0	0	5	15	30	0	0.5	2	0	5	2	20	0	0	12200	35	0.0
140101	36769	536129	101A	310	325	0	10	30	15	0	1.0	2	0	15	5	930	0	0	9300	125	0.0
140102	36791	536156	102A	16	15	0	10	75	30	0	1.0	2	0	30	15	310	0	0	28500	420	0.0
140103	36800	536125	103A	2	0	0	5	25	45	0	2.0	2	0	10	5	510	0	0	10000	60	0.0
140104	36821	536122	104A	14	2	0	5	15	10	0	2.0	2	0	5	2	1700	0	0	5800	50	0.0
140105	36840	536128	105A	12	0	0	5	20	15	0	2.0	2	10	5	2	810	0	0	6000	40	0.0
140106	36858	536127	106A	6	0	0	5	20	20	0	2.0	2	10	5	5	990	0	0	9400	145	0.0
140107	36891	536134	107A	8	0	0	25	50	40	0	1.0	2	0	25	5	60	0	0	52600	50	0.0
140108	36913	536120	108A	2	0	0	30	260	55	0	1.0	2	0	80	80	50	0	0	61900	7700	0.0
140109	36899	536109	109A	2	0	0	25	150	120	0	1.0	2	5	30	65	50	0	0	40600	1800	0.0
140111	36927	536137	111A	16	0	0	120	2200	7000	0	17.0	2	0	195	50	1000	0	0	80400	23000	0.0
140112	36935	536127	112A	14	0	0	50	5200	4200	0	16.0	2	0	250	65	840	0	0	64400	16000	0.0
140113	36867	536097	113A	18	0	0	10	50	45	0	1.0	2	0	10	5	280	0	0	13700	150	0.0
140115	36881	536096	115A	8	0	0	20	90	30	0	1.0	2	0	40	25	85	0	0	28300	375	0.0
140116	36895	536095	116A	6	0	0	5	20	20	0	0.5	2	0	10	5	250	0	0	9300	135	0.0
140117	36899	536118	117A	10	0	0	10	50	40	0	1.0	2	0	25	10	125	0	0	27700	75	0.0
140118	37323	536734	118A	6	0	0	40	60	75	0	1.0	2	0	35	10	130	0	0	28600	240	0.0
140119	37334	536691	119A	2	0	0	35	125	85	0	1.0	2	0	65	50	100	0	0	56900	2400	0.0
140120	37336	536724	120A	6	0	0	155	130	600	0	4.0	2	0	40	25	90	0	0	53300	1400	0.0
140121	37281	536767	121A	24	0	0	110	80	195	0	2.0	2	0	25	20	75	0	0	32200	980	0.0
140122	37252	536673	122A	14	0	0	680	55	65	0	2.0	2	0	30	5	105	0	0	21000	55	0.0
140123	37188	536644	123A	6	0	0	25	115	220	0	1.0	2	0	30	25	65	0	0	32200	1500	0.0
140124	37315	536538	124A	55	0	0	10	15	70	0	2.0	2	0	5	2	15	0	0	1800	20	0.0
140125	37211	536407	125A	8	0	0	70	95	100	0	1.0	2	0	20	25	10	0	0	43700	1400	0.0
140126	37210	536348	126A	24	0	0	40	130	260	0	2.0	2	0	25	25	15	0	0	46500	1800	0.0
140127	37129	536342	127A	24	0	0	45	120	180	0	1.0	2	0	20	15	20	0	0	49700	380	0.0
140128	37136	536223	128A	6	0	0	40	2200	300	0	2.0	20	10	70	80	15	0	0	37800	7000	0.0
140129	37110	536318	129A	6	0	0	20	60	90	0	1.0	2	0	10	15	10	0	0	25400	910	0.0
140130	37112	536281	130A	6	0	0	15	30	90	0	2.0	2	0	5	10	5	0	0	17000	520	0.0
140131	37115	536288	131A	8	0	0	45	155	125	0	2.0	2	0	20	30	10	0	0	42000	2000	0.0
140132	37125	536095	132A	8	0	0	40	1500	1000	0	3.0	2	0	50	40	20	0	0	40800	5400	0.0
140133	37068	536175	133A	10	0	0	50	1500	580	0	5.0	2	0	120	55	155	0	0	135000	3100	0.0
140134	37121	536104	134A	6	0	0	30	500	380	0	2.0	2	0	35	25	25	0	0	44100	2800	0.0
140135	37142	536155	135A	6	0	0	30	180	165	0	1.0	2	0	40	30	35	0	0	42200	1500	0.0
140136	37138	536159	136A	8	0	0	5	20	45	0	1.0	2	0	5	5	10	0	0	12700	250	0.0
140137	37081	536160	137A	4	0	0	15	150	260	0	1.0	2	0	20	10	45	0	0	22700	760	0.0
140138	37052	536365	138A	24	5	0	15	45	220	0	2.0	2	10	30	10	3700	0	0	15500	130	0.0
140139	37087	536336	139A	26	0	0	40	155	270	0	2.0	30	10	25	30	60	0	0	49100	1900	0.0
140140	37082	536340	140A	36	25	0	40	280	260	0	3.0	2	0	35	20	155	0	0	50000	2900	0.0

052

400053

140142	37074.	536305.	142A	28.	0.	0.	190.	42600.	14400.	0.	29.0	2.	0.	45.	20.	80.	0.	0.	165000.	46500.	0.0
140143	37067.	536313.	143A	14.	0.	0.	30.	250.	280.	0.	1.0	2.	0.	20.	20.	20.	0.	0.	35500.	1900.	0.0
140144	37055.	535946.	144A	8.	0.	0.	10.	65.	100.	0.	1.0	2.	0.	10.	10.	20.	0.	0.	21200.	1500.	0.0
140145	37261.	535883.	145A	4.	0.	0.	30.	270.	110.	0.	1.0	2.	0.	115.	105.	20.	0.	0.	45100.	10000.	0.0
140146	37119.	535797.	146A	6.	2.	0.	15.	45.	70.	0.	1.0	2.	0.	15.	10.	10.	0.	0.	23500.	530.	0.0
140147	37023.	535726.	147A	12.	2.	0.	10.	40.	3600.	0.	2.0	2.	0.	15.	10.	55.	0.	0.	15600.	250.	0.0
140148	37144.	536231.	148A	4.	0.	0.	50.	180.	150.	0.	2.0	2.	0.	45.	35.	20.	0.	0.	51000.	2500.	0.0
140149	37139.	536232.	149A	2.	0.	0.	50.	160.	130.	0.	2.0	2.	0.	40.	35.	15.	0.	0.	52700.	2200.	0.0
140150	37116.	536208.	150A	6.	0.	0.	60.	280.	240.	0.	2.0	2.	5.	40.	25.	15.	0.	0.	33100.	870.	0.0
140151	37180.	535213.	151A	6.	0.	0.	40.	320.	220.	0.	1.0	2.	0.	50.	50.	30.	0.	0.	62600.	4000.	0.0
140152	37142.	536377.	152A	6.	0.	0.	40.	150.	200.	0.	1.0	2.	0.	25.	30.	10.	0.	0.	52100.	4600.	0.0
140153	37133.	536372.	153A	18.	2.	0.	70.	490.	1000.	0.	5.0	2.	0.	70.	30.	55.	0.	0.	58300.	5700.	0.0
140154	37150.	536412.	154A	20.	5.	0.	150.	1400.	2900.	0.	23.0	2.	0.	70.	35.	25.	0.	0.	64100.	10000.	0.0
140156	37144.	536411.	156A	6.	0.	0.	65.	640.	570.	0.	3.0	2.	0.	95.	40.	80.	0.	0.	67200.	4800.	0.0
140157	37129.	536365.	157A	2.	0.	0.	20.	95.	90.	0.	1.0	2.	0.	15.	20.	15.	0.	0.	39800.	1900.	0.0
140158	37172.	536341.	158A	4.	0.	0.	30.	40.	70.	0.	1.0	2.	0.	10.	10.	10.	0.	0.	22900.	290.	0.0
140159	36690.	536368.	159A	16.	0.	0.	25.	320.	120.	0.	1.0	2.	0.	45.	30.	90.	0.	0.	54300.	910.	0.0
140160	37039.	535661.	160A	2.	0.	0.	10.	50.	35.	0.	0.5	2.	0.	20.	10.	45.	0.	0.	19400.	200.	0.0
140161	36756.	536308.	161A	12.	0.	0.	10.	45.	90.	0.	0.5	2.	0.	10.	10.	90.	0.	0.	23000.	230.	0.0
140162	37095.	535553.	162A	12.	0.	0.	2.	5.	20.	0.	0.5	2.	0.	2.	2.	5.	0.	0.	2200.	10.	0.0
140163	37010.	535714.	163A	2.	0.	0.	15.	80.	50.	0.	1.0	2.	0.	25.	15.	15.	0.	0.	25400.	690.	0.0
140164	36966.	535739.	164A	4.	0.	0.	5.	20.	20.	0.	0.5	2.	0.	5.	5.	150.	0.	0.	6000.	100.	0.0
140165	36649.	536212.	165A	8.	0.	0.	5.	10.	20.	0.	0.5	2.	0.	5.	2.	180.	0.	0.	3900.	20.	0.0
140166	36643.	536235.	166A	10.	0.	0.	20.	65.	50.	0.	1.0	2.	0.	20.	5.	85.	0.	0.	13200.	70.	0.0
140167	36960.	535765.	167A	12.	0.	0.	5.	20.	25.	0.	1.0	2.	0.	5.	5.	310.	0.	0.	5800.	130.	0.0
140169	36969.	535757.	169A	12.	0.	0.	5.	25.	20.	0.	1.0	2.	0.	5.	5.	1200.	0.	0.	7200.	50.	0.0
140170	36794.	535922.	170A	2.	0.	0.	5.	25.	20.	0.	0.5	2.	0.	5.	2.	60.	0.	0.	5400.	25.	0.0
140171	37256.	535554.	171A	8.	0.	0.	5.	25.	25.	0.	0.5	2.	0.	15.	5.	65.	0.	0.	11300.	100.	0.0
140172	36724.	536518.	172A	1000.	0.	0.	2400.	2000.	1500.	0.	6.0	2.	0.	130.	235.	110.	0.	0.	192000.	5600.	0.0
140173	37216.	536215.	173A	2.	0.	0.	45.	390.	300.	0.	1.0	2.	0.	65.	55.	20.	0.	0.	67200.	7100.	0.0
140174	37213.	536222.	174A	8.	0.	0.	70.	190.	115.	0.	1.0	2.	0.	65.	50.	20.	0.	0.	55900.	4400.	0.0
140175	37070.	536408.	175A	6.	0.	0.	35.	210.	130.	0.	1.0	2.	0.	150.	40.	260.	0.	0.	61100.	1900.	0.0
140176	37065.	536408.	176A	2.	0.	0.	35.	130.	70.	0.	1.0	2.	0.	85.	30.	240.	0.	0.	43700.	1500.	0.0
140177	37096.	536389.	177A	8.	0.	0.	45.	150.	280.	0.	1.0	2.	0.	25.	30.	50.	0.	0.	68100.	2100.	0.0
140178	37085.	536356.	178A	2.	2.	0.	25.	190.	300.	0.	1.0	2.	0.	30.	40.	75.	0.	0.	46600.	2800.	0.0
140179	37138.	536012.	179A	6.	0.	0.	10.	100.	160.	0.	0.5	2.	0.	10.	20.	15.	0.	0.	30400.	1600.	0.0
140180	37147.	535979.	180A	4.	0.	0.	20.	160.	170.	0.	0.5	2.	0.	25.	35.	20.	0.	0.	33700.	3700.	0.0
140181	37153.	535817.	181A	14.	0.	0.	25.	110.	65.	0.	0.5	2.	0.	30.	15.	25.	0.	0.	29100.	860.	0.0
140182	37111.	536394.	182A	16.	2.	0.	55.	450.	730.	0.	2.0	2.	0.	130.	45.	120.	0.	0.	61000.	7900.	0.0
140183	37079.	535824.	183A	6.	0.	0.	2.	5.	15.	0.	0.5	2.	0.	2.	2.	40.	0.	0.	1800.	35.	0.0
140184	36896.	536298.	184A	10.	0.	0.	30.	125.	60.	0.	1.0	2.	0.	55.	40.	55.	0.	0.	52800.	3200.	0.0
140185	36835.	536272.	185A	16.	0.	0.	100.	1200.	1200.	0.	3.0	2.	0.	60.	35.	50.	0.	0.	54700.	2700.	0.0
140186	36976.	535766.	186A	14.	0.	0.	2.	15.	20.	0.	1.0	2.	0.	5.	2.	40.	0.	0.	6100.	45.	0.0
140188	36959.	535778.	188A	8.	0.	0.	2.	15.	25.	0.	0.5	2.	0.	2.	5.	50.	0.	0.	4300.	125.	0.0
140190	37146.	536439.	190A	4.	0.	0.	20.	265.	180.	0.	0.5	2.	0.	90.	20.	70.	0.	0.	31500.	2500.	0.0
140191	37139.	536437.	191A	4.	0.	0.	35.	370.	200.	0.	1.0	2.	0.	95.	50.	55.	0.	0.	65000.	5700.	0.0
140192	37256.	535899.	192A	6.	0.	0.	20.	150.	90.	0.	1.0	2.	10.	30.	30.	30.	0.	0.	29000.	2100.	0.0
140193	37255.	535554.	193A	16.	0.	0.	10.	25.	20.	0.	0.5	2.	0.	15.	5.	65.	0.	0.	10800.	110.	0.0
140194	36595.	536522.	194A	20.	0.	0.	10.	85.	55.	0.	2.0	2.	0.	20.	20.	675.	0.	0.	26300.	930.	0.0
140195	36712.	536314.	195A	12.	0.	0.	15.	135.	115.	0.	1.0	2.	0.	20.	20.	55.	0.	0.	18200.	1900.	0.0
140196	37364.	535717.	196A	6.	0.	0.	20.	110.	75.	0.	1.0	2.	0.	55.	25.	30.	0.	0.	36600.	1600.	0.0
140197	36781.	536406.	197A	4.	0.	0.	30.	240.	210.	0.	1.0	2.	0.	35.	25.	60.	0.	0.	26900.	3200.	0.0
140198	36754.	536458.	198A	2.	0.	0.	20.	250.	90.	0.	1.0	2.	3.	115.	35.	270.	0.	0.	54300.	1900.	0.0
140199	37202.	535388.	199A	6.	0.	0.	20.	75.	40.	0.	0.5	2.	3.	10.	10.	15.	0.	0.	14300.	400.	0.0
140200	37246.	535290.	200A	4.	0.	0.	30.	130.	30.	0.	1.0	2.	0.	25.	40.	15.	0.	0.	34000.	450.	0.0
140201	36628.	536464.	201A	12.	0.	0.	2.	35.	5.	0.	1.0	2.	0.	5.	5.	4000.	0.	0.	3000.	35.	0.0
140202	36605.	536500.	202A	500.	0.	0.	5.	70.	10.	0.	2.0	2.	0.	20.	15.	10000.	0.	0.	11700.	110.	0.0
140203	36608.	536528.	203A	65.	0.	0.	20.	130.	55.	0.	1.0	2.	0.	25.	10.	1600.	0.	0.	46300.	160.	0.0
140204	36614.	536522.	204A	65.	0.	0.	20.	140.	40.	0.	2.0	2.	0.	40.	30.	10000.	0.	0.	24500.	330.	0.0
140206	36594.	536534.	206A	22.	0.	0.	5.	10.	20.	0.	0.5	2.	0.	10.	2.	55.	0.	0.	2200.	10.	0.0
140207	36674.	536806.	207A	10.	0.	0.	65.	390.	320.	0.	2.0	2.	0.	70.	90.	80.	0.	0.	65100.	1200.	0.0

053

400054

140208	36727.	536812.	208A	16.	0.	0.	55.	560.	310.	0.	2.0	2.	0.	80.	55.	140.	0.	0.112000.	5800.	0.0
140209	36714.	536822.	209A	6.	0.	0.	45.	240.	650.	0.	2.0	2.	0.	130.	70.	160.	0.	0.87400.	4300.	0.0
140210	36619.	536793.	210A	14.	0.	0.	5.	30.	40.	0.	0.5	2.	0.	5.	5.	15.	0.	0.8000.	175.	0.0
140211	36629.	536790.	211A	14.	0.	0.	35.	330.	105.	0.	1.0	2.	0.	75.	70.	110.	0.	0.58700.	2400.	0.0
140212	36758.	536791.	212A	18.	0.	0.	25.	650.	370.	0.	2.0	2.	0.	55.	50.	390.	0.	0.61800.	4700.	0.0
140213	36733.	536793.	213A	8.	0.	0.	60.	620.	460.	0.	2.0	2.	0.	65.	50.	195.	0.	0.87000.	3000.	0.0
140214	36688.	536753.	214A	2.	0.	0.	70.	4000.	1100.	0.	2.0	2.	0.	95.	110.	170.	0.	0.71100.	4100.	0.0
140215	36728.	536792.	215A	20.	0.	0.	25.	440.	180.	0.	2.0	2.	0.	105.	55.	2400.	0.	0.27600.	480.	0.0
140217	36574.	536739.	217A	10.	0.	0.	40.	1400.	200.	0.	2.0	2.	0.	400.	310.	1500.	0.	0.56800.	5300.	0.0
140219	36541.	536766.	219A	12.	2.	0.	5.	15.	15.	0.	0.5	2.	5.	5.	2.	25.	0.	0.6500.	50.	0.0
140220	36537.	536748.	220A	10.	0.	0.	5.	25.	15.	0.	0.5	2.	0.	5.	2.	20.	0.	0.5500.	35.	0.0
140221	36538.	536740.	221A	10.	0.	0.	100.	820.	200.	0.	1.0	2.	0.	170.	140.	140.	0.	0.47500.	3700.	0.0
140222	36527.	536748.	222A	6.	0.	0.	15.	60.	30.	0.	1.0	2.	0.	25.	10.	55.	0.	0.28400.	140.	0.0
140223	36603.	536693.	223A	22.	2.	0.	20.	30.	100.	0.	1.0	2.	0.	15.	5.	180.	0.	0.8500.	50.	0.0
140224	36601.	536729.	224A	10.	5.	0.	45.	105.	75.	0.	1.0	2.	0.	60.	30.	330.	0.	0.26100.	290.	0.0
140225	36504.	536424.	225A	55.	35.	0.	5.	15.	15.	0.	0.5	5.	0.	5.	5.	1300.	0.	0.3800.	35.	0.0
140226	36477.	536458.	226A	12.	0.	0.	5.	10.	10.	0.	0.5	2.	0.	5.	2.	95.	0.	0.3500.	10.	0.0
140227	36475.	536476.	227A	12.	0.	0.	2.	5.	10.	0.	0.5	2.	0.	5.	2.	85.	0.	0.1300.	15.	0.0
140228	36462.	536486.	228A	30.	0.	0.	195.	630.	195.	0.	2.0	2.	0.	240.	140.	210.	0.	0.59300.	3800.	0.0
140229	36552.	536609.	229A	14.	0.	0.	820.	1200.	210.	0.	3.0	2.	0.	410.	300.	230.	0.	0.89900.	6800.	0.0
140230	36541.	536606.	230A	115.	0.	0.	570.	870.	280.	0.	2.0	2.	0.	330.	200.	200.	0.	0.80600.	5300.	0.0
140231	36560.	536596.	231A	220.	0.	0.	520.	800.	460.	0.	3.0	2.	0.	230.	155.	155.	0.	0.82000.	5100.	0.0
140232	36649.	536617.	232A	18.	0.	0.	620.	530.	145.	0.	2.0	5.	0.	220.	115.	220.	0.	0.70000.	2400.	0.0
140233	37080.	536138.	233A	16.	2.	0.	15.	340.	540.	0.	2.0	20.	3.	35.	15.	125.	0.	0.33400.	1700.	0.0
140234	37060.	536140.	234A	14.	0.	0.	25.	810.	530.	0.	3.0	2.	0.	110.	45.	820.	0.	0.51700.	3600.	0.0
140235	37048.	536142.	235A	10.	0.	0.	25.	3000.	1900.	0.	2.0	2.	0.	1600.	135.	165.	0.	0.55500.	10000.	0.0
140236	37034.	536139.	236A	8.	0.	0.	20.	200.	550.	0.	2.0	2.	0.	110.	35.	500.	0.	0.47700.	3000.	0.0
140237	37030.	536122.	237A	4.	2.	0.	5.	50.	95.	0.	1.0	2.	5.	15.	5.	170.	0.	0.13500.	150.	0.0
140238	37000.	536134.	238A	2.	2.	0.	15.	380.	135.	0.	3.0	2.	0.	410.	80.	10000.	0.	0.46800.	1800.	0.0
140239	36990.	536102.	239A	10.	2.	0.	5.	75.	90.	0.	1.0	2.	5.	10.	5.	430.	0.	0.9300.	140.	0.0
140240	36988.	536115.	240A	12.	5.	0.	55.	6600.	4800.	0.	12.0	2.	0.	170.	110.	2100.	0.	0.64300.	10000.	0.0
140242	36984.	536097.	242A	10.	0.	0.	2.	5.	10.	0.	0.5	2.	0.	2.	2.	140.	0.	0.1400.	10.	0.0
140243	36976.	536092.	243A	2.	0.	0.	20.	420.	250.	0.	1.0	2.	0.	35.	20.	25.	0.	0.41000.	1700.	0.0
140244	36959.	536104.	244A	6.	0.	0.	65.	4700.	5700.	0.	5.0	2.	0.	550.	80.	1100.	0.	0.81700.	14200.	0.0
140245	36954.	536126.	245A	2.	0.	0.	15.	195.	270.	0.	0.5	2.	0.	470.	150.	900.	0.	0.31500.	4900.	0.0
140246	36959.	536165.	246A	55.	50.	0.	55.	1000.	2800.	0.	2.0	2.	0.	1400.	260.	2500.	0.	0.70100.	10000.	0.0
140247	36956.	536178.	247A	8.	0.	0.	115.	1600.	6400.	0.	14.0	2.	0.	150.	45.	500.	0.	0.81300.	10000.	0.0
140248	36973.	536178.	248A	10.	5.	0.	50.	700.	1700.	0.	3.0	2.	0.	480.	250.	2300.	0.	0.74000.	10000.	0.0
140249	36981.	536191.	249A	6.	2.	0.	70.	4100.	390.	0.	2.0	2.	0.	1000.	290.	2200.	0.	0.118000.	10000.	0.0
140250	36976.	536221.	250A	4.	0.	0.	170.	780.	1900.	0.	4.0	2.	0.	1700.	470.	8500.	0.	0.115000.	6200.	0.0
140251	36993.	536218.	251A	18.	0.	0.	105.	1000.	6400.	0.	24.0	2.	0.	65.	30.	170.	0.	0.59700.	10000.	0.0
140252	37009.	536251.	252A	12.	0.	0.	55.	480.	780.	0.	15.0	2.	0.	3000.	370.	10000.	0.	0.183000.	10000.	0.0
140253	37025.	536231.	253A	14.	0.	0.	60.	570.	2800.	0.	9.0	2.	0.	40.	30.	60.	0.	0.44200.	7300.	0.0
140254	37017.	536237.	254A	8.	0.	0.	320.	1600.	5800.	0.	25.0	2.	0.	350.	90.	240.	0.	0.124000.	10000.	0.0
140255	36992.	536242.	255A	4.	0.	0.	35.	510.	410.	0.	2.0	2.	0.	1700.	260.	3100.	0.	0.74500.	10000.	0.0
140257	36907.	536213.	257A	6.	0.	0.	15.	70.	45.	0.	0.5	2.	0.	30.	20.	220.	0.	0.24900.	330.	0.0
140258	36904.	536201.	258A	8.	0.	0.	20.	70.	30.	0.	0.5	2.	0.	25.	10.	115.	0.	0.14400.	70.	0.0
140259	36855.	536203.	259A	6.	0.	0.	30.	75.	45.	0.	0.5	2.	0.	40.	70.	85.	0.	0.71400.	2900.	0.0
140260	36844.	536202.	260A	12.	0.	0.	25.	50.	50.	0.	0.5	2.	0.	20.	5.	60.	0.	0.32600.	50.	0.0
140261	36846.	536176.	261A	2.	0.	0.	10.	20.	20.	0.	0.5	2.	0.	10.	5.	70.	0.	0.12300.	35.	0.0
140262	36819.	536223.	262A	2.	0.	0.	30.	150.	50.	0.	1.0	2.	0.	55.	30.	75.	0.	0.64100.	1800.	0.0
140263	36824.	536228.	263A	10.	0.	0.	15.	45.	20.	0.	0.5	2.	0.	20.	15.	50.	0.	0.19400.	105.	0.0
140264	36881.	536236.	264A	2.	0.	0.	20.	55.	35.	0.	0.5	2.	0.	30.	15.	45.	0.	0.31700.	260.	0.0
140265	37070.	536266.	265A	6.	0.	0.	5.	20.	25.	0.	0.5	2.	0.	5.	2.	10.	0.	0.3200.	25.	0.0
140266	37116.	536222.	266A	8.	0.	0.	40.	190.	120.	0.	1.0	2.	0.	35.	30.	25.	0.	0.42100.	1800.	0.0
140267	37102.	536231.	267A	4.	0.	0.	35.	220.	130.	0.	1.0	2.	0.	40.	30.	15.	0.	0.41400.	2100.	0.0
140269	37090.	536267.	269A	10.	0.	0.	165.	400.	10000.	0.	4.0	2.	0.	20.	55.	15.	0.	0.52300.	10000.	0.0
140270	37084.	536266.	270A	8.	0.	0.	380.	520.	3900.	0.	3.0	2.	0.	35.	25.	25.	0.	0.76100.	10000.	0.0
140271	37072.	536300.	271A	20.	20.	0.	190.	46000.	18400.	0.	37.0	2.	0.	50.	15.	90.	0.	0.190000.	48500.	0.0
140272	37044.	536304.	272A	8.	2.	0.	5.	150.	100.	0.	0.5	2.	0.	10.	5.	310.	0.	0.7400.	430.	0.0
140273	36878.	536440.	273A	18.	0.	0.	10.	135.	25.	0.	3.0	2.	0.	1900.	185.	10000.	0.	0.89400.	1700.	0.0

054

400055

140274	36900.	536447.	274A	10.	0.	0.	25.	115.	30.	0.	0.5	20.	0.	400.	65.	4700.	0.	0.	46800.	780.	0.0
140276	36906.	536449.	276A	4.	0.	0.	55.	110.	20.	0.	1.0	2.	0.	2000.	130.	3700.	0.	0.	72500.	1400.	0.0
140277	36926.	536449.	277A	2.	0.	0.	130.	115.	30.	0.	0.5	2.	0.	310.	40.	370.	0.	0.	57800.	730.	0.0
140278	36951.	536451.	278A	6.	0.	0.	50.	160.	30.	0.	0.5	2.	0.	80.	35.	100.	0.	0.	62200.	930.	0.0
140279	37034.	536299.	279A	100.	60.	0.	0.	0.	0.	0.	0.0	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.0
140280	36942.	536283.	280A	10.	0.	0.	35.	220.	195.	0.	0.5	2.	0.	175.	80.	600.	0.	0.	37900.	2300.	0.0
140281	36956.	536395.	281A	350.	0.	0.	55.	210.	450.	0.	1.0	2.	0.	260.	40.	4800.	0.	0.	57000.	1100.	0.0
140282	36950.	536399.	282A	8.	0.	0.	25.	100.	40.	0.	0.5	2.	0.	380.	50.	210.	0.	0.	44400.	820.	0.0
140283	36966.	536391.	283A	10.	0.	0.	20.	95.	25.	0.	0.5	2.	0.	650.	110.	540.	0.	0.	62300.	770.	0.0
140284	36970.	536426.	284A	2.	0.	0.	25.	170.	25.	0.	3.0	10.	0.	610.	155.	10000.	0.	0.	78500.	1000.	0.0
140285	37010.	536406.	285A	8.	0.	0.	15.	35.	55.	0.	1.0	2.	5.	50.	20.	6200.	0.	0.	20200.	240.	0.0
140286	36987.	536401.	286A	8.	0.	0.	20.	110.	25.	0.	1.0	10.	10.	55.	20.	260.	0.	0.	34700.	580.	0.0
140287	36989.	536374.	287A	4.	0.	0.	20.	110.	30.	0.	0.5	2.	0.	75.	20.	820.	0.	0.	37000.	560.	0.0
140288	37002.	536354.	288A	8.	0.	0.	30.	295.	160.	0.	1.0	2.	0.	180.	30.	1700.	0.	0.	44100.	1100.	0.0
140289	36993.	536354.	289A	2.	0.	0.	25.	400.	360.	0.	1.0	2.	0.	230.	50.	3000.	0.	0.	36300.	1300.	0.0
140290	36967.	536376.	290A	10.	0.	0.	50.	185.	390.	0.	2.0	2.	0.	270.	45.	2600.	0.	0.	48000.	780.	0.0
140291	36991.	536344.	291A	14.	0.	0.	25.	2000.	280.	0.	2.0	2.	0.	340.	40.	390.	0.	0.	43700.	2000.	0.0
140292	37038.	536378.	292A	12.	0.	0.	30.	170.	145.	0.	1.0	2.	5.	90.	30.	910.	0.	0.	41900.	1300.	0.0
140293	37022.	536379.	293A	6.	0.	0.	30.	100.	35.	0.	1.0	2.	5.	115.	35.	6000.	0.	0.	36000.	810.	0.0
140294	37040.	536369.	294A	8.	0.	0.	30.	125.	370.	0.	1.0	2.	10.	90.	40.	5100.	0.	0.	40200.	2300.	0.0
140295	37006.	536317.	295A	22.	0.	0.	90.	8400.	4200.	0.	16.0	2.	0.	35.	25.	60.	0.	0.	80300.	10000.	0.0
140297	36951.	536307.	297A	175.	0.	0.	90.	7400.	4100.	0.	15.0	2.	0.	175.	40.	1600.	0.	0.	83200.	10000.	0.0
140298	36532.	536337.	298A	8.	0.	0.	2.	35.	30.	0.	1.0	2.	0.	5.	2.	50.	0.	0.	2800.	50.	0.0
140299	36552.	536310.	299A	6.	0.	0.	5.	35.	35.	0.	1.0	2.	0.	5.	5.	15.	0.	0.	5200.	70.	0.0
140300	36745.	536615.	300A	8.	0.	0.	25.	360.	65.	0.	1.0	2.	0.	45.	25.	170.	0.	0.	36000.	2500.	0.0
140301	36727.	536532.	301A	4.	0.	0.	50.	150.	85.	0.	1.0	2.	0.	35.	25.	60.	0.	0.	35700.	580.	0.0
140302	36772.	536508.	302A	100.	0.	0.	1600.	1300.	1000.	0.	5.0	2.	0.	135.	150.	510.	0.	0.	144000.	3900.	0.0
140303	36689.	536222.	303A	6.	0.	0.	15.	40.	40.	0.	1.0	2.	0.	10.	20.	80.	0.	0.	23800.	420.	0.0
140304	36689.	536216.	304A	10.	0.	0.	20.	50.	35.	0.	1.0	2.	0.	15.	25.	70.	0.	0.	26500.	470.	0.0
140305	36681.	536223.	305A	10.	0.	0.	10.	55.	30.	0.	1.0	2.	0.	15.	20.	125.	0.	0.	30200.	730.	0.0
140307	37400.	535611.	307A	12.	0.	0.	30.	245.	90.	0.	1.0	2.	0.	100.	60.	25.	0.	0.	37600.	5900.	0.0
140308	37400.	535772.	308A	4.	0.	0.	35.	195.	135.	0.	1.0	2.	0.	70.	70.	25.	0.	0.	39400.	4000.	0.0
140309	37401.	535730.	309A	10.	0.	0.	15.	100.	40.	0.	1.0	2.	0.	45.	10.	15.	0.	0.	23300.	430.	0.0
140310	37397.	535719.	310A	8.	0.	0.	15.	85.	35.	0.	1.0	2.	0.	70.	15.	40.	0.	0.	27200.	630.	0.0
140311	37402.	535716.	311A	10.	0.	0.	10.	50.	30.	0.	1.0	2.	0.	25.	5.	25.	0.	0.	17400.	230.	0.0
140312	37255.	535554.	312A	4.	0.	0.	10.	30.	25.	0.	1.0	2.	5.	20.	5.	50.	0.	0.	12300.	105.	0.0
140313	37045.	536325.	313A	8.	0.	0.	55.	540.	310.	0.	3.0	2.	0.	135.	40.	4900.	0.	0.	45600.	2000.	0.0
140315	37035.	536228.	315A	8.	0.	0.	100.	125.	1900.	0.	3.0	2.	0.	55.	125.	330.	0.	0.	69800.	10000.	0.0
140316	37041.	536238.	316A	2.	0.	0.	5.	10.	15.	0.	1.0	2.	0.	2.	2.	15.	0.	0.	1900.	40.	0.0
140317	37048.	536227.	317A	2.	0.	0.	50.	620.	670.	0.	3.0	2.	0.	130.	75.	120.	0.	0.	87200.	10000.	0.0
140318	37054.	536228.	318A	12.	2.	0.	70.	530.	1100.	0.	3.0	2.	0.	95.	140.	145.	0.	0.	90700.	10000.	0.0
140319	37064.	536223.	319A	4.	0.	0.	20.	390.	320.	0.	2.0	2.	0.	50.	25.	15.	0.	0.	29500.	4900.	0.0
140320	37068.	536221.	320A	10.	0.	0.	30.	230.	320.	0.	1.0	2.	0.	45.	30.	25.	0.	0.	40800.	3100.	0.0
140321	36923.	536432.	321A	2.	0.	0.	25.	105.	20.	0.	2.0	2.	0.	310.	50.	10000.	0.	0.	43000.	470.	0.0
140322	36920.	536429.	322A	6.	0.	0.	95.	100.	20.	0.	1.0	2.	0.	260.	40.	1800.	0.	0.	52400.	560.	0.0
140323	36913.	536422.	323A	10.	0.	0.	20.	150.	40.	0.	2.0	2.	0.	600.	85.	10000.	0.	0.	48900.	410.	0.0
140324	36634.	536614.	324A	50.	0.	0.	1100.	80.	130.	0.	2.0	20.	0.	210.	15.	175.	0.	0.	62000.	200.	0.0
140326	36610.	536757.	326A	10.	0.	0.	980.	3200.	280.	0.	3.0	2.	0.	640.	470.	270.	0.	0.	87200.	10000.	0.0
140327	36598.	536769.	327A	10.	0.	0.	30.	280.	180.	0.	1.0	2.	0.	50.	50.	70.	0.	0.	37800.	2100.	0.0
140328	36624.	536775.	328A	2.	0.	0.	570.	65.	220.	0.	5.0	20.	50.	160.	5.	135.	0.	0.	47500.	120.	0.0
140329	36635.	536758.	329A	6.	0.	0.	65.	3800.	560.	0.	4.0	2.	0.	330.	350.	860.	0.	0.	83500.	10000.	0.0
140330	36550.	536692.	330A	12.	2.	0.	15.	115.	30.	0.	1.0	2.	0.	30.	15.	360.	0.	0.	57500.	110.	0.0
140332	36620.	536666.	332A	8.	0.	0.	215.	55.	45.	0.	1.0	2.	0.	70.	10.	40.	0.	0.	30700.	140.	0.0
140334	37139.	536372.	334A	8.	0.	0.	35.	105.	180.	0.	0.5	2.	0.	15.	20.	10.	0.	0.	37500.	2500.	0.0
140335	37134.	536375.	335A	10.	0.	0.	65.	420.	910.	0.	4.0	2.	0.	65.	25.	80.	0.	0.	52800.	5400.	0.0
140337	37125.	536370.	337A	6.	0.	0.	10.	60.	60.	0.	0.5	2.	0.	15.	15.	10.	0.	0.	21800.	1500.	0.0
140338	37135.	536341.	338A	65.	0.	0.	40.	130.	180.	0.	1.0	2.	0.	20.	20.	25.	0.	0.	57600.	1000.	0.0
140340	36997.	536350.	340A	2.	0.	0.	30.	220.	160.	0.	1.0	2.	0.	165.	35.	1100.	0.	0.	44100.	1400.	0.0
140342	37256.	535554.	342A	18.	0.	0.	5.	30.	25.	0.	0.5	2.	0.	15.	5.	100.	0.	0.	12000.	140.	0.0
140345	36845.	535865.	345A	8.	0.	0.	25.	15.	20.	0.	0.5	2.	0.	25.	2.	200.	0.	0.	4400.	20.	0.0
140347	37255.	535555.	347A	6.	0.	0.	10.	25.	25.	0.	0.5	2.	0.	15.	5.	160.	0.	0.	10600.	100.	0.0

055

400056

602594	36857.	536269.	594A	0.	0.	680.	110.	4200.	2600.	25.	9.0	0.	0.	350.	40.	0.	0.1700.	0.	0.	0.0
602652	36721.	536332.	652A	0.	0.	1.	10.	80.	100.	10.	0.5	0.	0.	30.	2.	0.	0.20.	0.	0.	0.0
602660	37256.	535899.	660A	0.	0.	1.	20.	130.	100.	10.	0.5	0.	0.	40.	20.	0.	0.10.	0.	0.	0.0
602663	37276.	535890.	663A	0.	0.	1.	20.	130.	120.	10.	0.5	0.	0.	50.	60.	0.	0.20.	0.	0.	0.0
602665	37289.	535894.	665A	0.	0.	1.	20.	210.	80.	10.	0.5	0.	0.	120.	50.	0.	0.10.	0.	0.	0.0
602667	36499.	536523.	667A	0.	0.	3.	1.	20.	20.	10.	0.5	0.	0.	30.	2.	0.	0.100.	0.	0.	0.0
602669	36547.	536554.	669A	0.	0.	500.	1.	50.	5.	10.	5.0	0.	0.	20.	10.	0.	0.300.	0.	0.	0.0
602671	36595.	536522.	671A	0.	0.	1.	10.	80.	60.	10.	0.5	0.	0.	40.	10.	0.	0.100.	0.	0.	0.0
602673	36712.	536314.	673A	0.	0.	1.	20.	160.	160.	10.	0.5	0.	0.	50.	30.	0.	0.10.	0.	0.	0.0
602675	37274.	535883.	675A	0.	0.	1.	40.	370.	240.	10.	0.5	0.	0.	170.	200.	0.	0.10.	0.	0.	0.0
602677	37364.	535717.	677A	0.	0.	1.	20.	100.	80.	10.	0.5	0.	0.	70.	30.	0.	0.10.	0.	0.	0.0
602679	37382.	535719.	679A	0.	0.	1.	30.	100.	60.	10.	0.5	0.	0.	70.	20.	0.	0.10.	0.	0.	0.0
602680	37376.	535722.	680A	0.	0.	1.	20.	90.	40.	10.	0.5	0.	0.	50.	10.	0.	0.10.	0.	0.	0.0
602681	37379.	535714.	681A	0.	0.	1.	10.	70.	40.	10.	0.5	0.	0.	70.	10.	0.	0.10.	0.	0.	0.0
602683	37390.	535626.	683A	0.	0.	1.	20.	100.	40.	10.	0.5	0.	0.	60.	20.	0.	0.10.	0.	0.	0.0
602685	37392.	535630.	685A	0.	0.	1.	20.	100.	60.	10.	0.5	0.	0.	70.	40.	0.	0.20.	0.	0.	0.0
602687	37322.	535635.	687A	0.	0.	1.	20.	90.	60.	10.	0.5	0.	0.	80.	20.	0.	0.10.	0.	0.	0.0
602689	37252.	535551.	689A	0.	0.	1.	10.	70.	40.	10.	0.5	0.	0.	60.	2.	0.	0.10.	0.	0.	0.0
602691	37252.	535555.	691A	0.	0.	1.	20.	20.	40.	10.	0.5	0.	0.	40.	2.	0.	0.20.	0.	0.	0.0
602693	37169.	535426.	693A	0.	0.	1.	10.	40.	40.	10.	0.5	0.	0.	40.	2.	0.	0.10.	0.	0.	0.0
602695	37220.	535340.	695A	0.	0.	1.	20.	70.	20.	10.	0.5	0.	0.	30.	10.	0.	0.10.	0.	0.	0.0
602697	37223.	535312.	697A	0.	0.	1.	20.	40.	20.	10.	0.5	0.	0.	30.	10.	0.	0.10.	0.	0.	0.0
602698	37243.	535277.	698A	0.	0.	1.	30.	110.	40.	10.	0.5	0.	0.	40.	20.	0.	0.10.	0.	0.	0.0
602700	37332.	535568.	700A	0.	0.	1.	10.	90.	40.	10.	0.5	0.	0.	90.	20.	0.	0.100.	0.	0.	0.0
602702	37378.	535567.	702A	0.	0.	1.	30.	120.	60.	10.	0.5	0.	0.	100.	20.	0.	0.10.	0.	0.	0.0
602704	37383.	535561.	704A	0.	0.	1.	10.	60.	40.	10.	0.5	0.	0.	50.	20.	0.	0.10.	0.	0.	0.0
602706	37384.	535528.	706A	0.	0.	1.	10.	70.	40.	10.	0.5	0.	0.	80.	20.	0.	0.10.	0.	0.	0.0
602708	37380.	535518.	708A	0.	0.	1.	40.	160.	40.	10.	0.5	0.	0.	60.	20.	0.	0.10.	0.	0.	0.0
602710	37372.	535517.	710A	0.	0.	1.	60.	120.	60.	10.	0.5	0.	0.	170.	30.	0.	0.10.	0.	0.	0.0
602712	36842.	535855.	712A	0.	0.	1.	10.	10.	60.	10.	0.5	0.	0.	30.	2.	0.	0.10.	0.	0.	0.0
602714	36803.	535933.	714A	0.	0.	1.	1.	10.	5.	10.	0.5	0.	0.	20.	20.	0.	0.10.	0.	0.	0.0
602716	37202.	535378.	716A	0.	0.	1.	30.	100.	40.	10.	0.5	0.	0.	50.	10.	0.	0.10.	0.	0.	0.0
602718	37271.	535240.	718A	0.	0.	1.	20.	30.	5.	10.	0.5	0.	0.	40.	10.	0.	0.20.	0.	0.	0.0
602722	36822.	536326.	722A	0.	0.	1.	80.	180.	280.	10.	5.0	0.	0.	70.	50.	0.	0.10.	0.	0.	0.0
602724	36811.	536341.	724A	0.	0.	1.	10.	50.	5.	10.	0.5	0.	0.	20.	10.	0.	0.10.	0.	0.	0.0
602726	36811.	536347.	726A	0.	0.	1.	10.	30.	40.	10.	0.5	0.	0.	10.	10.	0.	0.10.	0.	0.	0.0
602727	36808.	536352.	727A	0.	0.	1.	10.	20.	5.	10.	0.5	0.	0.	10.	2.	0.	0.10.	0.	0.	0.0
602729	36798.	536373.	729A	0.	0.	1.	10.	30.	160.	10.	0.5	0.	0.	10.	2.	0.	0.10.	0.	0.	0.0
602730	36793.	536385.	730A	0.	0.	1.	10.	20.	120.	10.	0.5	0.	0.	20.	2.	0.	0.10.	0.	0.	0.0
602731	36791.	536406.	731A	0.	0.	10.	20.	130.	100.	10.	0.5	0.	0.	40.	10.	0.	0.100.	0.	0.	0.0
602733	36754.	536458.	733A	0.	0.	1.	20.	180.	80.	20.	0.5	0.	0.	90.	20.	0.	0.10.	0.	0.	0.0
602735	36730.	536466.	735A	0.	0.	30.	30.	30.	40.	10.	0.5	0.	0.	30.	2.	0.	0.20.	0.	0.	0.0
602736	36730.	536490.	736A	0.	0.	1.	20.	90.	160.	10.	0.5	0.	0.	90.	2.	0.	0.10.	0.	0.	0.0
602737	36489.	536847.	737A	0.	0.	1.	10.	10.	5.	10.	0.5	0.	0.	2.	2.	0.	0.10.	0.	0.	0.0
602739	36544.	536832.	739A	0.	0.	1.	1.	10.	5.	10.	0.5	0.	0.	20.	2.	0.	0.10.	0.	0.	0.0
602741	36613.	536837.	741A	0.	0.	1.	1.	20.	5.	10.	0.5	0.	0.	2.	2.	0.	0.300.	0.	0.	0.0
602760	36505.	536717.	760A	5.	0.	0.	30.	75.	35.	20.	1.0	15.	0.	40.	10.	220.	1100.	0.	0.	1.0
602762	36500.	536855.	762A	5.	0.	0.	10.	10.	30.	10.	0.5	5.	0.	20.	1.	160.	410.	0.	0.	0.5
602764	36530.	536843.	764A	2.	0.	0.	15.	10.	30.	5.	0.5	5.	0.	20.	1.	150.	340.	0.	0.	0.5
602765	36542.	536843.	765A	2.	0.	0.	10.	5.	10.	5.	0.5	5.	0.	10.	1.	170.	360.	0.	0.	0.5
602766	36548.	536851.	766A	2.	0.	0.	10.	5.	10.	2.	0.5	5.	0.	15.	1.	330.	370.	0.	0.	0.5
602768	36557.	536855.	768A	2.	0.	0.	10.	10.	5.	5.	0.5	5.	0.	10.	1.	160.	410.	0.	0.	0.5
602770	36604.	536847.	770A	10.	0.	0.	10.	10.	15.	2.	0.5	10.	0.	10.	1.	150.	300.	0.	0.	0.5
602772	36613.	536847.	772A	10.	0.	0.	10.	70.	60.	10.	0.5	10.	0.	20.	10.	230.	470.	0.	0.	1.0
602774	37274.	535557.	774A	10.	0.	0.	10.	20.	15.	15.	0.5	10.	0.	20.	5.	270.	850.	0.	0.	0.5
602776	37262.	535547.	776A	15.	0.	0.	15.	35.	20.	35.	0.5	10.	0.	20.	10.	220.	440.	0.	0.	0.5
602778	37254.	535544.	778A	2.	0.	0.	20.	70.	35.	30.	1.0	10.	0.	60.	15.	115.	830.	0.	0.	1.0
602780	37560.	535820.	780A	10.	0.	0.	20.	50.	50.	25.	1.0	10.	0.	70.	30.	120.	380.	0.	0.	1.0
602782	37525.	535794.	782A	10.	0.	0.	20.	70.	70.	20.	1.0	15.	0.	120.	80.	230.	540.	0.	0.	2.0
602784	37519.	535791.	784A	5.	0.	0.	25.	70.	40.	30.	1.0	15.	0.	120.	20.	130.	670.	0.	0.	2.0
602786	37508.	535798.	786A	5.	0.	0.	20.	60.	40.	20.	1.0	10.	0.	75.	30.	185.	550.	0.	0.	1.0

056

400057

602788	37504.	535781.	788A	5.	0.	0.	15.	90.	45.	20.	1.0	10.	0.	105.	30.	260.	740.	0.	0.	0.	1.0
602790	37518.	535773.	790A	2.	0.	0.	10.	25.	30.	20.	1.0	15.	0.	35.	10.	230.	580.	0.	0.	0.	1.0
602791	37509.	535707.	791A	2.	0.	0.	10.	25.	30.	5.	1.0	5.	0.	45.	15.	320.	1000.	0.	0.	0.	0.5
602793	37479.	535697.	793A	5.	0.	0.	25.	100.	70.	5.	1.0	20.	0.	100.	50.	250.	400.	0.	0.	0.	2.0
602794	37385.	535666.	794A	5.	0.	0.	20.	60.	40.	5.	1.0	10.	0.	60.	20.	280.	680.	0.	0.	0.	1.0
602796	37402.	535629.	796A	2.	0.	0.	20.	100.	50.	25.	1.0	15.	0.	70.	30.	185.	490.	0.	0.	0.	2.0
602798	37394.	535620.	798A	10.	0.	0.	20.	100.	55.	20.	1.0	10.	0.	50.	25.	90.	280.	0.	0.	0.	2.0
602800	37240.	535530.	800A	2.	0.	0.	15.	40.	20.	5.	1.0	5.	0.	25.	10.	140.	520.	0.	0.	0.	0.5
602802	37225.	535510.	802A	5.	0.	0.	20.	40.	60.	15.	1.0	10.	0.	20.	20.	80.	560.	0.	0.	0.	1.0
602803	37213.	535506.	803A	10.	0.	0.	15.	50.	35.	10.	1.0	5.	0.	20.	15.	150.	300.	0.	0.	0.	1.0
602805	37194.	535506.	805A	5.	0.	0.	30.	60.	45.	5.	1.0	10.	0.	30.	25.	195.	370.	0.	0.	0.	1.0
602806	37167.	535498.	806A	2.	0.	0.	10.	20.	20.	5.	0.5	2.	0.	10.	10.	165.	500.	0.	0.	0.	0.5
602808	36545.	536497.	808A	30.	0.	0.	5.	20.	10.	2.	0.5	5.	0.	10.	10.	1500.	2500.	0.	0.	0.	0.5
602810	36517.	536510.	810A	45.	0.	0.	10.	40.	20.	2.	0.5	5.	0.	10.	10.	1600.	3600.	0.	0.	0.	0.5
602812	36503.	536518.	812A	15.	0.	0.	10.	20.	20.	2.	0.5	5.	0.	10.	10.	1400.	2300.	0.	0.	0.	0.5
602814	36630.	536291.	814A	10.	0.	0.	10.	30.	15.	2.	0.5	5.	0.	10.	10.	2800.	4200.	0.	0.	0.	0.5
602816	36561.	536239.	816A	20.	0.	0.	5.	180.	125.	10.	1.0	5.	0.	20.	25.	14800.	16800.	0.	0.	0.	1.0
602818	36726.	536486.	818A	245.	0.	0.	30.	130.	180.	20.	1.0	20.	0.	40.	30.	500.	4900.	0.	0.	0.	1.0
602820	36744.	536469.	820A	5.	0.	0.	25.	45.	30.	25.	1.0	10.	0.	20.	15.	220.	670.	0.	0.	0.	1.0
602822	36656.	536830.	822A	5.	0.	0.	35.	330.	100.	35.	2.0	10.	0.	70.	65.	230.	420.	0.	0.	0.	2.0
602824	36677.	536831.	824A	15.	0.	0.	110.	150.	120.	15.	2.0	20.	0.	60.	25.	210.	410.	0.	0.	0.	2.0
602826	37176.	535434.	826A	15.	0.	0.	15.	40.	30.	10.	1.0	5.	0.	20.	15.	180.	610.	0.	0.	0.	0.5
602828	37137.	535449.	828A	10.	0.	0.	15.	150.	95.	10.	1.0	25.	0.	20.	20.	600.	3200.	0.	0.	0.	2.0
602830	37202.	535386.	830A	10.	0.	0.	20.	90.	45.	5.	1.0	5.	0.	20.	20.	400.	890.	0.	0.	0.	1.0
602832	37228.	535347.	832A	2.	0.	0.	10.	25.	20.	2.	1.0	5.	0.	10.	10.	370.	1000.	0.	0.	0.	0.5
602834	37222.	535329.	834A	15.	0.	0.	20.	40.	45.	5.	1.0	20.	0.	25.	10.	55.	130.	0.	0.	0.	1.0
602836	37233.	535319.	836A	15.	0.	0.	30.	65.	50.	10.	1.0	20.	0.	30.	30.	60.	270.	0.	0.	0.	1.0
602838	37246.	535290.	838A	15.	0.	0.	35.	130.	50.	15.	2.0	5.	0.	40.	30.	50.	530.	0.	0.	0.	1.0
602840	37272.	535228.	840A	2.	0.	0.	10.	40.	30.	15.	1.0	3.	0.	30.	20.	2400.	5600.	0.	0.	0.	0.5
602842	37278.	535242.	842A	2.	0.	0.	25.	95.	30.	25.	1.0	3.	0.	60.	30.	1500.	3600.	0.	0.	0.	0.5
602844	36524.	535657.	844A	10.	0.	0.	10.	20.	20.	2.	0.5	5.	0.	10.	10.	640.	2200.	0.	0.	0.	0.5
602846	36511.	535661.	846A	5.	0.	0.	10.	30.	50.	2.	0.5	15.	0.	15.	10.	250.	450.	0.	0.	0.	0.5
602848	36546.	535756.	848A	10.	0.	0.	10.	40.	15.	2.	1.0	5.	0.	20.	10.	3600.	4600.	0.	0.	0.	0.5
602850	36533.	535744.	850A	2.	0.	0.	10.	20.	15.	2.	1.0	5.	0.	20.	5.	320.	1000.	0.	0.	0.	0.5
602852	36632.	535829.	852A	2.	0.	0.	15.	70.	40.	5.	1.0	15.	0.	30.	10.	430.	1900.	0.	0.	0.	1.0
602854	36693.	535819.	854A	2.	0.	0.	15.	20.	20.	2.	1.0	10.	0.	20.	5.	410.	1400.	0.	0.	0.	0.5
602856	36727.	535827.	856A	5.	0.	0.	10.	15.	10.	2.	0.5	5.	0.	10.	1.	440.	2100.	0.	0.	0.	0.5
602858	36703.	535811.	858A	2.	0.	0.	10.	15.	20.	5.	1.0	5.	0.	15.	1.	390.	1100.	0.	0.	0.	0.5
602860	36661.	535773.	860A	5.	0.	0.	10.	20.	20.	10.	1.0	20.	0.	10.	1.	200.	400.	0.	0.	0.	0.5
602861	36870.	535945.	861A	5.	0.	0.	10.	15.	10.	5.	1.0	10.	0.	10.	1.	320.	680.	0.	0.	0.	0.5
602863	36845.	535937.	863A	5.	0.	0.	10.	30.	25.	2.	1.0	10.	0.	10.	10.	580.	1600.	0.	0.	0.	0.5
602864	37313.	535203.	864A	5.	0.	0.	25.	70.	25.	10.	1.0	5.	0.	45.	20.	640.	2100.	0.	0.	0.	1.0
602866	37249.	535174.	866A	2.	0.	0.	25.	20.	10.	2.	0.5	5.	0.	20.	10.	520.	1500.	0.	0.	0.	0.5
602868	37093.	535544.	868A	15.	0.	0.	20.	70.	30.	10.	0.5	5.	0.	50.	20.	520.	2200.	0.	0.	0.	1.0
602870	36796.	535927.	870A	5.	0.	0.	10.	20.	15.	2.	0.5	3.	0.	20.	10.	760.	3800.	0.	0.	0.	0.5
602872	36740.	536008.	872A	335.	0.	0.	150.	4800.	7600.	55.	15.0	10.	0.	210.	80.	8400.	8900.	0.	0.	0.	29.0
602874	37442.	535191.	874A	5.	0.	0.	20.	65.	70.	5.	1.0	3.	0.	45.	20.	5600.	8000.	0.	0.	0.	1.0
602876	37550.	535711.	876A	5.	0.	0.	10.	10.	20.	10.	0.5	10.	0.	15.	5.	135.	1600.	0.	0.	0.	0.5
602878	37286.	535596.	878A	2.	0.	0.	20.	95.	35.	20.	1.0	5.	0.	70.	10.	1400.	3300.	0.	0.	0.	1.0
602880	36817.	536170.	880A	5.	0.	0.	30.	65.	30.	10.	1.0	10.	0.	30.	30.	800.	1600.	0.	0.	0.	1.0
602882	36843.	536147.	882A	2.	0.	0.	90.	2800.	4800.	25.	12.0	3.	0.	180.	65.	2000.	3400.	0.	0.	0.	19.0
602884	36865.	536154.	884A	2.	0.	0.	20.	150.	340.	2.	1.0	3.	0.	30.	15.	190.	860.	0.	0.	0.	2.0
602886	36844.	536134.	886A	10.	0.	0.	10.	15.	30.	2.	0.5	3.	0.	15.	10.	170.	1500.	0.	0.	0.	0.5
602888	36817.	536142.	888A	2.	0.	0.	10.	20.	50.	2.	0.5	2.	0.	20.	10.	200.	3000.	0.	0.	0.	0.5
602890	36815.	536138.	890A	280.	0.	0.	80.	1600.	2400.	30.	7.0	3.	0.	90.	35.	330.	1400.	0.	0.	0.	9.0
602891	36777.	536119.	891A	15.	0.	0.	20.	120.	760.	10.	2.0	3.	0.	30.	40.	430.	3300.	0.	0.	0.	1.0
602893	36788.	536114.	893A	60.	0.	0.	10.	30.	50.	2.	0.5	2.	0.	20.	10.	800.	5800.	0.	0.	0.	0.5
602895	36792.	536149.	895A	90.	0.	0.	15.	65.	35.	2.	1.0	5.	0.	30.	40.	440.	3600.	0.	0.	0.	1.0
602897	36774.	536077.	897A	5.	0.	0.	10.	35.	30.	2.	0.5	2.	0.	20.	20.	220.	620.	0.	0.	0.	1.0
602899	36768.	536097.	899A	10.	0.	0.	5.	20.	25.	2.	0.5	15.	0.	20.	5.	310.	1400.	0.	0.	0.	0.5
602900	36767.	536060.	900A	35.	0.	0.	20.	60.	50.	5.	1.0	10.	0.	30.	25.	210.	960.	0.	0.	0.	1.0

057

400058

602902	37331.	535150.	902A	10.	0.	0.	30.	60.	30.	5.	1.0	5.	0.	30.	20.	175.	680.	0.	0.	0.	1.0
602904	36897.	536122.	904A	10.	0.	0.	125.	4600.	6400.	40.	18.0	5.	0.	200.	70.	920.	3500.	0.	0.	0.	28.0
602906	36894.	536116.	906A	2.	0.	0.	30.	130.	30.	30.	1.0	25.	0.	50.	70.	200.	710.	0.	0.	0.	2.0
602908	36884.	536106.	908A	5.	0.	0.	10.	20.	65.	5.	0.5	3.	0.	20.	10.	380.	970.	0.	0.	0.	1.0
602910	36881.	536441.	910A	10.	0.	0.	10.	95.	40.	40.	1.0	5.	0.	1600.	160.	1600.	37800.	0.	0.	0.	3.0
602912	36833.	536473.	912A	20.	0.	0.	20.	105.	170.	30.	2.0	10.	0.	720.	95.	640.	24200.	0.	0.	0.	2.0
602914	36907.	536276.	914A	145.	0.	0.	15.	70.	95.	15.	1.0	5.	0.	40.	25.	270.	8000.	0.	0.	0.	1.0
602916	36845.	535865.	916A	10.	0.	0.	10.	20.	20.	2.	0.5	5.	0.	20.	10.	160.	790.	0.	0.	0.	0.5

058

400059

APPENDIX III

HEAVY MINERAL CONCENTRATES MINERALOGY

602651C-602740C

400061

MINPET SERVICES

REPORT NO. 23/79

MINERALOGICAL EXAMINATION OF HEAVY MINERAL
DRAINAGE SAMPLES FROM E.L. 15/76, DUNDAS, TASMANIA

(For P.M. Macnamara, Regional Geologist, CSR Limited
Exploration Group)

5TH DECEMBER, 1979

061

LIST OF CONTENTS

	<u>PAGE NO.</u>
INTRODUCTION	1
SUMMARY	2
MINERALOGY DISCUSSION	3
REFERENCES	7

APPENDICES

Table I	HEAVY MINERAL CONCENTRATE ANALYSIS, 1979 EXPLORATION PROGRAMME, E.L. 15/76, TASMANIA	
Map 1	LOCATION MAP SHOWING SAMPLING POINTS FOR HEAVY MINERAL SAMPLES	} not included here
Map 2	LOCATION MAP SHOWING SAMPLING POINTS FOR HEAVY MINERAL SAMPLES	

INTRODUCTION

Forty one panned heavy mineral samples were received from the Dundas CSR Exploration office for further concentration over tetrabromoethane and determination of heavy minerals present.

Heavy minerals were tabulated as major (more than 10.0 percent), minor (1.0% to 10.0%) and trace (less than 1.0%).

063

400064

-2-

SUMMARY

Other than an abundance of chromite and ilmenite (including leucoxene) in many samples and major zircon and rutile in several there is little of interest or significance in these concentrates. There are however, traces of gold, beryl and monazite in sample 691. (= 692P)

Chromite is present as non-magnetic opaque octahedra having a bluish reflectance was checked out by Central Mineralogical Services, Adelaide and was confirmed to be a magnesian variety of the mineral.

Chromite was found in large quantities in the drainage samples from streams draining the extensive serpentine outcrop of Mount Razorback (metamorphosed pyroxenite sills) and its extension. Chromite also appears to be eroding from the Cambrian gabbro/norite in the south-east sector of the lease, and from an unknown source occupying high country on the east side of the lease.

The problem of chromite from ultrabasic intrusives having a close association with gabbro/norite dykes is exemplified in The Lizard occurrence where a metamorphosed serpentine magma has been intruded by gabbro and norite. The chromite there is in fluxion bands in fine grained serpentinite which is converted to anthophyllite, tremolite and talc in shear/crush zones. The serpentinite described has a ratio of 4:1 chrome to nickel (i.e., 0.28% Cr_2O_3 and 0.07% NiO). It is interesting to note the Cr_2O_3 :NiO contents of other serpentinite present :

	Cr_2O_3	W/W Percent	NiO
Durite serpentinite	0.28		0.15
Tremolite serpentinite	0.25		0.17
Bastite serpentinite (Lherzolite)	0.20		0.16
Chromite serpentinite	0.28		0.07 --

The tremolite serpentinite therefore has a close chrome:nickel relationship.

064

400065

MINERALOGY DISCUSSION

Sample locations unknown.

649-AR 003P : LYONS RIVER (HILDERS Road)

Mostly consists of an abundance of calc-silicate minerals and limonite particles. A poorly sorted coarse concentrate of tremolite, actinolite and epidote and heavy rock particles.

602654P

CE 069 : 602654P

Limonite particles are abundant with prominent gametiferous schist and traces of red spinel. Worn mineral grains, poorly sorted.

602657P

CE 072 : 602657P

Abundant limonite particles and calc-silicate and some granite derived minerals occur with traces of molybdenite. Partly worn mineral particles, moderately sorted in a bimodal distribution.

602650P

RG 100 : 602650P

An abundance of goethite particles and zircon, appreciable leucoxene ilmenite and rutile. Granite and basic rock sources or from sediments. Well sorted.

NW Corner just beyond the lease (5368 m N to 5368.5 m N/
36500 m N to 36600 m N). Catchment from Crimson Creek-Oonah
Quartzite and Slate 738 and 740 :

These concentrates are similar with epidote rock fragments and abundant chromite, epidote and rutile, zircon and tourmaline in 738. Chromite appears fresh and is probably derived from the southerly extension of Serpentine Hill. ?

NW Part of lease (5365 m N - 5365.5 m N/3650 m E - 3660 m E),
668, 670 and 672 :

There is an abundance of magnetite rubble in 670. Ilmenite is abundant in all specimens with moderate chromite in 668 and 670, abundant in 672. In 672 the chromite is fresh, euhedral and probably originated from the south west extension of the ultramafic exposure which includes Serpentine Hill. Other minerals and their proportions are common to the area and are well sorted.

Central West (5363 m N to 5365 m N/367 m E to 368.5 m E).
Samples 734, 732, 651, 725, 726, 723 and 674; 728 is missing.

The drainage is from Mt. Razorback. As one would expect all samples except those from the most southerly streams contain appreciable quantities of fresh crystalline chromite from the serpentiferous Mt. Razorback. Samples 725 and 650 contain more than 90 volume percent with rather less than in 726, 734 and 725 with least in 723 which contains mostly epidote rock fragments. Rutile, ilmenite and zircon (726) are also abundant.

Central East (1) (5359 m N to 5360 m N/368 m E. Sample 715 :

Major chromite is present with appreciable epidote and zircon, less ilmenite and tourmaline. The chromite is unlikely from Mt. Dundas dolerite of high relief, yet the Mariposa stream drains from this mountain. No other source of basic/ultramafic rocks is observed. The ilmenite association is weak, chromite varies from fresh to weathered. The origin is therefore diverse.

Central East (2) (5357 m N to 5358 m N/375 m E to 376 m E).
Sample 557 :

Major hypersthene and tremolite present indicates an origin from rivers draining south from Mt. Dundas (?) and tremolite from the Dundas Group. Tremolite could be from metamorphosed serpentine, hypersthene is from norite.

066

East (1) (5357 m N to 5358 m N/373m E to 374 m E). Samples 678, 682:

Largely ilmenite and epidote, but traces of chromite occur in 678 and the mineral is in abundance (10 percent) in 682. Otherwise magnetite, zircon and tourmaline and contact metamorphic (?) garnet and tremolite are present.

Origin of chromite unlikely to be from Mt. Dundas the only basic igneous intrusive in the catchment ?

East (2) (5356 m N to 5357 m N/373 m E to 374 m E). Samples 684, 686 and 688 :

A major abundance of chromite occurs in all three samples.

The only source of basic rock derived minerals is gabbro or norite which occupies high ground to the east and just west of the lease boundary. An abundance of leucoxenised ilmenite also occurs and epidote from catchment metamorphosed serpentinite or metasediments. Contact metamorphic garnet and andalusite are present. The freshness of chromite probably indicates an adjoining source.

East (3) (Adjoins 5365 m N/373 m E). Samples 546 and 566 :

Sample 564 contains anthophyllite, augite and both concentrates contain 50 to 60 percent of hypersthene and rutile and spectrographic analysis shows 0.2 percent chromium. However 0.2% antimony and zinc were not accountable. The hypersthene and anthophyllite probably derived from exposed norite/gabbro in the area. The anthophyllite could also derive from metamorphosed serpentinite.

East (4) (5355 m N to 5356 m N/372 m E to 373 m E). Samples 690 and 692 :

Leucoxene and ilmenite are very abundant (70 and 90 volume percent, respectively), and chromite (4 percent) in 690 which also contains a trace of hypersthene. A gabbroic

067

source in the east is the likely source). An abundance of zircon (20 percent) in Sample 690 and a trace of gold with monazite, tourmaline and beryl in 691. A possible granite/basic rock contact may be responsible for the trace of gold present (where is the granite ?).

East (5) (5355 m N to 5356 m N/373 m E to 374 m E). Samples 701, 703, 705, 707 and 709 :

From samples 701 to 707 inclusive all contain major chromite (35, 40, 48 and 40 volume percent respectively). All samples are from streams draining the gabbro near the eastern border of the lease. Sample 709 contains only 3 percent of chromite and is from the southernmost stream. Ilmenite and leucoxene are also dominant minerals in the above concentrates. Towards 707 and 709 calc-silicate minerals, epidote, actinolite and tremolite (from altered serpentinite and basic intrusives?) become dominant and most of sample 709 is epidote. The minerals are fresh and largely angular fragmented grains but are well sorted. Talc appears as an impurity in 707 (from metamorphosed gabbro ?). From whence the garnet schist in 703 ?

South (5351 m N to 5355 m N/371 m E to 373 m E). Samples 694, 717, 696, 699, 719 and 721.:

The drainage trend is SSW and samples were taken from NE trending tributaries of the main stream - Ewart River which joins the Henty River (to the west coast). The tributaries drain Quaternary Moraine to the east. Heavy mineral suites contain a large abundance of epidote and leucoxenised ilmenite with minor (694) or traces (717, 696 and 699) of chromite. The neighbouring tributary contains (in 719) a major abundance of chromite with a balance of mainly epidote and a little ilmenite; similarly for the last sample (just south of the lease boundary, 721) which contains 15 volume percent chromite and large amounts of ilmenite and epidote. The mineral grains vary from angular to subangular and are fairly fresh.

REFERENCES

1. Zeehan, 1 Mile Series, Sheet No. 50, Geological Survey of Tasmania.
2. Explanatory Report, K'55-5-50 Zeehan by A.H. Blissett, 1962. 1 Mile Geological Map Series, Geological Survey of Tasmania.
3. A Mineralogical Examination of Heavy Mineral Concentrates and Petrographic Survey of Rock Types, E.L. 15/76, Dundas, Tasmania. Pacminex Report PMR 215/77.
4. A Mineralogical/Geochemical Appraisal of Heavy Mineral Concentrates, E.L. 15/76, Dundas, Tasmania. Pacminex Report PMR 88/78.
5. Geology of the Lizard and Meneage 1946, by J.S. Flett and J.B. Hill. H.M. Stationery Office, London, U.K.

5/12/79

069

400070

DUNDAS H.M., STREAM SEDIMENT EXPLORATION PROGRAMME 1979

LEGEND

Rock Particles

Actinolite, Tremolite, Schist	TS
Banded ferruginous shale	BF
Chlorite Schist	CS
Epidote rock fragments	ED
Ferruginous Pebbles	FP
Ferruginous Siltstones	FS
Garnetiferous Schist	GS
Goethite Pebbles	GP
Graphite Schist	G
Limonitised Garnet Schist	LGS
Limonitic Pebbles	LP
Limonitic Schist	LS
Magnetite Rubble	MR
Mica Schist	MS
Magnetite Rock Aggregates	MA

Colours

BL Black; BR Brown; BLU Blue; BU Buff;
 DBR Dark Brown; GR Grey; GN Green;
 W White; VT Vitreous; Y Yellow;

Grain Shapes

Euhedral, crystalline	1
Aggregated laths	2
Subangular	3
Angular	4
Fragmented	5
Rounded	6
Pitted	7

Sorting

Excellent	1
Very Good	2
Good	3
Mainly Good	4
Moderate	5
Poor	6

Mineral, Rock Fragments Abundance

1 Major 5 → 2 Minor 1 → <5 3 Trace 0 → <1

DUNDAS STREAM SEDIMENT MINERAL SAMPLING PROGRAMME - 1979

070

SAMPLE No.	Rock Fragments Abundance	MINERAL ABUNDANCE																			Grain Shapes	Grain Size Limits (mm)			Scoring	Comments	Concentric Weight %									
		Actinolite	Anatase	Andalusite	Augite/Epidote	Beryl	Enstatite	Chromite	Clinochlore	Diopehide	Epidote	Garret	Gold	Hypersphene	Ilmenite	Kyanite	Leucosene	Magnetite	Nyctogenite	Muscovite		Rutile	Sphene	Spinel				Talc	Tourmaline	Tremolite	Zircon	Other Colours	Minimum	Maximum	Median	
649 AR OOR P	LP1 TS1 CS2									1								2			3					2	3	CL, BR, BL	4-6	.05	4.0	1.2 0.1	6	Many grains show crystalline forms. Clinzoisite 29%	13.1	
602 654 P (CE 069)	LP1 MS1																	2			3	2	3			2	2	BR	6-3, 7	.06	5.0	0.90 0.11	6		38.7	
602 657 P (CE 072)	LP1 CS1 CS1									3							1	2	3		2		3				3	BR, BL, W	3	.05	6.0	1.3 0.1	5		16.6	
602 650 P (RG 100)	GP1		3							2	2			1		1	3				1		2		2	3	1	BR, BL, Y	4-3	.04	3.0	0.1	4	Good concentrate for basic demonstration purposes	8.0	
602 651	LP2																					2	3			3	1	BL	1-6	.05	6.0	0.50 0.22	4	Chromite 79% concentrate. Zircon, rutile are rounded	12.3	
602 661	EP1 CS2 LP3									3				2			3				3					3	3	BL, BL	5, 2	.06	10.0	0.90 0.10	4	Epidote rock fragments 79% concentrate	26.0	
602 664	BF1									2				1		3	3				1					3	1	Y, BL, GR	5, 4, 6	.05	10.0	0.10	4	Zircon rounded	9.0	
602 666	MA1 EP1													1		3						3					2	BL, WH	4				4	Zircon rutile } round Epidote - subangular	28.1	
602 668														1			3		2	3						3		BL	6-7-3	.05	12	0.14	3	Ilmenite > 70% Chromite 29%	16.0	
602 670	MR1																					3				3	2	BR	4-7-3	.05	2.0	0.20	3	Chromite 39%	16.4	
602 672																						3					3	BL	1	.05	1.6	0.20	2	chromite > 80% present	115.1	
602 674	FP2																					3					2	BL	1 > 6	.20	2.9	0.40	3	chromite 60%	33.8	
602 676	MR2 MR2																					3						Y, BL							Specularite, trace	5.8
602 678	EP1																					3					2		3-7-4	.06	2.9	0.10	2			
602 682			3							3	1						3	3									2		BL, GR	3-4	.05	1.1	0.10	3	Brookite - trace chromite - 16%	9.0
602 684	FS1 EP1 MR3																					2							D, BL	4-3	.08	7.5	0.14	3	Brookite trace	6.2
602 686	EP1 FP1																											2	BL, Y	4-7-3, 1	.06	4.5	0.14	3	Clinzoisite 39% chromite 30%	6.3

400071

SAMPLE No.	SOIL FRAGMENT IDENTIFICATION	MINERAL ABUNDANCE																				GRAIN SHAPES	GRAIN SIZE LIMITS (µm)			SORTING	COMMENTS	CONCENTRATION (g/100g C)						
		ACTINOLITE	ALBITE	ANORTSITE	ANDROSITE/FIGUEROITE	BIOTITE	CLINOCHLORITE	COLEMANITE	DIOPTASE	EPIDOTE	GARNET	GOLD	HYPERSTHENE	ILMENITE	KYANITE	LEUCANE	MAGNETITE	MALYBDATE	MONTMORILLONITE	OPHIDE	SPINEL		SPINEL	TALC	TOURMALINE				TRENORITE	ZIRCON	GRAIN COLOURS	MINIMUM	MAXIMUM	MEDIAN
602	688	FP1		3				1	3	1			1		1	3									3	Y, BL	374	.02	1.0	0.11	5	Chromite 20%	6.8	
		CG 3																																
602	690	LS 2						2	3	3		3	1												3	Y, BL	374	.06	0.8	0.10	3	Zircon class, pink Chromite 4%	5.8	
602	694							2		3	3	1		1	2									3	Y, BL	473	.08	4.5	0.16	1	Garnet, orange, pink Chromite 2%	9.0		
602	696							3	3	1		1		1	2									3	Y, BL	473	.10	1.8	0.20	1		50.4		
602	699	LP 3	3					3		1		1		1						3					3	BR, Y	374	.08	4.5	0.21	3		204.5	
602	701	TS 2						1		1					1	3										BL, Y	1, 4	.07	1.8	0.40	3	Chromite 35%	31.6	
602	703	LGSS2																																
		MA 2						1		3	3	1		1						3					3	BR, Y	1, 4	.05	3.2	0.44	3	Chromite 40%	5.0	
602	705		3					1		2	3	2		1	3					3					3	BL, W	1, 4, 3, 6	.04	1.1	0.08	3	Chromite 48%	6.3	
602	707	TS 1																																
		MR 3						1		1				1						3					2	3	BL, Y	5, 4	.09	6.1	0.17	5	Chromite 40%	44.6
602	709	EP 1 -																																
		MR 3	2					2		1	2	2													2	GN	473	.10	4.0	0.10	1	Garnet orange	21.3	
602	711	EP 1																																
		MR 3	1					3		1																	GN	4	.08	5.5	0.17	6		52.7
602	713	FS 3						1		3		2			3										2	1	BL, GR	673	.05	2.5	0.11	3	Chromite 70% Magnetite, fine euhedral	8.4
602	715	EP 1	2					3	1	2	3	2			3					3					1	BL, Y	37476	.05	4.5	0.07	6	Chromite 49%	6.6	
602	717	EP 2	2					3		1		1		1						3					2	BR, GN	374	.03	2.5	0.07	5		26.3	
		MR 2																																
602	719	EP 1						1		2		2			3					3					2	BL, Y	473	.04	4.5	0.10	6	Chromite 30%	61.8	
602	721	EP 1																																
		MR 3						1		1	3	1								3					2	BL, GN	473	.04	3.0	0.11	6	Garnet, pink and orange	55.3	
602	723	EP 1																																
		TS 2						2		3		2								3					2	BR	674	.02	6.0	0.11	5	Chromite 3%	8.6	
		MR 3																																



073

Central Mineralogical Services

231 Magill Road
Maylands, S.A. 5069
Telephone 42 5659

Mr. P. Curtis
Minpet Services
P.O. Box 24
RUSHCUTTERS BAY / N.S.W. 2011

12th October, 1979

REPORT CMS 79/10/21

YOUR REFERENCE: Order No. 24/79
DATE RECEIVED: 10th October, 1979
SAMPLE NOS.: 602725, 602672
SUBMITTED BY: P. Curtis
WORK REQUESTED: Mineralogy

H.W. Fander
H.W. Fander, M. Sc.

07A

400075

CENTRAL MINERALOGICAL SERVICES PTY. LTD.

Date 12th October, 1979

SAMPLE REPORT (Mineralogy, Petrology, Ore Microscopy)

Job No. CMS 79/10/21 Date Received: 10.10.1979

Reference Order No. 24/79

Sample No. 602725, 602672

Nature of Sample: Mineral fractions

IDENTIFICATION
602725, 602672
Chromite

DESCRIPTION SECTION No.

a. Hand Specimen:

b. Microscopic:

Optical and physical examinations showed that in each sample the dominant mineral is chromite. Very minor amounts of silicates and possible traces of ilmenite are present.

The term "chromite" is used here in a fairly loose sense to include the various members of the magnesiochromite ($Mg Cr_2 O_4$)-ferrochromite ($Fe Cr_2 O_4$) series; optical properties suggest a magnesian chromite. X-ray powder diffraction would be inadequate to distinguish between them and further data would need to be obtained by chemical analysis.

H.W. Fander, M. Sc.

APPENDIX IV

HEAVY MINERAL CONCENTRATES MINERALOGY

602761C-602740C

076

400077

Minpet Services

76 McLachlan Avenue, Rushcutters Bay, N.S.W. 2011 - P.O. Box 24 Rushcutters Bay, N.S.W.
Telephone 357 6423 - after hours 665 4986

MPS 15/81

10th April, 1981.

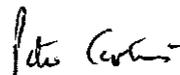
Mr. P.M. Macnamara,
CSR's Minerals Division,
G.P.O. Box 485,
SYDNEY, N.S.W. 2001

Dear Phil,

HEAVY MINERAL CONCENTRATES FROM DUNDAS
PROSPECT 602, DUNDAS

Attached is a copy of Report 15/81 concerning the semi-quantitative heavy mineral analyses of TBE concentrated stream sediment samples from Dundas, Tasmania, which you submitted for determination, recently.

Yours sincerely,



P.J. CURTIS

c.c. P.G. Miller/MD Library

400078

MINPET SERVICES

REPORT NO. 15/81

DUNDAS HEAVY MINERAL CONCENTRATES
FOR MINERARAPHIC DETERMINATION

(for P.M. Macnmara, CSR Limited)

March 1981

078

CONTENTS

PAGE NO.

1.	INTRODUCTION	1
2.	SUMMARY	2
3.	DISCUSSION	3

APPENDICES

I	TABLE 1 : DUNDAS HEAVY MINERAL ANALYSIS, MARCH, 1981.	
II	COPY OF CSR PURCHASE ORDER NO. 24518, DATED 2/3/81	
III	FIELD SAMPLE DESPATCH SHEET	

079

1. INTRODUCTION

This current work is a follow-on from previous heavy mineral analysis of stream sediments completed in Pacminex Pty. Ltd. report PMR 88/78 entitled "A Mineralogical/Geochemical Appraisal of Heavy Mineral Concentrates, E.L. 15/76, Dundas, Tasmania". In that exercise, chemical analyses and a map were provided. In the current project discussion will necessarily have to be confined to the interesting details of mineralogy.

One specimen, 602825 was missing from the series; one sample 602796 was also missing but was replaced by 602896 - unlisted.

080

2. SUMMARY

- (a) Gold traces were seen in 602761, 602775, 602779, 602801 and 602811 with association of arsenopyrite, and appreciable tourmaline in the latter.
- (b) Cassiterite traces occur in 602809, 602812, 602851, 602859 and 602901, and with topaz in 602851 and 602859.
- (c) Scheelite determined (optically) occurs in 602801; and possibly in several other specimens containing skarn minerals (idocrase, diopside) and other hydrothermal/pneumatolytic minerals (tourmaline, topaz, beryl, fluorite, etc.). This scheelite was not tabulated.
- (d) Ilmenite and a splendid fractured chromite features largely in many of the concentrates, otherwise there is an abundance of zircon and in several specimens, epidote.
- (e) High grade pelitic metamorphic minerals (sillimanite, andalusite and staurolite) are present but rare.

Footnote

Sample No. 602875

'Spinel' mineral in abundance, somewhat fractured octahedra with a splendid lustre. Black to brown colour with some translucent grain margins, sent to a laboratory for confirmation of spinel type.

Determined by :-

XRD - Spinel? = chromite
 Probe - Major - Mg, Fe, Al, Cr.
 Minor - Ti.

Identification confirmed - chromite (JFR 24/3/81).

3. DISCUSSION

3.1 Common Minerals

Several common mineral species (zircon, tourmaline and ilmenite for example) are present in most samples. These show fresh crystalline forms to variable attrition depending on number of sedimentary cycles and/or energy states of stream environment. Colour variations (tourmaline and zircon) and crystal form variations (rutile, cassiterite) are seen.

Ilmenite is very dominant in a number of samples - 602775, 602777, 602783, 602789, 602801, 602809, 602813, 602817, 602819, 602894, 602907, 602913, 602915 and 602917. Very dominant in 414AH 001P and 002P with magnetite. Apart from magnetite minerals such as an angular, splintery or crystalline splendent spinel (microprobed and identified as chromite) ilmenite is commonly an associate as are much smaller amounts of rutile of variable colouring, and crystal forms, sometimes anatase, brookite and various other minerals.

High grade metamorphics, particularly sillimanite are seen from time to time but only in trace amounts. Cordierite is present is there by accident having an S.G. of 2.6 to 2.7 (TBE is 2.96). Andalusite is rarely seen (602807, 602871, 602839). Staurolite (602827 only) with beryl.

The common calc silicate minerals are represented mainly by epidote, very much less actinolite and an 'abundance' of idocrase (602798, 602843, 602865 only). Epidote and idocrase are commonly associated and with diopside (602843) probably indicate proximity of skarn conditions - but seen below.

3.2 Economic Minerals and Associations

(a) Gold. This was seen many times, as solitary grains up to 1 mm size and occasionally as two grains in one sample. Without panning each concentrate individually (as

084

was done last year for CEC, Perth), gold could easily be missed. In the current batch of samples, gold was spotted either during heavy mineral separation (by E. Sky) and then confirmed during mineragraphy, or where missed during the heavy media separation then in the +60 mesh and once only in -60 mesh samples during the mineralogical determinations.

Where gold was seen specimens showed a fair abundance of tourmaline (602761, 602775, 602779, 602801); with cassiterite and arsenopyrite (602811); with arsenopyrite and CO_3 (602807P); with scheelite (602801); with no specific indicator minerals (602873, 602907).

- (b) Cassiterite. In every case where cassiterite is reported it was confirmed by zinc test, as some rugged looking blotchy brown/yellow rutile looks remarkably like cassiterite.

Cassiterite occurs with traces of tourmaline in 602809, 602813, 602851, 602859 and 602901. The mineral occurs also with topaz in 602851, 602859,

- (c) Scheelite. Observed optically only once as a trace in 602801.

3.3 Indicator Minerals

- (a) Topaz is more common here than previously reported for the Dundas area generally occurring as trace amounts as angular low B.R. fragments - confirmed by $2V = (50-65^\circ)$, +ve optical sign and high R.I.'s (1.61 to 1.64) compared with quartz which it superficially resembles.

The mineral is associated with a high grade metamorphic mineral; sillimanite (602771); with fluorite (602773); with gold (602779); garnet and chromite (602785);

chromite only (602817, 602855, 602879, 602885); with cassiterite and sillimanite (602851); beryl, fluorite, phlogopite (zinnwaldite?) (602859); with cassiterite, sillimanite (602901). So like tourmaline its pneumatolytic 'rival', topaz, has a fairly even spread in this specimen suite.

- (b) Tourmaline. A widespread distribution, always very variable in colour and preservation state. Described above. Where it is more abundant, gold, topaz or fluorite may be present, e.g. 602761, 602773, 602785 and 602801.
- (c) Beryl. With topaz 602773, 602827, 602847, 602859 (and with fluorite and cassiterite).
- (d) Fluorite. Traces only of cleavage fragments and grains 602773 (with beryl and topaz); 602843 (with a trace of gadolinite?); 602859 (with topaz and beryl); 602875, 602887 (with tourmaline only).

As seen the associations of hydrothermal/pneumatolytic vein minerals are fairly normal.

3.4 Scheelite by Fluorescence

Concentrates with abundant tourmaline, some topaz, scheelite or other pneumatolytic/hydrothermal minerals and concentrates containing skarn minerals - all samples were examined under S/W, U/V light. From this exercise it was noted that several specimens contain faint traces of yellow, less commonly bluish fluorescence. This includes 602843, 602896, 602883, 602879, 602811, 602909, 602877, 602855, 602801, 602795, 602773 and 602763. Scheelite was determined optically only in 602801.

N.B. Marked fluorescence in underlined (801).

084

400085

APPENDIX I

P. G. m

SAMPLES FOR HEAVY MINERAL SEPARATION o/n 23271

<u>Sample No.</u>	<u>H/Mineral gms.</u>	<u>Sample No.</u>	<u>H/Mineral gms.</u>
602761 P	32.6	602843 P	169.5
63	1.0	45	8.4
67	4.4	47	0.6
69	5.2	49	88.8
71	8.2	51	13.9
73	6.9	53	3.6
75	28.2	55	11.4
77	7.9	57	38.3
79	6.6	59	17.9
81	4.3	62	23.1
83	2.1	65	68.9
85	1.8	67	11.5
87	6.4	69	21.5
89	13.4	71	51.9
92	21.4	73	309.1
95	12.2	75	95.9
96	214.8	77	7.1
97	3.7	79	31.6
98	9.0	81	47.4
602801	17.9	83	150.3
4	13.2	85	22.5
7	7.6	87	45.9
9	92.6	89	39.3
11	31.5	94	363.8
13	58.3	98	8.5
15	90.6	602901	18.6
17	325.9	3	10.3
19	200.3	5	74.2
21	225.6	7	226.5
23	68.0	9	13.3
25	no sample	11	536.3
27	7.2	13	699.3
29	8.8	15	346.1
31	9.6	17	29.1
602833 P	53.2	807 P	1.4
35	2.3	414PH001 P	346.4
37	4.3	002 P	258.7
39	43.7		
41	141.1		

76

PROS 602

Results of Tetra bromethane / Bromoform separation.

080

400087

TABLE 1 : DUNDAS, HEAVY MINERAL ANALYSIS, MARCH, 1981

CSR NO.	HS NO.	MINERAL ABUNDANCE AND ROUNDNESS			GRAIN SIZE RANGE (mm)			CONCT. WEIGHT (g)	MISC. COMMENTS
		Major	Minor	Trace	Max.	Min.	Med.		
602761	1545	Limonitised amphibole 3 Ilmenite 3	Chromite 1>5 Zircon 1>5 Tourmaline 2>4	Rutile 1 Gold 4 Corundum 2 Epidote 4 Biotite 4	7.5	0.03	0.5 0.06	32.6	Limonitised amphibole grains - several mm. Gold 0.7 mm. Minor fresh purple zircon. 5367.10N/365.07E
602762	1546	Zircon 5>1 Tourmaline 4 Ilmenite 4>1	Actinolite 3 Biotite 4	Magnetite 3>1 Idocrase 3 Chromite 2 Epidote 3 Sillimanite 4	1.5	0.04	0.2 0.06	1.0	5368.52N/364.97E
602767	1547	Zircon 5>1 Tourmaline 4 Ilmenite 3>1	Biotite 3	Corundum 3 Magnetite 1 Actinolite 4>1 Epidote 3 Tourmaline 5 Rutile 4 Sillimanite 4 Chromite 1	1.8	0.05	0.3 0.05	4.4	5368.47N/365.49E
602769	1548	Ilmenite 4 Zircon 5>1 Tourmaline 4>1	Ferruginised amphibole(?) 4	Biotite 3 Actinolite 3 Rutile 4 Sillimanite 5	7.5	0.02	0.9 0.06	5.2	Ilmenite, brownish pitted grains. 5368.45N/365.55E
602771	1549	Ilmenite 4>3 Zircon 3>1 Tourmaline 4>1	Limonitic pebbles 3 Chromite 2>1 Epidote 3 Leucocoxene	Biotite 3 Magnetite 3>1 Sillimanite 4 Garnet 3 Topaz 2 Rutile 3	1.5	0.03	0.3 0.07	8.2	5368.45N/366.04E
602773	1550	Limonitic pebbles 3 Ilmenite 1>3 Zircon 3>2	Ferruginised amphibole 3 Chromite 2>1 Tourmaline 2>3 Leucocoxene	Fluorite 1 Magnetite 4>1 Garnet 3 Anatase 1 Biotite 4 Sillimanite 4 Epidote 3 Idocrase 4 Topaz 2 Beryl 1 Tremolite 4	2.8	0.03	0.4 0.04	6.9	5368.45N/366.15E
602775	1551	Ilmenite 4	Magnetite 4 Leucocoxene Rutile 4 Tourmaline 4>2 Zircon 2>3	Gold 2 Epidote 2>4 Perovskite x 1 Tremolite 3	6.2	0.02	0.9 0.14	28.2	~60 vol.% coarse worn ilmenite crystals. Gold 0.3 mm. 5355.55N/372.68E
602777	1552	Magnetite 4>1 Ilmenite 3>1 Zircon 1>4	Chromite 1>2 Leucocoxene	Andalusite 1 Biotite 3 Tourmaline 1 Anatase 1 Rutile 2 Baryte 2 Cordierite 3	0.8	0.04	0.3 0.14	7.9	+60# 95 vol.% magnetite + ilmenite. 5355.45N/372.66E
602779	1553	Ilmenite 3>1 Zircon 3>1	Magnetite 3>4 Leucocoxene Biotite 4 Tourmaline 4>1	Gold 4 Siderite 1 Tremolite 3 Actinolite 3 Topaz 2	5.0	0.02	0.3 0.07	6.6	Magnetite very pitted. Gold 1.5 mm. Ilmenite, badly pitted, leucocoxenised. 5355.46N/372.54E
602781	1554	Limonitic pebbles 3 Ilmenite 3 Leucocoxene	Tremolite schist 4 Tremolite 3 Chromite 2	Magnetite 4>1 Biotite 3 Zircon 5 Epidote 3 Tourmaline 1 Rutile 4>3 Idocrase 2	1.2	0.03	0.3 0.14	4.3	5358.16N/375.71E

087

400088

CSR NO.	HS NO.	MINERAL ABUNDANCE AND ROUNDNESS			GRAIN SIZE RANGE (mm)			CONCT. WEIGHT (g)	MISC. COMMENTS
		Major	Minor	Trace	Max.	Min.	Med.		
602783	1555	Ilmenite 3>1	Magnetite 3>1 Chromite 2>1	Tremolite 3 Biotite 3 Epidote 4>2 Rutile 4 Tourmaline 1	3.5	0.04	0.3 0.10	2.1	Concentrate >70 vol.% ilmenite. 5357.92N/375.29E
602785	1556	Ilmenite 3>1	Chromite 2>1 Tremolite schist 3 Tourmaline 1	Magnetite 3 Rutile 1 Zircon 1>5 Garnet 3 Topaz 3	1.2	0.04	0.3 0.10	1.8	5357.87N/375.23E
602787	1557	Ilmenite 1>4	Leucoxene Limonitic pebbles 4 Tourmaline 1 Zircon 1>4 Chromite 2	Magnetite 3>1 Anatase 1 Garnet 4 Ferruginised amphibole 3 Rutile 2>4 Biotite 3 Epidote 3 Topaz 2	6.0	0.04	0.4 0.06	6.4	5357.93N/375.12E
602789	1558	Ilmenite 3>1	Leucoxene Magnetite 2>3 Zircon 1>4 Tourmaline 1 Chromite 2	Tremolite schist 4 Rutile 4 Actinolite 4 Sillimanite 3 Biotite 4 Anatase 2	1.1	0.02	0.3 0.11	13.4	Concentrate is very largely ilmenite. 5357.83N/375.16E
602792	1559	Ilmenite 3>1 Chromite 3>1	Leucoxene Rutile 4>5 Tourmaline 1 Zoisite 2	Magnetite 3>1 Biotite 3 Anatase 3 Epidote 4 Zircon 1	1.8	0.04	0.3 0.11	21.4	5357.04N/375.12E
602795	1560	Ilmenite 3>1 Chromite 3>2	Leucoxene Zoisite 1 Epidote 3 Zircon 4>1	Magnetite 4 Rutile 4 Biotite 4 Epidote 3 Tourmaline 1 Baryte 1 Diopside 3	1.9	0.03	0.4 0.11	12.2	5356.30N/374.02E
602896 (796)	1561	Ilmenite 3>1 Limonitic, banded pebbles		Magnetite 1>4 Biotite 3 Rutile 3>1 Tourmaline 3 Zircon 5>1 Tremolite 4 Garnet 5 Epidote 3 Topaz 2>1	9.0	0.02	0.3 0.14	214.8	
602797	1562	Ilmenite 3>1 Chromite 2>1	Limonitic pebbles 4 Zircon 4>1 Epidote 3	Biotite 3 Magnetite 4>1 Garnet 3 Leucoxene Tourmaline 1>4 Actinolite 3	6.5	0.02	0.3 0.10	3.7	5356.30N/374.02E
602798	1563	Limonitic coarse pebbles 4 Ilmenite 1 Zircon 1>3	Idocrase 1	Tourmaline 3 Magnetite 1 Rutile 4 Garnet (orange) 4 Epidote 3 Leucoxene 1 Biotite 4 Actinolite 4	3.5	0.03	0.4 0.07	9.0	5356.21N/373.96E
602801	1564	Ilmenite 3	Leucoxene Zircon 1 Tourmaline 1 Antase 1 Chromite 4	Dolomite 4 Leucoxene Gold 4 Rutile 4 Epidote 1 Scheelite 3	4.5	0.04	0.4 0.11	17.9	Ilmenite, coarse, pitted. Gold 1.5 mm. Coarse anatase to crystal intergrowths. Spinel - red or yellow translucent crystal edges. 5355.27N/372.41E

CSR NO.	HS NO.	MINERAL ABUNDANCE AND ROUNDNESS				GRAIN SIZE RANGE (mm)			CONCT. WEIGHT (g)	MISC. COMMENTS
		Major	Minor	Trace	Max.	Min.	Med.			
602804	1565	Magnetite 3>1 Ilmenite 3>1	Leucoxene Zircon 1>3	Garnet 2 Chromite 2 Chlorite 4	3.5	0.06	0.5 0.08	13.2	Magnetite, ilmenite + leucoxene with >95 vol.% conct. Trace of zircon orange (fresh). 5355-IN/372	
602807	1566	Zircon 1>5 Ilmenite 4	Epidote 3	Garnet 4 Chromite 3 Leucoxene 3 Biotite 3 Tourmaline 1>4 Actinolite 3 Anatase 1 Andalusite 4 Rutile 3	3.0	0.06	0.2 0.10	7.6	5354-96N/371-71E	
602809	1567	Ilmenite 4>5 Zircon 4>1	Limonitic particles, coarse 4	Magnetite 4 Cassiterite 4 Rutile 4 Tourmaline 4>1 Actinolite 4	3.8	0.04	0.4 0.17	92.6	Conct. >95 vol.% ilmenite. Red:amber cassiterite - several coarse grains. 5364-98N/365-53E	
602811	1568	Ilmenite 4>1	Limonitic particles, coarse 4 Zircon 4 1	Tourmaline 4>1 Magnetite 4>2 Gold 4>2 Pyrite 1 Arsenopyrite 1 Rutile 5 Biotite 4 Epidote 4 Cassiterite 3	2.2	0.04	0.4 0.10	31.5	Gold 1.4 mm. Arsenopyrite, fresh, twinned. Conct. 95 vol.% ilmenite.	
602813	1569	Ilmenite 4>1 Zircon 5>1		Magnetite 4 Rutile 4 Tourmaline 5>1 Cassiterite 3	2.5	0.04	0.4 0.11	58.3	Conct. >95 vol.% ilmenite. Some coarse bright red/brown cassiterite - large and small grains.	
602815	1570	Ilmenite 5>1 Zircon 5>1		Magnetite 4>3 Rutile 5 Biotite 4 Sillimanite 4 Tourmaline 5 Epidote 4 Garnet 3	2.8	0.04	0.2 0.14	90.6	Possible prismatic tantalite trace, prismatic black, vitreous lustre.	
602817	1571	Ilmenite 5>3>1	Limonitic pebbles 4 Zircon 5>1	Magnetite 5>3 Chromite 2 Rutile 4 Garnet 4 Topaz 3 Tourmaline 4	3.5	0.06	0.3 0.21	323.9	Conc. >98 vol.% ilmenite.	
602819	1572	Ilmenite 1>5>2 Limonitic pebbles	Spinel 2>3	Magnetite 3>2 Limonitised amphibole 3 Zircon 5>1 Tourmaline 5 Rutile 4 Biotite 3	3.5	0.06	0.4 0.21	200.3	Conc. >95 vol.% ilmenite.	
602821	1573	Limonitised metamorphics Ilmenite 1>4	Leucoxene	Magnetite 1>3 Biotite 2 Zircon 4>1 Rutile 3 Tourmaline 4 Clinzoisite 4	7.5	0.02	1.2 0.10	225.6		
602823	1574	Limonitic pebbles 5>3 Ilmenite 2	Magnetite 2>1	Tourmaline 3 Epidote 3 Garnet 4 Rutile 2	5.1	0.02	0.2 0.21	68.0		
602815		MISSING								

089

400090

CSR NO.	HS NO.	MINERAL ABUNDANCE AND ROUNDNESS					GRAIN SIZE RANGE (mm)			CONCT. WEIGHT (g)	MISC. COMMENTS
		Major	Minor	Trace	Max.	Min.	Med.				
602827	1576	Ilmenite 1>3 Zircon 1>5	Magnetite 1 Leucoxene Topaz 2	Staurolite 4 Chromite 4 Actinolite 3 Anatase 1 Garnet 4 Epidote 1 Biotite 1 Rutile 3 Beryl 1	4.0	0.01	0.4 0.07	7.2	Spinel - black, vitreous lustre = chromite. Beryl - slightly kaolinised.		
602829	1577	Limonitic pebbles 4 Ilmenite 4>1	Magnetite 1>4 Topaz 2	Biotite 3 Rutile 4 Actinolite 1 Zircon 1>5 Beryl 1	4.1	0.01	0.3 0.14	8.8	Beryl - slightly kaolinised.		
602831	1578	Ilmenite 3>1 Limonitic pebbles 3 Zircon 4>1	Magnetite 1>4	Epidote 2 Rutile 4 Garnet 4 Leucoxene Biotite 2 Tourmaline 2 Antase 1	4.0	0.04	0.4 0.10	9.6	Rounded zircon - purple.		
602833	1579	Magnetite 1>3 Epidote 3>1 Ilmenite 3>1 Zircon 1>5		Chromite 1 Leucoxene Garnet 5 Tourmaline 2 Rutile 3	1.5	0.03	0.4 0.06	53.2			
602835	1580	Magnetite 1>3 Epidote 1>3 Ilmenite 3>1	Leucoxene Zircon 1	Garnet (orange) 4 Biotite 3 Rutile 4	0.8	0.01	0.4 0.11	2.3	Abundance of leucoxenised ilmenite present.		
602837	1581	Epidote 3>1 Ilmenite 1 Leucoxene	Magnetite 1>3 Topaz 2	Rutile 4 Biotite 3 Staurolite 3 Tourmaline 4 Garnet 4 Actinolite 4>2 Diopside 3	3.5	0.02	0.3 0.10	4.3			
602839	1582	Ilmenite 3>1 Limonitic pebbles 3 Epidote 3>1	Magnetite 2>1 Leucoxene Zircon 1	Chromite 1 Rutile 4 Actinolite 1 Andalusite 5	4.9	0.05	0.3 0.14	43.7			
602841	1583	Epidote 3 Chromite 3>1>2		Magnetite 4>2 Garnet 3 Zircon 5 Rutile 4 Sillimanite 5 Idocrase 3	4.0	0.01	0.3 0.14	141.1	Spinel - vitreous lustre, black = chromite.		
602843	1584	Ilmenite 1>3	Magnetite 1>4 Chromite 3>2 Leucoxene Epidote 3 Idocrase 3 Zircon 1	Biotite 2 Rutile 4 Gadolinite x 1 Diopside 2 Fluorite 1 Tremolite 3	5.5	0.03	0.14 0.10	160.5	Spinel - red internal reflection.		
602845	1585	Chromite 2>1 Zircon 5>4	Ilmenite 2 Leucoxene 3 Tourmaline 4	Magnetite 1>4 Biotite 3 Rutile 4 Anthophyllite x 3	2.0	0.03	0.2 0.04	8.4	50 vol.% worn zircon grains. Purple zircon, rare.		
602847	1586	Zircon 5>4>1 Chromite 2>3	Magnetite 2>1 Rutile 4>3 Topaz 2	Biotite 2 Tourmaline 3 Beryl 4 Spene 4	4.2	0.01	0.15 0.04	0.6	Magnetite is largely rubble from rock bands.		
602849	1587	Chromite 1 Ilmenite 5>4	Magnetite 5>3 Rutile 4 Zircon 4>1	Garnet 2 Epidote 3 Tourmaline 4	3.1	0.04	0.2	83.8			

090

400091

CSR NO.	HS NO.	MINERAL ABUNDANCE AND ROUNDNESS						GRAIN SIZE RANGE (mm)			CONCT. WEIGHT (g)	MISC. COMMENTS
		Major		Minor		Trace		Max.	Min.	Med.		
602851	1588	Ilmenite Chromite Zircon	3>1 1 1>5	Magnetite Rutile Ilmenite Leucoxene	3>1 4 3 4	Tourmaline Sillimanite Cassiterite Topaz Biotite	4>1 4 3 3 3	3.9	0.03	0.2 0.04	13.9	> 60 vol.% conct. is zircon.
602853	1589	Magnetite Chromite	1>3 1>5	Zircon	1	Phlogopite Tourmaline Siderite Epidote Rutile Actinolite Sillimanite	3 4 1 3 5 1 5	5.0	0.04	0.4 0.1	3.6	Spinel - vitreous lustre, conchoidal fracture. octahedra = chromite > 70 vol.% chromite. Brown-red tourmaline.
602855	1590	Ilmenite	4>1	Chromite Rutile Zircon	1>5 5>4 5>1	Biotite Magnetite Tourmaline Tremolite Topaz	3 5 3 3 2	3.2	0.04	0.2 0.1	11.4	
602857	1591	Ilmenite Zircon	5>1 5>1	Magnetite Chromite Rutile	5>1 1>5 4	Biotite Garnet Rutile Tourmaline Leucoxene	2 2 4 1 4	1.2	0.02	0.2 0.11	38.3	
602859	1592	Ilmenite Chromite	3>1 1>2	Rutile	4>1	Biotite Garnet Tourmaline Cassiterite Phlogopite Topaz Beryl Fluorite	2 1 4 2 3 2 1 2	3.5	0.03	0.3 0.14	17.9	
602862	1593	Ilmenite Zircon	3>2 4>1	Chromite Garnet Rutile Leucoxene	3 2>3 4 4	Magnetite Biotite Tourmaline Tremolite	4>1 3 4 3	1.1	0.03	0.3 0.06	23.1	
602865	1594	Epidote Spinel Ilmenite	3 3 1	Magnetite Idocrase	3>1 1	Zircon Garnet Tourmaline	1 3 3	6.2	0.05	0.3 0.10	68.9	
602867	1595	Ilmenite	1>4	Magnetite Epidote Chromite Leucoxene Zircon	1>3 3 1>2 1 5>1	Anhydrite Rutile Spinel (red) Siderite Gold Biotite	3 4>6 2 1 3 2	4.5	0.03	0.3 0.14	11.5	Gold, several grains 0.1 to 0.2 mm.
602869	1596	Chromite Ilmenite Limonitic pebbles	3>1 1 3	Magnetite Topaz	3>1 2	Chlorite Epidote Actinolite Tourmaline Sillimanite Garnet Zircon Clinzoisite	3 3 3 1 3 4 4 3	4.0	0.03	0.5 0.10	21.5	
602871	1597	Chromite Ilmenite	1>3 1>2	Limonitic pebbles Zircon	5 5	Garnet Rutile Tourmaline Biotite Andalusite	3 5>1 2 4 4	3.5	0.04	0.3 0.2	51.9	
602873	1598	Ilmenite Dolomite	3>1 1>2	Magnetite Chromite	3>4 3	Gold Rutile Sillimanite Epidote Zircon Garnet	3 3 3 2 3 4	3.2	0.02	0.4 0.18	309.1	Gold 0.15 mm. More than 60 vol.% carbonate.

CSR NO.	HS NO.	MINERAL ABUNDANCE AND ROUNDNESS			GRAIN SIZE RANGE (mm)			CONCT. WEIGHT (g)	MISC. COMMENTS
		Major	Minor	Trace	Max.	Min.	Med.		
602875	1599	Pebbles MnO ₂ / limonitic rock 1>3 Chromite 2>1	Ilmenite Garnet Spinel 2>1	1 4 2>1	Epidote Tremolite Specularite Tourmaline Rutile Zircon Spinel (red) Fluorite 3 3 4 4 4 3>1 2 1	11.5 0.01	0.3 0.18	95.9	Spinel - red transparent margins, occasionally all over - bright red/colourless.
602877	1600	Chromite 2>1	Ilmenite Pebbles, MnO ₂ / ilm. Idocrase Leucosene Zircon 1>3 3 1>3 5>1	1>3 3>1 3 1>3 5>1	Sillimanite Biotite Pyrite Pyrite - specked rock frags. Fluorite - blue Rutile Tourmaline 1 2 1 3 3 1 4 3 1	2.8 0.03	0.4 0.10	7.1	
602879	1601	Chromite 2>1	Magnetite Ilmenite Epidote Zircon 1>3 3>1 1>3 1>3	1>3 3>1 1>3 1>3	Topaz Idocrase Actinolite Biotite Rutile Tourmaline 2 3>1 3 3 4 3	2.9 0.03	0.2 0.08	31.6	Purple and colourless zircon in equal quantities. Brown epidote.
602881	1602	Ilmenite Limonitic pebbles 3>1 4>2	Chromite 1 2	1 2	Magnetite Rutile Biotite Zircon Phlogopite Topaz Clinozoisite 1 4 3 4 3 2 2	9.5 0.01	0.3 0.08	47.4	
602883	1603	Magnetite Ilmenite 2 4>1	Dolomite Epidote Chromite Rutile 1 3 3 3>4	1 3 3 3>4	Zircon Brucite Topaz 3 3 2	8.0 0.01	0.3 0.10	150.3	Magnetite apparently altered amphibole or hedenbergite. Orange rutile.
602885	1604	Limonitised amphibole, pebble size 3 Limonitised fine grain (epidote, hematite, etc.)	Magnetite Chromite Ilmenite Zircon 2>1 2>1 1 4	2>1 2>1 1 4	Carbonate Rutile Epidote Garnet Tourmaline Biotite Topaz 1 2 4 3 2 3 2	5.2 0.04	0.3 0.10	22.5	Some magnetite pseudo-morphing amphibole. More limonitised bundles fibrous amphibole - pebble size. Yellow-orange rutile common.
602887	1605	Ilmenite 3>1	Chromite Zircon Rutile 2 4>1>2 3	2 4>1>2 3	Magnetite Biotite Epidote Garnet Tourmaline Sillimanite Fluorite Topaz Idocrase 3 2 3 2 4 2 1 2 1	4.5 0.03	0.3 0.14	45.9	Low B.R., moderate R.I., 2V 55° - ve. Prismatic cleavage, l. slow. Mineral present as trace - not identified.
602889	1606	Ilmenite 1>3	Chromite Rutile Zircon Garnet 2 4>3 4>1 3	2 4>3 4>1 3	Magnetite Tourmaline 1>4 4	1.8 0.03	0.3 0.10	39.3	More than 90 vol.% ilmenite.
602894	1607	Ilmenite 1>4>3			Cassiterite Zircon Rutile Spinel Garnet Tourmaline 4 4>1 4>1 1 3 3	2.9 0.03	0.6 0.10	363.8	More than 90 vol.% coarse ilmenite. Large volume of ilmenite has trapped an abundance (~5 vol.%) quartz. Large (~1 mm) cassiterite grain.
602898	1608	Limonitic pebbles 4>3 Ilmenite 4	Epidote 3	3	Beryl Biotite Chromite Tourmaline Zircon Rutile Epidote Topaz 3 4 3 4 4 1 4 2	3.5 0.01	0.2 0.14	8.5	

CSR NO.	HS NO.	MINERAL ABUNDANCE AND ROUNDNESS			GRAIN SIZE RANGE (mm)			CONCT. WEIGHT (g)	MISC. COMMENTS
		Major	Minor	Trace	Max.	Mod.	Min.		
602901	1609	Ilmenite 1>4 Limonitised amphibole coarse frgs. 3	Rutile 3 Zircon 1>4	Actinolite 3 Magnetite 1>4 Spinel 3>1 Garnet 3 Tourmaline 4>1 Biotite 3 Sillimanite 3 Cassiterite 4 Topaz 3 Epidote 3	6.5	0.03	0.3 0.10	18.6	Spinel fairly bluish at edges, one grain. Largely brown or red on margin. Cassiterite, coarse (+1 mm) grain.
602903	1610	Epidote 3>1 Chromite 3>1 Idocrase 1	Magnetite 3>1 Ilmenite 3 Pyritic hornfels 4 Zircon 4>1	Biotite 3 Leucoxene Rutile 4 Tourmaline 5	7.2	0.04	0.3 0.18	10.3	
602905	1611	Ilmenite 3>1	Ferruginised coarse amphibole/pyroxene 1 Rutile 3>4 Chromite 2>3	Zircon 4 Tremolite 3 Epidote 3	3.5	0.02	0.3 0.10	74.2	Rutile - orange.
602907	1612	Ilmenite pebbles 4 Limonitic pebbles 2	Epidote 3 Tremolite rock fragments 4	Gold 4 Rutile 4 Zircon 4 Actinolite 3 Tourmaline 4 Magnetite - rubbly 3 - crystals 4	4.5	0.01	1.0 0.14	226.5	Gold, 1.0 mm. Ilmenite >90 vol.% concentrate.
602909	1613	Limonitic pebbles 4>3 Ilmenite 4>3>1	Magnetite 1>3 Chromite 3>2 Zircon 4>3>1	Garnet 3 Tourmaline 4 Rutile 3 Biotite 2 Epidote 3 Topaz 3	5.8	0.01	0.3 0.10	13.3	
602911	1614	Limonitic pebbles 4>3 Spinel 2>1		Magnetite - ferruginised amphibole 2 Magnetite 4 Zircon 4 Garnet 3	5.5	0.01	0.4 0.14	536.3	Chromite >95% of sample concentrate. Very splintery, splendid lustre. Zircon purple
602913	1615	Ilmenite 1>3 Chromite 2>1	Limonitic pebbles 3 4	Magnetite = ferruginised amphibole 2 Garnet 4>2 Zircon 1>5 Anatase 4 Sillimanite 3	6.2	0.02	0.4 0.14	699.3	Chromite > ilmenite, more than 98 vol.% of conct.
602915	1616	Ilmenite 1>3 Limonitic pebbles 3	Magnetite 3>2 Chromite 2>1	Limonitised amphibole 4 Garnet 3 Zircon 4 Epidote 3 Tremolite 3	5.0	0.01	0.3 0.21	346.1	Limonitic magnetite - several mms: Concentrate > 90 vol.% ilmenite.
602917	1617	Ilmenite 1>3 Zircon 4>5	Limonitic magnetite - platy several mms.	Rutile 3 Tourmaline 1>4	6.0	0.01	0.2 0.10	29.1	Ilmenite > 90 vol.% of concentrate.
602807P	1618	Ilmenite 4>1 Zircon 1>4	Leucoxene 2 Chromite	Gold 4 Pyrite 2 Carbonate 2 Rutile 4 Biotite 3 Arsenopyrite 4 Garnet 4 Tourmaline 3	2.5	0.01	1.0 0.05	1.4	Gold 2.9 mm, 0.7 mm. Zircon colourless > 80 vol.% -60% fraction.

093

400094

CSR NO.	HS NO.	MINERAL ABUNDANCE AND ROUNDNESS				GRAIN SIZE RANGE (mm)			CONCT. WEIGHT (g)	MISC. COMMENTS		
		Major	Minor	Trace	Max.	Med.	Min.					
602414 AH 001P	1619	Magnetite	2>3		Epidote	3	5.0	0.06	0.3	346.4	Magnetite about 30 vol.% concentrate. Ilmenite about 65 vol.% conct. Mineral pitted.	
		Ilmenite	1>3		Rutile	4						0.14
					Zircon	1						
					Tremolite	4						
602414 AH 002P	1620	Magnetite	4>1>2	Epidote	4	6.5	0.02	0.4	258.4	Magnetite > 60 vol.% of concentrate. Ilmenite ~ 30 vol.% of concentrate. Zircon murky with limonite attachments.		
		Ilmenite	1>3	Rutile	4						0.14	
				Zircon	1>4							
				Garnet	4							
				Tourmaline	4							

APPENDIX II



PURCHASE ORDER **23290**

PLEASE SUPPLY TO AND ADDRESS ANY COMMUNICATION OR INVOICE TO:

TO MR. P.J. CURTIS, MINPET SERVICES,
 76 MCLACHLAN AVENUE,
 RUSHCUTTERS BAY, N.S.W. 2011

CSR Limited, Minerals Division
 (address as above)

Date 5/4/91
 R.A./Pros No. 602
 Account No. 30319 PE

Item No.	Quantity	Description	Unit Price	Total Price
		SAMPLE DESCRIPTIONS OF 76 HEAVY MINERAL CONCENTRATES. INCORPORATE SAMPLE WEIGHTS IN REPORT PLUS TABULATED DESCRIPTION. NOTE GOLD AND PLUTINOIDS IN PARTICULAR, PLUS ANY UNUSUAL SILICATES NOT LIKELY TO BE DETECTED BY CHEMICAL ANALYSIS : NOTE SOME SAMPLES MAY BE CONTAMINATED. SAMPLES TO BE SUBSEQUENTLY ANALYSED FOR Cn, Cu, Zn, Pb, Bi, Ag, Au, Co, Ni, Cr., etc. PLEASE ADVISE P.M. MACNAMARA WHEN THESE ARE AVAILABLE FOR CHEMICAL ANALYSIS	15.00	

DELIVERY INSTRUCTIONS

APPROX. \$ 1,140.00

INSTRUCTIONS

- Please show Purchase Order Number on all invoices, packages, packing slips.
 Please note that liability is accepted only for goods purchased on our official purchase orders.
 The supplier or contractor by his acceptance of this order also accepts the conditions on the back. These conditions shall prevail over and cancel any conditions specified by the supplier or contractor, there shall be no exception to these provisions except by mutual agreement between the parties, evidenced in writing.

- WHITE COPY - SUPPLIERS COPY
- YELLOW COPY - ATTACH TO INVOICE
- PINK COPY - TO SYDNEY OFFICE
- GREEN COPY - PURCHASING OFFICER COPY
- BLUE COPY - PROSPECT LEADER COPY

SALES TAX (EXEMPTIONS AND CLASSIFICATIONS) ACT.

I hereby certify that the above goods are for use in the mining industry in carrying out mining operations and in the treatment of the products of those operations and exemption is claimed under Item 14 in the First Schedule.

For and on behalf of CSR LIMITED

Signature

096

APPENDIX III



FIELD SAMPLE DESPATCH SHEET

State NT Project _____ Prospect No. _____ Locality _____

CSR Order No. _____ Date Sampled _____ Sampler _____

Date Despatched _____ Despatcher _____ Despatched per _____

Type of Sample _____

Lab. Name _____

Sample Number Co-ordinates	From	To	Chemical Analyses (ppm or %)				Remarks
	E/W	N/S					
400099							
17							
41							
53							
54							
57							
59							
62							
63							
67							
69							
71							
72							
75							
77							
79							
85							
85							
87							
89							
94							
95							
96							
97							
98							
99							
100							
101							
102							
103							
104							
105							
106							
107							
108							
109							
110							
111							
112							
113							
114							
115							
116							
117							
118							
119							
120							
121							
122							
123							
124							
125							
126							
127							
128							
129							
130							
131							
132							
133							
134							
135							
136							
137							
138							
139							
140							
141							
142							
143							
144							
145							
146							
147							
148							
149							
150							

Instructions to Analyst: _____

400099

Results to: _____

099

400100

APPENDIX V

HEAVY MINERAL CONCENTRATES MINERALOGY

A140007C-A140371C

Minpet Services

659 Botany Road, Rosebery, NSW 2018 • P.O. Box 24 Rushcutters Bay, NSW 2011
Telephone 699 7497 • After hours 665 4986

Ref: MPS 45/82

12th January, 1983

Mr. P.M. Macnamara,
CSR Minerals Division,
G.P.O. Box 483,
SYDNEY N.S.W. 2001

Dear Phil,

MINPET REPORT 45/82

Herewith the final report on your mineragraphic study
of drainage samples from E.L. 15/76, Dundas, Tasmania.

Yours sincerely,



P.J. CURTIS

10
MINPET SERVICES

REPORT NO. 45/82

MINERALOGICAL EXAMINATION OF HEAVY
MINERAL DRAINAGE SAMPLES FROM
E.L. 15/76, DUNDAS, TASMANIA

(prepared for Mr. P.M. Macnamara,
CSR Limited)

December 1982

102

CONTENTS

PAGE NO.

1.	INTRODUCTION	1
2.	SUMMARY	2
3.	MINERAGRAPHY - DISCUSSION	3
4.	REFERENCES	10

TABLES

1	MINERALOGY OF STREAM SEDIMENT SAMPLES
2	SAMPLE WEIGHTS, E.L. 15/76
3	UV/SW FLUORESCENCE, E.L. 15/76 SAMPLES

<u>PLANS</u> (in pocket) - Minpet copy and P. Macnamara copy only)	
K555-6	SAMPLE POSITIONS, E.L. 15/76 - NORTH SHEET
K555-7	SAMPLE POSITIONS, E.L. 15/76 - SOUTH SHEET

} not included here

APPENDICES

I	FIGURE 1 - MAP, CSR/AMOCO GRIDS
II	FIGURE 3 - LOCATION MAP, E.L. 15/76, DUNDAS, TASMANIA
III	ORDER NO. 33283, DATED 5/11/82
IV	FIELD SAMPLE DESPATCH SHEET 33283 SHOWING SAMPLE CO-ORDINATES
V	XRD REPORTS

10.

1. INTRODUCTION

Thirty-four panned mineral concentrates obtained from the Dundas E.L. were dried and further concentrated over tetrabromoethane. Magnetic minerals were then separated by a heavy, switch on/off hand magnet. Fractions were examined semi-quantitatively by the low power stereomicroscope followed by more detailed examination of the -60 mesh fractions under R.I. oils, using the petrological microscope. Results are presented as on previous occasions, using a 'Bangka style' table, which though giving information on grain sorting, expresses in detail the general state of all grains in the same concentrate.

Discussion was limited in view of CSR's budget expenditure restrictions. Two specimens were submitted for XRD. Diffractometry of pyroxene and amphiboles (A090) and XRD powder pattern - identification of yellow pleochroic prisms (A256).

A routine examination for fluorescent minerals was made.

104

400105

- 2 -

2. SUMMARY

The sampled area consists of much faulted serpentine intrusives, metamorphosed calc-silicate sediments, slates, etc. and also gabbro of Cambrian age and in one location Jurassic dolerites. If grains of the same mineral show in one sample, varied crystal forms, colours and wear, this may indicate grains present are derived from more than one rock suite or more likely from more than one sedimentary erosion period and many grains may have little relevance to existing catchment stratigraphy. However an abundance of chromite in varied states of erosion, much of it fresh euhedral grains but to fragmentary slivers is noted particularly in the northwest sector and Nevada Grid. In Cambrian Serpentine rocks and sediments, crocoite (lead chromate) occurs as traces commonly where pyrite occurs, also present with baryte once. Crocoite occurs in the central southern sector adjoining the location where lead sulphides occur in the M.F. Phelan and West Comet Mine neighbourhoods (hydrothermal mineralisation - or mine dumps?) and where chromite is shedding from the serpentine masses at Serpentine and Razorback Hills. Cassiterite seen is very sparse and grains which are mottled brown-red are small and rather worn. These are present north and south within the sampled area, Morain (A007), Crimson Creek Formation (A042), Silurian Amber Slate (A189), Dundas Group Unassigned (A062).

? Pascoite [$H_2Ca_2(VO_3)_6 \cdot 10H_2O$] identified by optical properties only occurs in the presence of crocoite and pyrite at A214P and is a likely hydrothermal galena associate mineral; also occurs in A256 with goethite. Fresh galena occurs with pyrite curiously in heavily oxidised A060, so presumably as for pyrite, comes from an adjoining exposure.

Fresh pyrite (often accompanied by pale, near white marcasite) is seen in A056, A216, A241, A333, A336, A339, A368, A369, A370 and A371. Its mineral associates are galena in A056, marcasite (A216), crocoite, pascoite and marcastite (A241), baryte, marcasite and shceelite (A339) and marcasite (A371).

/....

3. MINERAGRAPHY - DISCUSSION

(a) Northeast Sector

No sampling.

(b) Northwest Sector

.. A218P, A216P, NE.

.. A218P - largely contains hornblende, chromite, ilmenite and zircon - subangular and euhedral crystal grains (zircon, chromite and minor magnetite, traces of diopside). Alluvium.

.. A216P - largely magnetite rubble and limonite-stained carbonate. Pyrite, marcasite, chromite and specularite. Crimson Creek Formation (Dundas Group).

.. A205P - magnetite rubble, but largely chromite, ilmenite, traces of hornblende, topaz, magnetite, rutile, tourmaline and zircon. Alluvium.

No economic mineral indicators except presence of chromite (from serpentine mass to the east). Much of this sector is in Crimson Creek Formation and occurs in broad alluvial networks. Abundant tin and chromium were reported in assays of previous concentrates of stream sediments from this sector (Ref. PMR 88/78, Dundas report).

(c) Central Northern Sector

Over Razorback serpentine, Dundas Group and Oonah rocks (Cambrian to Proterozoic).

.. A336P - (Concert Creek, NE of N. Comet Mine) - Oonah Quartzite. Largely goethite pebbles with minor chromite, ilmenite and carbonate, traces of zircon, magnetite, epidote, and pyrite grains which are largely subangular or rounded, some zircon, magnetite and pyrite.

.. A333P - adjoins A336P in Oonah Quartzite. Largely tremolite schist fragments, ferruginous pebbles with minor ilmenite and tourmaline and traces of chromite, garnet, epidote and pyrite - mainly worn grains except pyrite and chromite.

The two specimens above show proximity of North Comet Lead Mine, gossanous material and chromite shedding serpentine.

- .. A296. Alluvium on Dundas Group sediments.
Largely actinolite, enstatite, hornblende, hypersthene and ilmenite, minor epidote, traces of leucoxene, magnetite and zircon. Mainly worn grains (alluvium). Adjoin largely metamorphosed basic rocks.
- .. A339 (Dundas River - alluvium) - adjoining A333, A336.
Largely goethite pebbles, ilmenite and traces of tremolite and actinolite schist, scheelite, marcasite, pyrite and brookite. Like A333 and A336, traces of oxide derivation of primary galena; chromite and scheelite.
- .. A341. North of A296 on Barker Creek - Dundas Group.
Mainly magnetite rock aggregates, chromite, ilmenite and magnetite single crystals. Traces of actinolite, staurolite, x epidote, tremolite and zircon. Fresh crystals are predominant, shedding mainly from the serpentine and adjoining metamorphosed basic rocks?
- .. A268P. Just east of the Maestries Mine (lead) on Oonah Quartzite.
Largely tremolite schist fragments, minor hypersthene and ilmenite (basic rock origin), traces of actinolite, hornblende, diopside, epidote, magnetite, rutile, zircon and tourmaline. Also traces of specularite. Worn and fresh grains.
- .. A256P. NNE of Adelaide Mine and WSW of West Comet on Dundas Group sediments.
Largely ilmenite and yellow-orange pleochroic prisms of crocoite* (XRD). Minor carbonate, traces of topaz, chromite, rutile and zircon, pascoite# and chlorite.

* Crocoite $PbCrO_4$

Pascoite - hydrous calcium vanadate.

- .. A241P. M.F. Phelan prospect adjoining Adelaide Mine Creek and the Cambrian, Serpentinite/Pyroxenite rock unit. Largely magnetite aggregates. Chromite and ilmenite; with minor magnetite aggregates. Chromite and ilmenite; with minor magnetite single crystals, limonite pebbles, tremolite and rutile, traces of actinolite, epidote, garnet, sillimanite, tourmaline, zircon, pyrite and crocoite, pascoite and marcasite. X
- .. A062P. Adjoins 241P in the M.F. Phelan Prospect. Major magnetite rubble, ilmenite, magnetite crystals and carbonate actinolite, chromite, garnet, rutile and tremolite have a minor presence; and limonite pebbles, epidote, tourmaline and zircon as traces; also crocoite, baryte, apatite, specularite and cassiterite as traces. Mainly worn or subangular grains.
- .. A060P. Just southwest of M.F. Phelan's Prospect. Dundas Group unassigned. Mainly limonitic pebbles and tremolite; minor actinolite schist, ilmenite, tourmaline and zircon; traces of magnetite rubble, staurolite, chromite, garnet, epidote, rutile, magnetite crystals and crocoite (see A241P).
- .. A092P. Climie Creek, central south of Central Northern Sector in the Fernfields Formation of Dundas Group. Largely limonitic pebbles, epidote rock and zircon, minor tremolite schist, chromite, ilmenite and leucoxene (ilmenite pseudomorphs). Traces of actinolite, topaz, hornblende, staurolite, biotite, epidote crystals, garnet, rutile, tourmaline and forsterite.

Chromite shedding, otherwise minerals are derived from basic rock and calc-silicate sediments. Grains show variable attrition; and zircon, and tourmaline are varicoloured.
- .. A090P. From just south of A092 on the similar 'E-W' trending creek system. Fernfields Formation, Cambrian. Limonitic pebbles, epidote rock fragments, enstatite, diopside, and ilmenite are the main occurring minerals, generally fresh in appearance. Minor chromite, leucoxene, rutile and tremolite. From an ultramafic and metamorphic catchment.

Two concentrates from neighbouring streamlets on the west/south side of the sector on alluvium of the Climie Creek overlying Dundas Group unassigned rocks (A069P and A067P):-

- .. A069P. Mainly limonite pebbles, epidote and zircon, minor chromite, ilmenite and magnetite. Traces of staurolite, garnet and tourmaline. Mixed subangular and freshly crystalline forms.
- .. A067P. Largely limonite pebbles, tremolite schist fragments, ilmenite, tremolite crystals and zircon; minor magnetite and rutile; traces of crocoite, actinolite, hornblende, staurolite, corundum, chromite, sillimanite and tourmaline. Largely worn, some good crystal forms - ilmenite, zircon and chromite.

Apart from chromite there is little of significance here. Orange prisms = crocoite, trace present.
- .. A056P. Adelaide Mine Creek - Dundas Group - unassigned. Mainly limonitic pebbles, actinolite schist fragments, tremolite. Minor - nil samples; traces of magnetite rubble, staurolite, chromite, garnet, ilmenite, magnetite, rutile, tourmaline, zircon, pyrite, galena. Largely worn grains except pyrite, galena, tourmaline and magnetite. Unusual to find galena fragments as fresh as these in a stream sediment so there is likely to be adjoining freshly exposed sulphide veins.

(d) Central Southern Sector (just WSW of A090P)

- .. A046P (WSW of A090P, approx. 1/2 mile). (Alluvium).
Heavy concentrate is largely (>70 vol.% ilmenite as worn grains) with a further 10 vol.% zircon of fresh and worn grains, minor chromite, rutile and tremolite, traces of enstatite, hornblende, staurolite, epidote, leucoxene, cordierite, spinel and tourmaline. Rock fragments of minor tremolite schist, traces of garnetiferous schist and epidote aggregates. Most grains are worn but include fresh ilmenite, tourmaline and zircon and some rounded, pitted and fragmented grains. Grains are of varied origin, with fresh ilmenite (basic intrusive), chromite (ultramafic) and zircon (granitic).

/....

(Page 7 missing)

chromite and ilmenite (to 90 vol.%) associated with plentiful zircon.

- .. A025P. Just (0.6 mile) east of A033P, SE of part of Southern Sector on unassigned Dundas Group/Moraine.

Largely tremolite schist, hornblende, ilmenite, tremolite crystal grains. Minor epidote, leucoxene, carbonate and traces of limonite pebbles, epidote, aggregates, actinolite, topaz, hypersthene, rutile and hematite - calc-silicate sedimentary and basic intrusive origin (gabbros, dolerites to west) with fresh topaz, hornblende and some ilmenite).

- .. A022P. Southeast within Southern Sector (nearest A025P to the west, approx. ($\frac{1}{2}$ mile). Sediments rest on Cambrian gabbros, norite, dolerite.

Largely chromite, ilmenite and tremolite. Minor enstatite, tremolite schist, epidote, leucoxene, and carbonate. Traces of epidote rock, actinolite, topaz, hornblende, garnet, sillimanite, hypersthene, rutile, enstatite, apatite and zircon. Mainly fragmented and finely crystalline with some rounded grains. The bulk of minerals present are chromite, magnetite and ilmenite from basic and ultrabasic(?) sources.

- .. A017P. Southeast within Southern Sector (south of A025P) on Moraine.

Largely epidote, magnetite and ilmenite. Traces of limonite pebbles, epidote rock and minor tremolite schist, topaz, hornblende, chromite, diopside, sillimanite, leucoxene and zircon. Mainly subangular grains, some fresh crystals (zircon, chromite, magnetite, ilmenite and sillimanite). Ilmenite varies 50:50, magnetic and feebly magnetic fractions. Varied origin mainly calc-silicate sedimentary and basic intrusives.

- .. A015P. Close to A017P - just to the east and also on Moraine.

Largely epidote, minor hornblende, diopside, ilmenite, magnetite; traces of chromite, actinolite, topaz, cordierite, rutile, tourmaline, tremolite and zircon. Similar origin to A017P with greater emphasis on sedimentary calc silicate rather than basic intrusives. Diopside fresh, fragmentary.

110

.. A009P. Just over 1 mile SSE of A017P and resting on Moraine. Largely diopside, epidote and magnetite. Minor epidote rock, ilmenite, leucoxene, zircon and tourmaline. Traces, actinolite, chromite, idocrase, garnet, sillimanite and tourmaline.

Mainly of calc-silicate metamorphic origin with some granitic influence.

.. A007P. Approximately $\frac{1}{2}$ mile SE of A015P and ESE of A017P, southeast Southern Sector, on Moraine. Largely chromite, epidote, ilmenite, magnetite and zircon. Chromite is >10 vol.%. Minor epidote rock, epidote >70 vol.%.

Traces of tremolite schist, actinolite, topaz, diopside, garnet, rutile and cassiterite (worn) and tourmaline. Grains are subangular and rounded - worn, but evenly crystalline - some ilmenite, zircon and tourmaline. Well-sorted. Mixed metamorphic calc-silicate and ultramafic/basic intrusive sources - fairly fresh.

Remaining specimens are shown separately and consist of A341, A368, A369, A370 and A371, Nevada Grid, NW of NW Sector. Situated on Hodge Slate and Razorback Conglomerate of the Dundas Group.

All contain abundant fragmentary chromite including brown/yellow transparent thin slivers of the mineral. Chromite is major in all concentrates except A371 where there is a minor presence. Magnetite is fresh and also worn, rubbly - the latter most notable in A368 and A371 but with a major presence only in A341 and A371. Ilmenite is major in all concentrates but is pitted and worn in most. Traces of limonite:garnet schist, limonitic(?) schist, actinolite schist in A371 indicates a metamorphic (calc-silicate?) catchment. Similarly for minor tremolite schists (A370). Trace actinolite (except A368), trace hornblende (except A369 and A370), trace epidote (except A368), trace tremolite (except A368). One other trace metamorphic mineral present is sillimanite (A369). Most interesting is major pyrite (A371) - commonly associated with marcasite (altered pyrite?).

4. REFERENCES

PACMINEX PTY. LIMITED

PMR 215/72 - A Mineralogical Examination of Heavy Mineral Concentrates, etc., E.L. 15/76, Dundas, Tasmania.

PACMINEX PTY. LIMITED.

PMR 88/78 - A Mineralogical/Geochemical Appraisal of Heavy Mineral Concentrates, E.L. 15/76, Dundas, Tasmania.

MINPET SERVICES

MPS 23/79 - Mineralogical Examination of Heavy Mineral Drainage Samples from E.L. 15/76, Dundas, Tasmania.

December 1982

TABLE 1

MINERALOGY OF STREAM SEDIMENT SAMPLES

TABLE 1 : LEGEND

Rock Aggregates

- TS - tremolite schist
- AS - actinolite
- BF - banded ferruginous shale
- CS - chlorite schist
- ED - epidote rock fragments
- FP - ferruginous hematite/limonite pebbles
- FS - ferruginous siltstone
- GS - garnetiferous schist
- LGS - garnetiferous schist, limonitised
- GP - goethite pebbles
- OcL - ochreous limonite particles
- MS - mica schist
- MA - magnetite rock aggregates
- MR - magnetite rubble

Minerals

- Ap - apatite
- Ah - anhydrite
- Ba - baryte
- Br - brookite
- Cl - chlorite
- Cr - crocoite
- Ch - chrysotile
- Cs - cassiterite
- En - enstatite
- Fo - forsterite
- Gt - goethite
- Ga - galena
- Hm - hematite
- Mh - maghemite
- Mc - marcasite
- Ps - pascoite
- Sp - specularite
- Sh - scheelite

Abundance (minerals and rock fragments)

- 1 - major >5 vol.%
- 2 - minor 1-5 vol.%
- 3 - trace <1 vol.%

Grain Shapes

- 1 - euhedral, crystalline
- 2 - aggregated laths
- 3 - subangular
- 4 - angular
- 5 - fragmented
- 6 - rounded
- 7 - pitted

Sorting

- 1 - excellent
- 2 - very good
- 3 - good
- 4 - mainly good
- 5 - moderate
- 6 - poor

TABLE 1 : STREAM SEDIMENT HEAVY MINERAL DETERMINATIONS, DUNDAS (Part 2)

114

SAMPLE NUMBER	ROCK FRAGMENT/ABUNDANCE	Actinolite	Fibrolite	Hornblende	Staurolite	Enstatite	Biotite	Corundum	Chromite	Diopside	Epidote/clc	Garnet	Sillimanite	Hypersthene	Ilmenite	Leucopene	Magnetite	Carbonate	Cordierite	Rutile	Spinel	Tourmaline	Zircon	Additional Minerals	GRAIN COLOURS	GRAIN SHAPES	GRAIN SIZE LIMITS (mm)			SORTING	COMMENTS	CONCT. WEIGHT (g)		
																											MIN.	MAX.	MED.					
A140007	TS3, ED2, FP3	3	3						1	3	1	3			1	3	1			3	3	1		Cs3	Green, black, brown	3>1>4	0.07	2.2	0.4 0.22	3	Chromite >10 v%. Epidote >70 v%. Cassiterite - trace.	9.8		
A140009	ED2, FP3	3							3	1	1	3	3		2	2	1						3	2	Id3	Black, green, brown	3>1>4>5	0.03	1.8	0.3 0.11	2	Diopside, very fragmentary, fresh.	17.7	
A140015	AcS3, LP3	3	3	2					3	2	1				2		2		3	3		3	3	3	Mh3	Green, brown,	3>1>5>6>7	0.03	1.4	0.4 0.12	3	Mainly epidote - crystalline. Ilmenite, both dull and brilliant. Hornblende, brown.	19.2	
A140017	ED2, TS2, LP3	3	3						3	3	1		3		1	3	1							3		Black, brown, yellow.	3>1>5>6	0.01	2.2	0.3 0.16	5	Ilmenite 50:50, mag:non mag. fraction.	21.1	
A140022	ED3, TS2	3	3	3	2				1	2	3	3	3	3	1	2	1	2		3			1	3	Ap3	Black, yellow, white	5>1>3	0.05	2.0	0.4 0.16	4	Largely ilmenite + chromite? zircon pink (4)	13.9	
A140025	TS1, LP3, ED3	3	3	1					1	2				3	2		1			3			1		Hm3	Yellow, brown, green	3>1>4	0.02	1.6	0.4 0.11	4	Much pale amphibole present.	16.8	
A140033	LS3	2	3	1	3				3	2	3	3	3	3	1	2	1	3	3	3			3	1	2		Black, brown, white	3>1>4	0.03	1.3	0.5 0.08	4	Several generations of ilmenite present. Mauve zircon.	4.5
A140036	AcS3	3	3		3				2	3	3				1	2	2		3				3	1	2	Ah3	Black, white	3>6>1>7	0.03	1.2	0.3 0.10	3	Mauve zircon.	4.4
A140042	Ts3, AcS3 Ocl3	3	3	3	3				3	3		2	3		1		3		2			3		1	Ap3 Cs3	Black, white	3>1>7>6	0.03	1.0	0.4 0.06	3	Ilmenite >70 v%. Brown-red mottled angular cassiterite.	39.7	
A140046	TS2, GS3, ED3		3	3	3				2	3	2				1	3	3		3	2		3	2	1			Black, white	3>1>7>6>5	0.02	0.8	0.3 0.07	2	Ilmenite >70 v%. Zircon >10 v%. Spinel, black/green.	23.2
A140056	MR3, LP1, TS3, AcS1			3					3		3				3		3		3			3	1	3	Py3 Ga3	Brown, yellow	3>6>1	0.01	2.0	0.3 0.08	5	Largely ferruginous rubble.	5.4	
A140060	MR3, LP1, Ocl3, AcS2	3		3					3	3	3				2		3		3			2	1	2			Brown, yellow	3>5>1>7	0.03	2.4	0.3 0.08	5	Purple zircon. Fibrous magnetite - abundant.	4.1
A140062*	MR1, LP3	2							2	3	2				1		1	1	2			3	2	3	Cr3 Ap3 Ba3 Cs3 Sp3	Brown, black	3>5>1>7	0.01	2.0	0.4 0.16	6	Ilmenite, pitted. Mainly rubbly ferruginous carbonate.	63.1	
A140067*	LP1, TS1, AcS3	3		3	3	3	3	3	3	3	3				1	3	2		2			3	1	1	Cr3	Black, yellow	3>1>6	0.02	2.9	0.3 0.05	5	Abundant ilmenite - splendid.	7.8	
A140069	LP1			3					2	1	3				2		2		3			3	1				Black, white	3>1>7>6>7	0.02	2.2	0.4 0.08	5	Mauve (worn) zircon. Fragmental chromite.	3.8

* Orange prisms (XRD) trace.

400115

SAMPLE NUMBER	ROCK FRAGMENTS ABUNDANCE	Actinolite	Tepalc	Hornblende	Staurolite	Enstatite	Biotite	Corundum	Chromite	Diopside	Epidote/Cls	Garnet	Sillimanite	Hypersthene	Ilmenite	Leucosene	Magnetite	Carbonate	Cordierite	Rutile	Spinel	Tourmaline	Tremolite	Zircon	Additional Minerals	GRAIN COLOURS	GRAIN SHAPES	GRAIN SIZE LIMITS (mm)			SORTING	COMMENTS	CONCT. WEIGHT (g)	
																												MIN.	MAX.	MED.				
A140090	MR3, LP1 ED1	3				1			2	1					1	2	3		3	2					2		Brown, yellow	3>2>6>7	0.05	3.0	0.3 0.16	6	Diffractometer test ⁺ .	5.1
A140092	LP1, TS2	3	3	3	3		3		2	3	3			2	2	3				3		3		1	FO3	Brown, yellow	3>1>6>7	0.02	3.2	0.3 0.07	5	Zircon, tourmaline, variable wear, coloration.	3.8	
A140187	LP3, TS2 OcL3	3	3	3					1	3	3			1	1	3				2		3	2	1			Black, yellow	3>1>6	0.02	1.0	0.4 0.11	3	Concentrate >90 vol.% chromite + ilmenite, multi-coloured zircon. Purple, worn garnet.	10.6
A140189	LP3, OcL3	3							1	3	3	3		1	1	3				2		2	3	1	Ap3 Cs3	Black, yellow	3>1>6>7	0.01	0.8	0.3 0.07	3	Concentrate >90 vol.% ilmenite + chromite. Zircon colourless and mauve. Both 1 = 6, superabundant.	22.8	
A140205	MR3			3	3				1		3			1		3				3		3		3			Black	1>3>7	0.01	1.0	0.3 0.20	2	Concentrate >98 vol.% chromite > ilmenite. Rutile main minor component.	304.2
A140216	MR3		3						3		3					3	1			3			3		Py2 Mc3 Hm1	Brown, yellow	3>5>1	<0.01	1.5	0.6 0.12	3	Ferruginous carbonate and calcite.	53.0	
A140218	Ts1	3		1					1	3					1	2								1			Black, brown, yellow	3>1>2>7	<0.01	1.7	0.3 0.08	3	Brown < green hornblende.	84.0
A140241	MA1, LP2	3							1	3	3	3		1	2	1				2		3	2	3	Cr3 Py3 Ps3 Mc3	Brown, yellow, white	3>5>2>1	<0.01	2.2	0.3 0.10	4	Abundance of coarse ferruginous carbonate and calcite fragments. Crocoite, monoclinic yellow/orange pleochroic ZAC 7°.	27.1	
A140256	MA3		3						3						1	3	2			3		2	3	Ps3 Cl3 Cr2 Gt1	Brown, orange, white	3>5>2>1	0.01	1.8	0.5 0.16	5	Yellow/orange pleochroic prisms of crocoite.	80.1		
A140268	MR2, TS1	3		3					3	3				2	2	3	3			3		3	3	3	Sp3	Brown, yellow	3>2>5>1	0.02	1.4	0.4 0.11	5	Rutile as squat prisms.	9.7	
A140296	LP3	1	1	1						2				1	1	3	3							3			Black, green, yellow	3>7>6	0.02	2.6	0.3 0.08	2	Coarse pale hypersthene and ilmenite. Fines hypersthene enstatite, hornblende mix.	66.0
A140333	MR3, TS1, AcS3 DcL3 LPS2 FP1	3	3	3	3				3	3				2			3			3		2	3	Py3	Brown, yellow	3>4>6>1	0.03	4.0	0.3 0.2	5	Rutile - squat red prisms.	12.9		
A140346	MR3, GP1 LP1, TS3		3	3					3	2	3			2	3	2				3	3	3	3	3	Sp3 Py3	Black, yellow	3>6>1>5>6	<0.01	2.2	0.3 0.11	4	Largely goethite pebbles. Dull grey manganese oxides fragments. Spinel - red.	16.9	

+ Enstatite, diopside, chromite.

SAMPLE NUMBER	FORM PREPARATION	Actinolite	Py 12	Hornblende	Albite	Anorthite	Biotite	Corundum	Chromite	Diopside	Epidote/Cr	Garnet	Sillimanite	Hypersthene	Ilmenite	Leucosene	Magnetite	Carbonate	Cordierite	Rutile	Spinel	Tourmaline	Tremolite	Zircon	Additional Minerals	GRAIN COLOURS	GRAIN SHAPES	GRAIN SIZE LIMITS (mm)			SORTING	COMMENTS	CONCT. WEIGHT (g)
																												MIN.	MAX.	MED.			
A140339	MR3, GP1 TS3, AcS3			3								3	3		1			3					3	3	Br3 Py3 Mc3	Black, brown, yellow.	3>6>5	<0.01	2.8	1.2 0.12	4	90 vol.% (+60 mesh) component of worn ilmenite pebbles; purple zircon - worn; colourless, fresh.	72.1
A140341	MA1, GP2		3		3			1		3					1		1			3			3	3		Black, brown	1>2>3>7	0.02	1.4	0.3 0.16	3	Magnetite fresh euhedra - splendid lustre or aggregate laths. Abundant chromite and ilmenite - fresh and less so pitted. Black tourmaline.	57.3
A140368	MA3			3				1							1		3								Py2 Mc3	Black	1>5>7>2	0.03	0.8	0.3 0.08	3	Ilmenite - pitted. Chromite fragmented, splendid, bluish reflectance. Mainly opaque, slivers + crystals, amber, transparent.	23.9
A140369	MS3		3					1		3				3	1		3						3	2	Py3	Black, white	1>5>3>6	0.02	1.4	0.3 0.08	2	Mainly chromite - mostly fragmentary and transparent; otherwise rounded ilmenite and fragmentary > euhedral zircon.	45.3
A140370	TS2		3					1		3				1		3			3				3	3	Py1 Mc3 Sp3	Black, yellow	1>3>5	0.02	1.2	0.3 0.09	2	Chromite:tremolite growths: pyrite. Zircon - orange, euhedral, also mauve, worn.	11.9
A140371	MR1, LS1 LP1, AcS3 LGS3		3	3				2		3				1		1			3				3	3	Py3 Mc3	Brown, yellow, black	3>5>1	0.01	1.3	0.4 0.12	2	Magnetite - aggregate laths. Marcasite - near white, fine granular.	34.8

117

TABLE 2

SAMPLE WEIGHTS, E.L. 15/76

TABLE 2 : SAMPLE WEIGHTS, E.L. 15/76

<u>Sample No.</u>	<u>Head Weight</u>	<u>Heavies</u>
A140007	85.2	9.8
A140009	85.0	17.7
A140015	85.2	19.2
A140022	56.3	13.9
A140025	56.0	16.8
A140033	49.5	4.5
A140036	49.5	4.4
A140042	277.3	39.7
A140046	170.0	23.2
A140056	56.7	5.4
A140060	56.5	4.1
A140062	170.3	63.1
A140067	56.7	7.8
A140069	49.5	3.8
A140090	99.5	5.1
A140092	49.5	3.8
A140187	70.9	10.6
A140189	99.2	22.8
A140205	509.7	304.2
A140216	170.6	53.0
A140218	227.1	84.0
A140241	85.0	27.1
A140256	142.2	80.1
A140268	57.1	9.7
A140296	99.2	66.0
A140333	99.3	12.9
A140336	113.0	16.9
A140339	198.0	72.1
A140341	99.2	57.3
A140368	49.5	23.9
A140369	170.0	45.3
A140370	49.5	11.9
A140371	56.2	34.8

TABLE 3

FLUORESCENCE, E.L. 15/76 SAMPLES

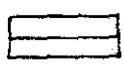
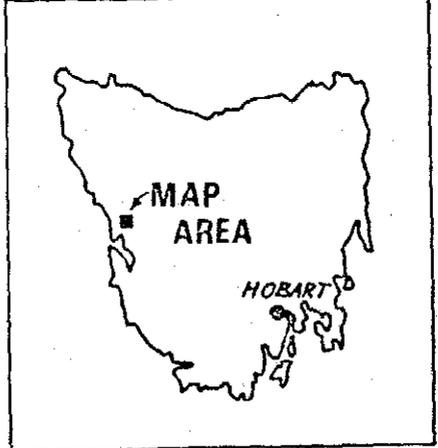
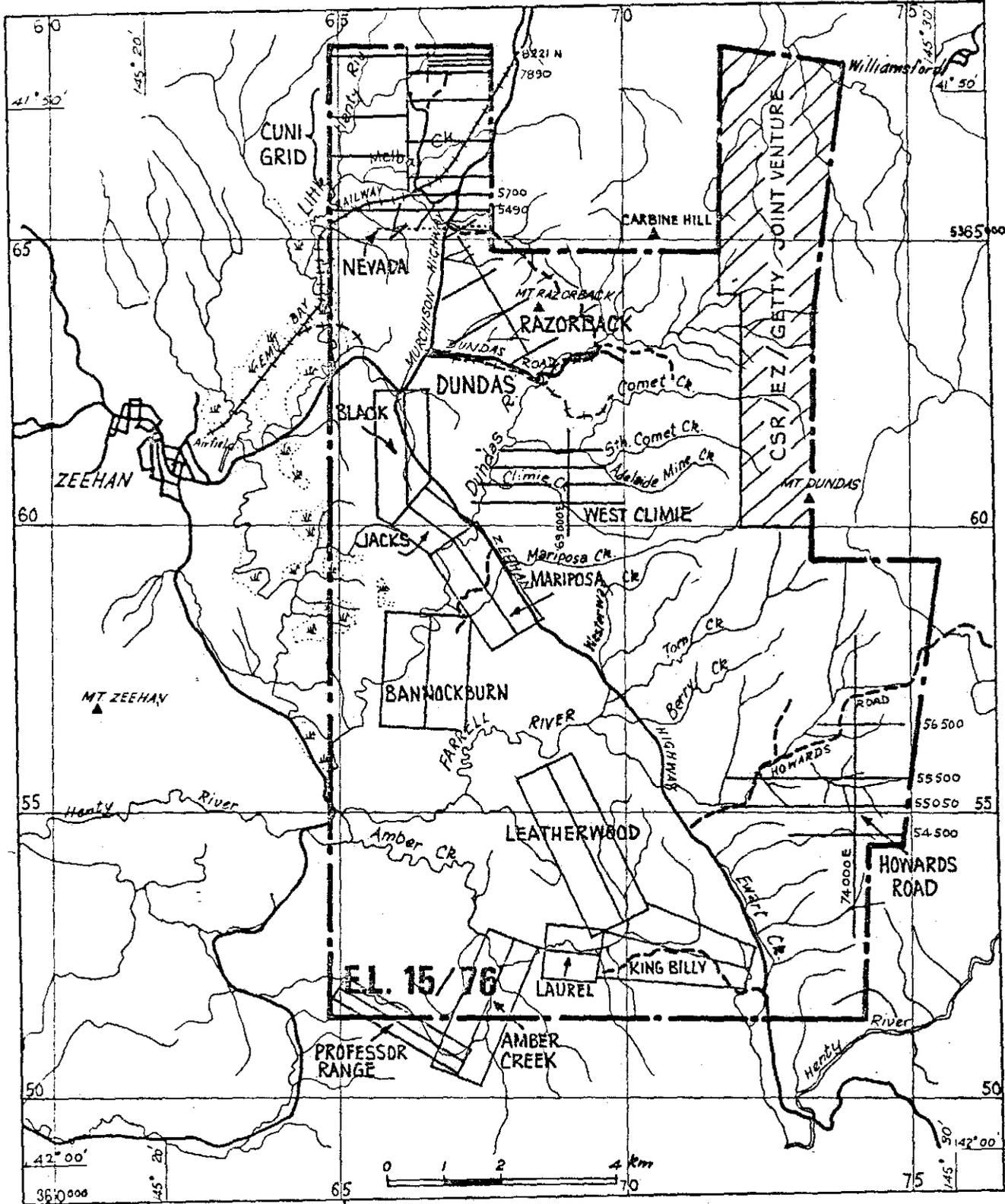
TABLE 3 : PARTICLE SIZE AND ABUNDANCE OF FLUORESCING MINERALS (UV/SW)

<u>SAMPLE NO.</u>	<u>TYPE OF FLUORESCENCE</u>		
	<u>Blue</u>	<u>Yellow</u>	<u>Orange</u>
140007		Abundant, fine	
140009		Abundant, fine	
140015		Abundant, bright	Abundant, medium bright
140017			1 medium, bright
140022			Moderate, medium bright
140025			1 large, bright
140033		2 coarse, many fine, bright	
140036		Many bright	Many medium, bright
140042		Many bright	
140046		Many bright	Many medium, bright
140056		Few fine, bright	
140060			1 medium, bright red
140062			1 medium, bright red
140067	2 medium	Abundant medium and fine, bright.	
140069		Many medium, bright	Many medium, bright
140090		Many medium, bright	Many medium, bright
140092		Many fine, bright	
140187		Abundant, medium, bright	
140189		Abundant, fine, bright	
140216			
140218			
140241		Trace - fine	
140256	2 coarse, dull	1 medium, bright	
140268			
140296	1 medium, pale		
140333			
140336			4 medium
140339	1 large, 4 medium, bright		
140341	1 medium, pale	Minor fine, bright	
140368			
140369		Abundant fine, pale	
140370	1 medium	Few very fine, pale	
140371	1 fine, pale	1 medium	
140205	2 large, pale	2 medium	

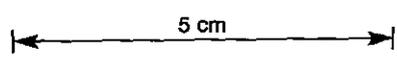
Code : Bright blue (possible yellow tinge) - scheelite. Bright yellow - zircon. Bright orange/red - hematite.

APPENDIX I

122



CSR-AMOCO GRIDS



LOCATION MAP - CSR-AMOCO GRIDS

EL. 15/76 DUNDAS TASMANIA

FIG. 1

APPENDIX II

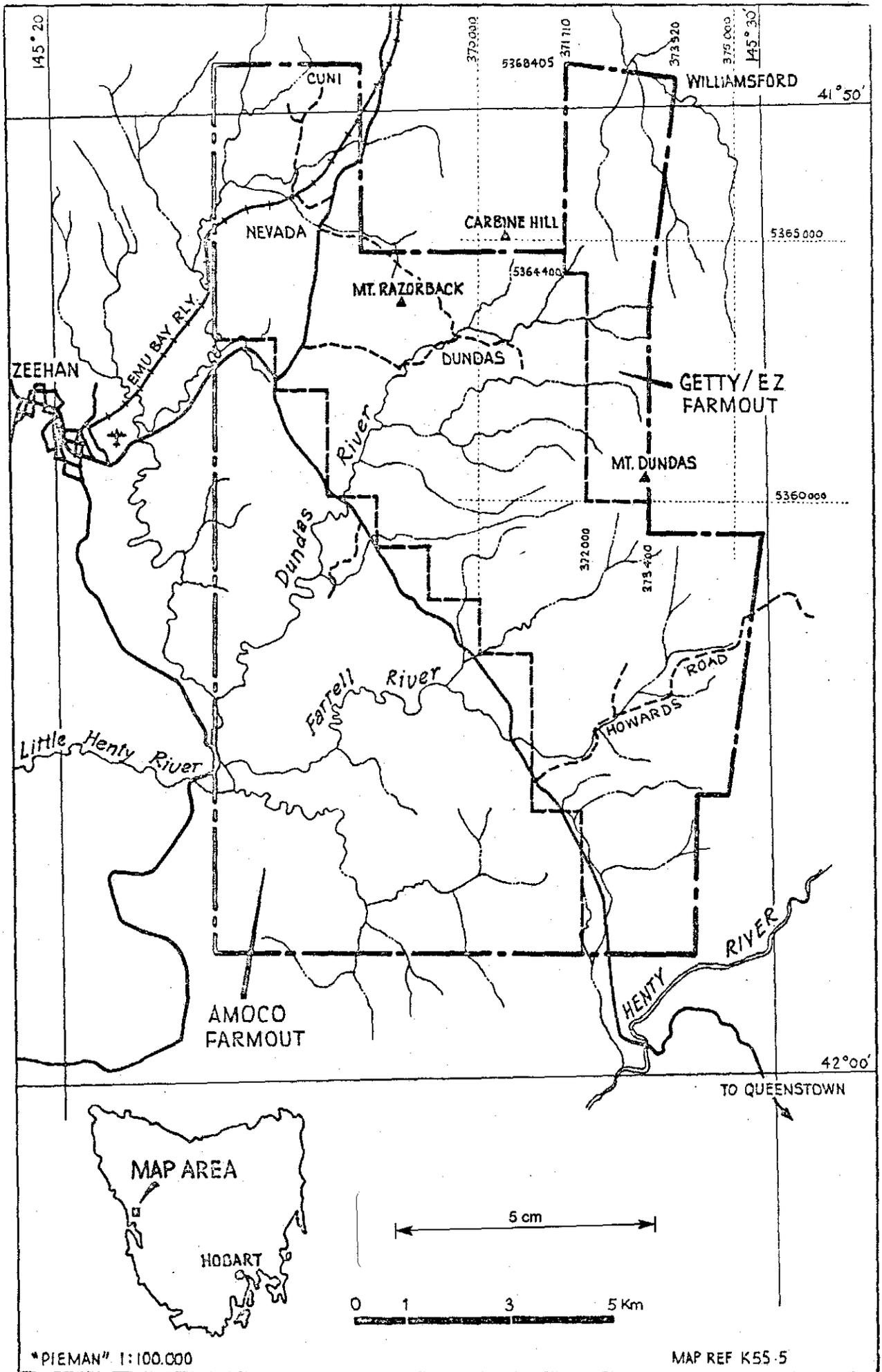


FIG. 3 LOCATION MAP E.L. 15/76 DUNDAS, TASMANIA

APPENDIX III

126

400127

1 O'CONNELL STREET
SYDNEY AUSTRALIA
BOX 483 GPO
SYDNEY AUSTRALIA 2001
TELEPHONE (02) 237 5111
TELEX AA20285
CABLE 'CSRMINDIV' SYDNEY



PURCHASE ORDER 33283

PLEASE SUPPLY TO AND ADDRESS ANY COMMUNICATION OR INVOICE TO:

TO Minpet Services Date 5/11/82
P.O. Box 24, CSR Limited, Minerals Division A/c 602
RUSHCUTTERS BAY Attn. D. Fehon R.A. PET 319
CEA

Item No.	Quantity	Description	Unit Price	Total Pr
1	34	Heavy mineral separation using bromoform or tetra-bromoethane. Clean up for subsequent chemical analysis	7.00	238.
2	34	Binocular description of heavy mineral separates	18.00	612.
3	34	Weighing, specific mineral identification (XRD) report preparation	2.00	64.
Samples A140007P-A140371P as per attached Field Sample Despatch Sheet 13200				

DELIVERY INSTRUCTIONS Please return heavy mineral separates to P.M. Macnamara. Results to (1) Chief Geologist - above Address. (2) P.D. Ellis, 6 William St. WEST HOBART 7000 \$ 914.00

- INSTRUCTIONS**
1. Please show Purchase Order Number on all invoices, packages, packing slips.
 2. Please note that liability is accepted only for goods purchased on our official purchase orders.
 3. The supplier or contractor by his acceptance of this order also accepts the conditions on the back. These conditions shall prevail over and cancel any conditions specified by the supplier or contractor, there shall be no exception to these provisions except by mutual agreement between the parties, evidenced in writing.

WHITE COPY - SUPPLIERS COPY
 YELLOW COPY - ATTACH TO INVOICE
 PINK COPY - TO SYDNEY OFFICE
 GREEN COPY - PURCHASING OFFICER COPY
 BLUE COPY - PROSPECT LEADER COPY

SALES TAX (EXEMPTIONS AND CLASSIFICATIONS) ACT.
 I hereby certify that the above goods are for use in the mining industry in carrying out mining operations and in the treatment of the products of those operations and exemption is claimed under Item 14 in the First Schedule.

For and on behalf of
CSR LIMITED
 INCORPORATED IN N.S.W.

Signature [Signature]

APPENDIX VI

128

FIELD SAMPLE DESPATCH SHEET

13200

State TAS Project 602 Prospect No. 602 Locality _____

CSR Order No. 33253 Date Sampled _____ Sampler _____

Date Despatched _____ Despatcher _____ Despatched per _____

Type of Sample panned concentrates

Lab. Name _____

Sample Number Co-ordinates	From	To	Chemical Analyses (ppm or %)				Remarks
	<u>E/W</u>	<u>N/A</u>					
A140007P	373.97	5354.26	✓				
A140009P	374.04	5353.31	✓				
A140015P	373.52	5354.59	✓				
A140017P	373.17	5354.45	✓				
A140022	374.58	5355.47	✓				
A140025P	373.63	5355.44	✓				
033P	372.57	5355.42	✓				
036P	371.69	5355.46	✓				
042P	370.89	5359.72	✓				
046P	369.11	5359.28	✓				
056P	370.80	5360.58	✓				
060P	369.75	5360.95	✓				
062P	369.76	5361.04	✓				
067P	367.98	5360.57	✓				
069P	367.99	5360.65	✓				
090P	369.64	5359.91	✓				
092P	369.18	5360.32	✓				
187P	369.72	5357.64	✓				
189P	369.59	5357.73	✓				
A140205P	366.12	5365.23	✓				
216P	367.26	5367.50	✓				
218P	366.79	5367.39	✓				
241P	369.83	5361.10	✓				
256	369.88	5362.17	✓				
268	371.07	5362.31	✓				
296	370.11	5363.17	✓				
333	371.40	5363.74	✓				
336	371.34	5363.78	✓				
339	371.35	5363.44	✓				
A140341	369.96	5363.51	✓				602NEV052 Nevada Grnd
368							NEV 602NEV052 Nevada Grnd
369							NEV2/ 1230N ✓ ✓
370							602NEV058 ✓ ✓
371							602594P nte

Instructions to Analyst: (1) heavy mineral separation by bromoform etc
 (2) binocular examination of heavy minerals as in previous studies

Results to: _____

129

400130

APPENDIX V

APPENDIX V

XRD reports from J.F. Riley (Originals are in personal letter form

9th December 1982 (A140256)

Grains of orange/yellow prisms, pleochoric, $z\wedge c 6^\circ$.
Powder pattern indicated crocoite ($PbCrO_4$).

10th December 1982 (A140090)

X Ray diffractometer test on portion of sample.
Chromite - minor component.
Enstatite and diopside - major components.



REFERENCE

- + -20 MESH (SIEVE) DRAINAGE SAMPLES
- o PANNED CONCENTRATE DRAINAGE SAMPLES



400132



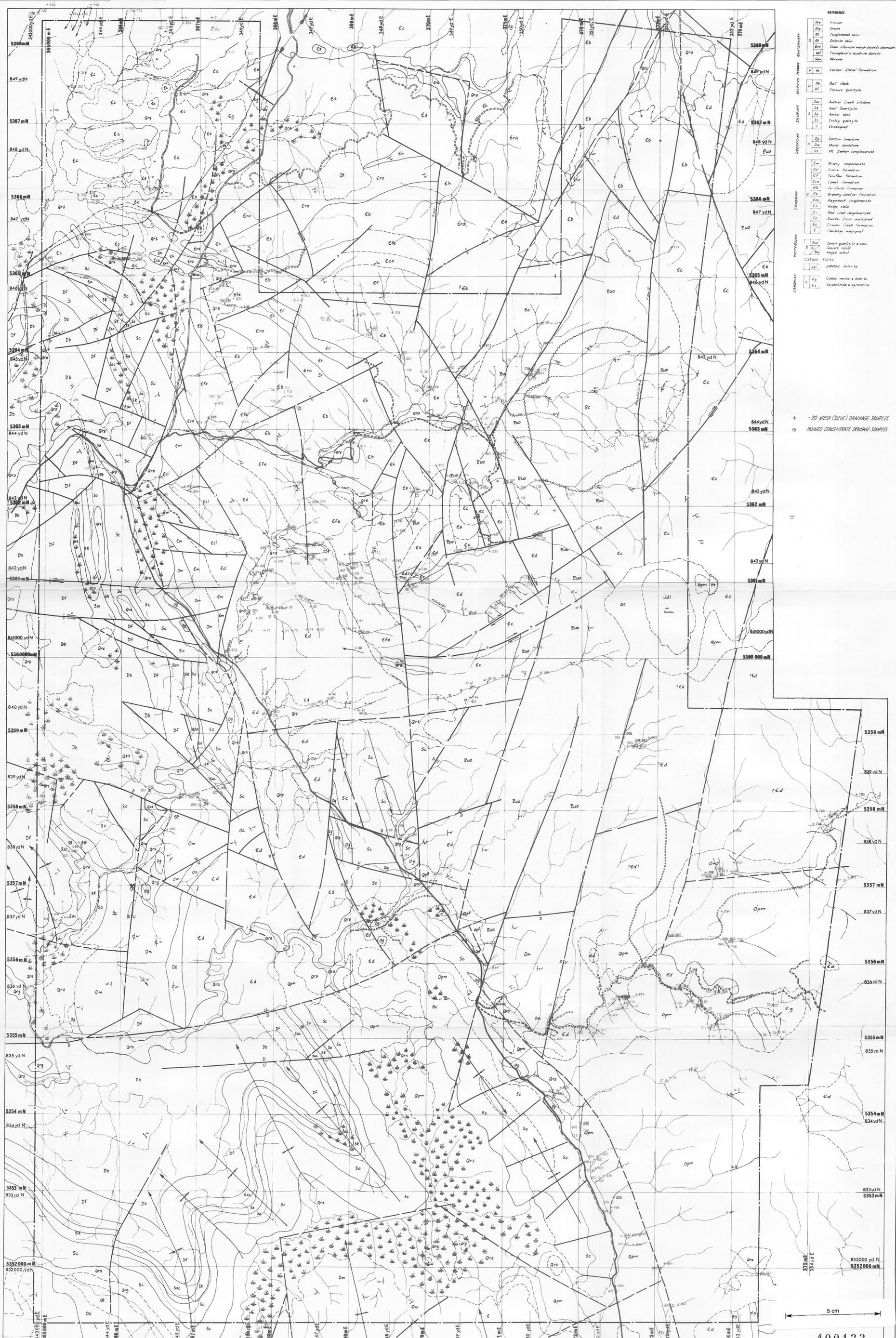
CSR LIMITED - MCD

E.L. 15/76 DUNDAS W. TAS.

GEOCHEMISTRY 131
DRAINAGE SAMPLE LOCATIONS

SCALE : 1:25,000
 DRAWN :
 DATE : APRIL '84
 REVISED :

84-2157
 DRG. No.
K 555-44



REFERENCE

Dr	Alluvium
Dq	Clay
Ds	Claystone
Dt	Claystone with shaly beds
Du	Claystone with shaly beds (claystone)
Dv	Claystone with shaly beds (claystone)
Dw	Claystone with shaly beds (claystone)
Dx	Claystone with shaly beds (claystone)
Dy	Claystone with shaly beds (claystone)
Dz	Claystone with shaly beds (claystone)

DEVELOPMENT

Pa	Zealandia Glacial Formation
Pb	Zealandia Glacial Formation
Pc	Zealandia Glacial Formation
Pd	Zealandia Glacial Formation
Pe	Zealandia Glacial Formation
Pf	Zealandia Glacial Formation
Pg	Zealandia Glacial Formation
Ph	Zealandia Glacial Formation
Pi	Zealandia Glacial Formation
Pj	Zealandia Glacial Formation
Pk	Zealandia Glacial Formation
Pl	Zealandia Glacial Formation
Pm	Zealandia Glacial Formation
Pn	Zealandia Glacial Formation
Po	Zealandia Glacial Formation
Pp	Zealandia Glacial Formation
Pq	Zealandia Glacial Formation
Pr	Zealandia Glacial Formation
Ps	Zealandia Glacial Formation
Pt	Zealandia Glacial Formation
Pu	Zealandia Glacial Formation
Pv	Zealandia Glacial Formation
Pw	Zealandia Glacial Formation
Px	Zealandia Glacial Formation
Py	Zealandia Glacial Formation
Pz	Zealandia Glacial Formation

DEVELOPMENT

Ca	Zealandia Glacial Formation
Cb	Zealandia Glacial Formation
Cc	Zealandia Glacial Formation
Cd	Zealandia Glacial Formation
Ce	Zealandia Glacial Formation
Cf	Zealandia Glacial Formation
Cg	Zealandia Glacial Formation
Ch	Zealandia Glacial Formation
CI	Zealandia Glacial Formation
Cj	Zealandia Glacial Formation
Ck	Zealandia Glacial Formation
Cl	Zealandia Glacial Formation
Cm	Zealandia Glacial Formation
Cn	Zealandia Glacial Formation
Co	Zealandia Glacial Formation
Cp	Zealandia Glacial Formation
Cq	Zealandia Glacial Formation
Cr	Zealandia Glacial Formation
Cs	Zealandia Glacial Formation
Ct	Zealandia Glacial Formation
Cu	Zealandia Glacial Formation
Cv	Zealandia Glacial Formation
Cw	Zealandia Glacial Formation
Cx	Zealandia Glacial Formation
Cy	Zealandia Glacial Formation
Cz	Zealandia Glacial Formation

DEVELOPMENT

Ca	Zealandia Glacial Formation
Cb	Zealandia Glacial Formation
Cc	Zealandia Glacial Formation
Cd	Zealandia Glacial Formation
Ce	Zealandia Glacial Formation
Cf	Zealandia Glacial Formation
Cg	Zealandia Glacial Formation
Ch	Zealandia Glacial Formation
CI	Zealandia Glacial Formation
Cj	Zealandia Glacial Formation
Ck	Zealandia Glacial Formation
Cl	Zealandia Glacial Formation
Cm	Zealandia Glacial Formation
Cn	Zealandia Glacial Formation
Co	Zealandia Glacial Formation
Cp	Zealandia Glacial Formation
Cq	Zealandia Glacial Formation
Cr	Zealandia Glacial Formation
Cs	Zealandia Glacial Formation
Ct	Zealandia Glacial Formation
Cu	Zealandia Glacial Formation
Cv	Zealandia Glacial Formation
Cw	Zealandia Glacial Formation
Cx	Zealandia Glacial Formation
Cy	Zealandia Glacial Formation
Cz	Zealandia Glacial Formation

DEVELOPMENT

Ca	Zealandia Glacial Formation
Cb	Zealandia Glacial Formation
Cc	Zealandia Glacial Formation
Cd	Zealandia Glacial Formation
Ce	Zealandia Glacial Formation
Cf	Zealandia Glacial Formation
Cg	Zealandia Glacial Formation
Ch	Zealandia Glacial Formation
CI	Zealandia Glacial Formation
Cj	Zealandia Glacial Formation
Ck	Zealandia Glacial Formation
Cl	Zealandia Glacial Formation
Cm	Zealandia Glacial Formation
Cn	Zealandia Glacial Formation
Co	Zealandia Glacial Formation
Cp	Zealandia Glacial Formation
Cq	Zealandia Glacial Formation
Cr	Zealandia Glacial Formation
Cs	Zealandia Glacial Formation
Ct	Zealandia Glacial Formation
Cu	Zealandia Glacial Formation
Cv	Zealandia Glacial Formation
Cw	Zealandia Glacial Formation
Cx	Zealandia Glacial Formation
Cy	Zealandia Glacial Formation
Cz	Zealandia Glacial Formation

400133

CSR LIMITED- AMCD

E.I. 15/76 DUNDAS WEST TASMANIA

DRAINAGE SAMPLES & GEOLOGY 132

84-2157

SCALE : 1 : 25,000	DATE	DRG. No.
DRAWN : P.M.M.	REVISED : April '84	K555-45