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HEAZLEWOOD PROSPECT

NORTH WEST TASMANIA

E.L. 21/85

ANNUAL REPORT FOR THE PERIOD ENDING 1.12.86

REPORT NO. 972

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SUMMARY

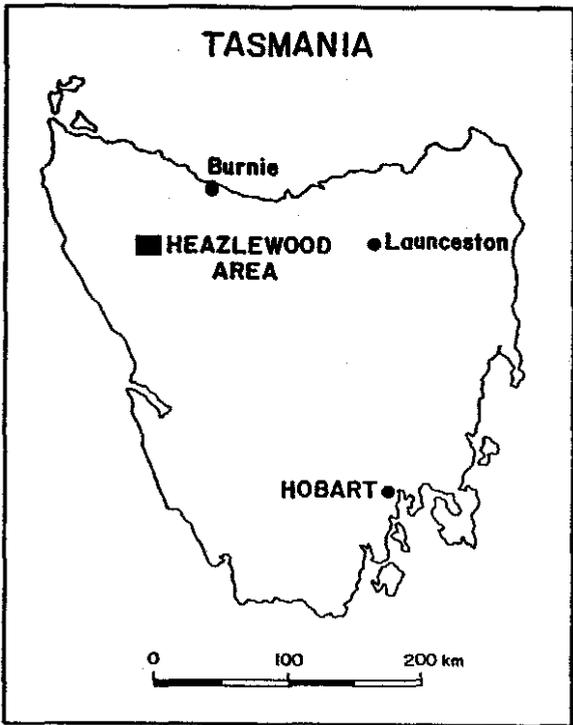
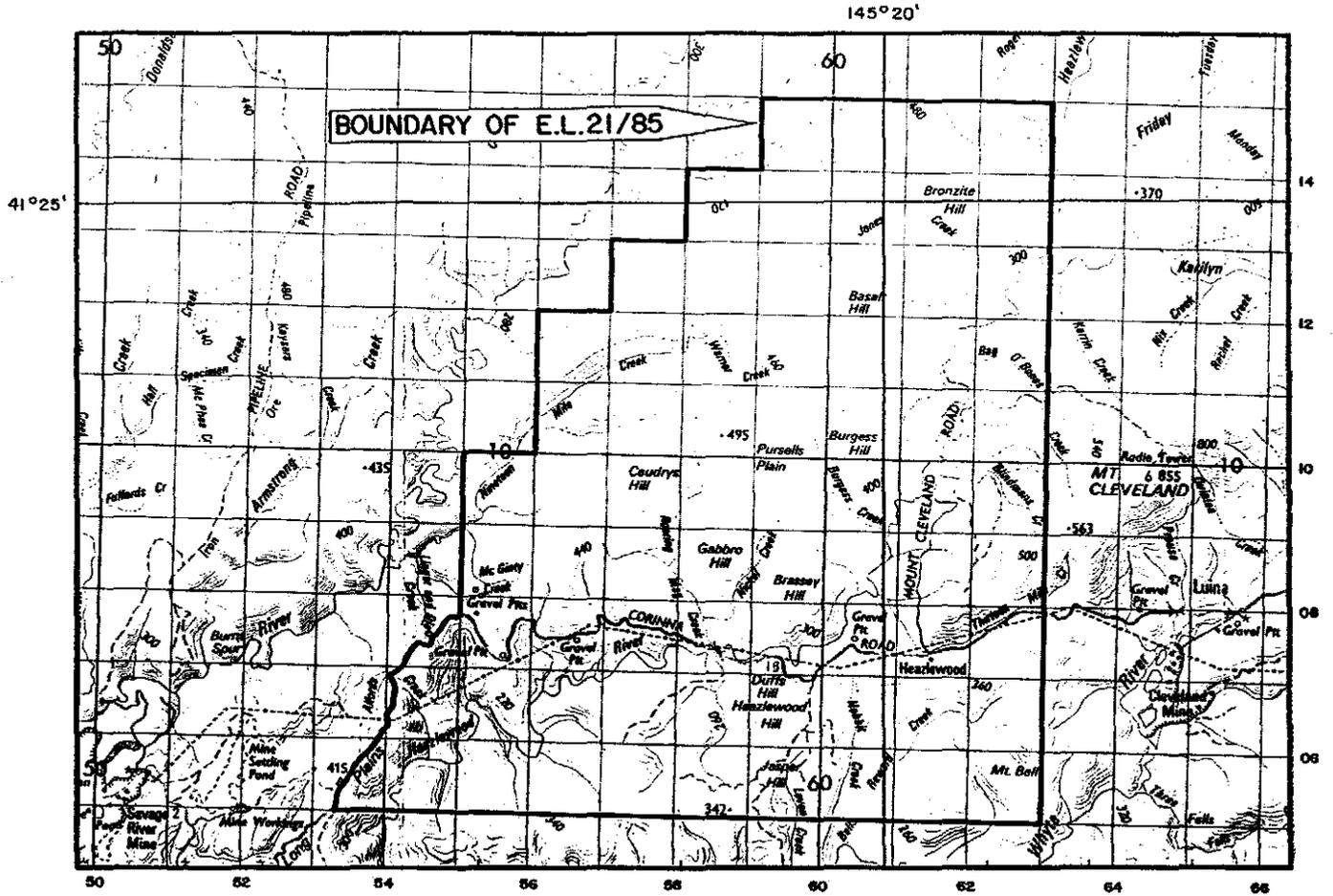
The Heazlewood Igneous Complex has been covered by a broad spaced stream sediment sampling program, the results of which confirm the refractory PGE prospectivity of the western margin of the complex, over an 8 km strike extent.

Analytical problems with the determination of Ir have impeded the project since its inception, and considerable effort has been expended in order to obtain reliable and representative assay results.

The technique used by Analytical Services of W.A. (ICP-MS) would appear the most satisfactory, although the influence of sampling bias has not been quantified to date.

Mapping of the igneous complex at varying scales has shown the broad divisions currently in use in the literature to be generally valid, but that a greater diversity of mafic and ultramafic lithologies are present. The occurrence of highly depleted and refractory melt products in conjunction with plagioclase bearing mafic and ultramafic differentiates of a tholeiitic melt, may have facilitated the formation of PGE sulphides during first and second phase magma mixing.

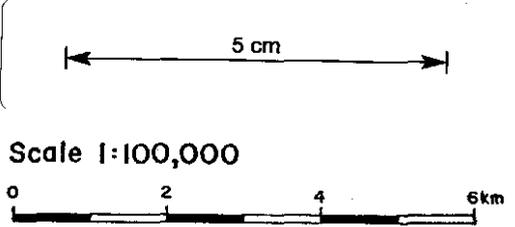
Mineralisation, confirmed or newly discovered in the area includes PGE alloys in the western area, traces of ? hydrothermal PGE in the eastern area, nickel sulphide in both areas, and base metals in the eastern area.



METALS EXPLORATION LTD.

HEAZLEWOOD PROSPECT
N.W. TASMANIA
E.L. 21/85

LOCATION MAP



1. INTRODUCTION

Exploration Licence 21/85 covers an area of approximately 70 km² around the old town of Heazlewood in North West Tasmania. Heazlewood, located almost midway between the mining towns of Savage River and Luina, is situated 65 km southwest of Burnie, as shown in Figure 1.

Access to the area is via the Corinna Road, which commences from the Murchison Highway, 8 km east of the town of Waratah.

The general area is drained by Nineteen Mile Creek (a tributary of the Savage River) in the west, and by the Heazlewood River and its numerous tributaries in the east and south of the licence area.

The topography of the area resembles that of a deeply dissected peneplain with an original (?Tertiary) elevation of 350 to 500 m ASL.

Probable relicts of this surface are present as Caudry's (Bald) Hill, Basalt Hill, Bronzite Hill, and Burgess Hill.

The lithological influence on soil types is further enhanced by the vegetation, which typifies the low altitude - high rainfall climate. The ultramafic rock types are covered by a button grass moor type of flora while the surrounding sedimentary and mafic igneous rocks support a rain forest cover.

This report details the work undertaken in EL21/85 for the twelve month period ended 1.12.86.

2. GEOLOGY

2.1 Regional Setting

The ultramafic complexes of Western Tasmania occur intermittently along a major crustal suture. They lie fault bound within Cambrian sediments or at the boundary between Cambrian and Precambrian rocks (Williams et al; 1975). Numerous cross cutting transcurrent faults have displaced the ultramafic lenses.

The ultramafics throughout the belt display similar geochemical signatures and petrographic characteristics, indicating an origin from a common parent magma.

It is believed that these complexes were emplaced early in the development of the Tasman Geosyncline, into sediment filled troughs formed within and between regions of disrupted Precambrian basement (Williams, 1976).

The Heazlewood Exploration Licence is situated at the northern end of the Dundas Trough in western Tasmania; this basin overlies a basement of Precambrian age (Whyte Schist, Oonah Formation) which is younger than the Adelaidean Rocky Cape Group to the west.

The main sequences in the Dundas Trough here are the late Proterozoic Success Creek Group, conformably overlain by the late Proterozoic - early Cambrian Crimson Creek Formation; the Dundas Group and the Mt. Read Volcanics are absent.

The successions in the general area have been intruded by igneous rocks of diverse origin and composition, including intermediate, basic and ultrabasic rocks of the Cambrian Heazlewood Igneous Complex, and acidic rocks of the Devonian Meredith Granite.

In addition, basic to intermediate volcanics are interbedded with the Crimson Creek Formation, and late Cambrian quartz diorite stocks cut the ultramafic rocks.

2.2 Heazlewood Igneous Complex

This assemblage of rocks includes the previously described Heazlewood Ultramafic Complex and in addition many of the basic, intermediate ("dacitic") intrusives and extrusives are now believed to be related to the ultramafic rock types.

The Heazlewood Igneous Complex extends for 15 km in a north-north easterly direction, and is 5 km across at its widest point. Further outcrop of serpentinite, peridotite and related rocks are found in the Wilson River area south of Heazlewood and it is believed that the two areas of ultramafic rock represent a continuous belt that has been later intruded by the Meredith Granite.

The ultramafic portions of the complex consist of partly serpentinitised, faulted, layered, and differentiated masses with sheared and deformed margins; they consist of a layered dunite sequence forming the western side, and layered harzburgite and pyroxenite sequences over the balance of the complex. The central and eastern sequences have been intruded by gabbro and dolerite dykes and sills, and covered by basaltic lavas of the third stage (Brown et al 1980).

The dolerites and basalts are mainly quartz tholeiites, but include high magnesian andesites (i.e. the third and second stage volcanics of Brown and Waldron, 1982).

Layering styles and textures in the ultramafic rocks imply cumulate origins in relatively quiet magma chambers.

The olivine tholeiites (first stage volcanics) are considered to have had ultramafic cumulate phases represented by the layered harzburgite and pyroxenite sequences, while the second stage volcanics are regarded as having cumulate phases represented by the dunites (A.V. Brown pers. comm.).

2.3 Platinoid Mineralisation

2.3.1 General

Alluvial platinum group element (PGE) alloys, (usually termed osmiridium), were discovered by the prospector McGinty in Nineteen Mile Creek, west of Bald Hill in 1884. Subsequent alluvial workings included Warners, Free and Easy, Jones and Burgess Creeks in the general vicinity of Nineteen Mile Creek.

The PGE detrital grains occur in association with gold, chromite and minor cassiterite, and ranged in size from 0.1 gm to \pm 100 gm. Chromite was seen to either enclose, or be intergrown with the PGE, and the rare grains of Pt were always found to be attached to gold grains.

In 1912, W. Caudry discovered PGE grains in an altered peridotite with minor talc and magnesite, on the west side of Bald Hill (Twelvetrees 1914, Reid 1921.)

The grade of the lode in Caudry's mine apparently ranged from \pm 70 g/t to 2024 g/t of PGE (with an exceptional single assay of 100,000g/t).

Pur^Ssell's Mine was also developed on in situ PGE in a blue (?hellyerite) green serpentinite, cut by magnetite and sulphide veinlets; the latter consisted of pyrite and nickeliferous pyrrhotite (?pentlandite).

The distribution of PGE in this deposit was considered to be extremely erratic.

In the Mt. Stewart area (south of Bald Hill), grains of Ir-Os were found embedded in a matrix of Ru, Ir and Os sulphides.

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TABLE 1 Western Dunites: Assay Results

Analysis	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Sample No.	Ru	Rh	Pd	Pt	Os	Ir	Au	Re
210697	BLD	2	BLD	5	BLD	1.5	1	BLD
698	BLD	2	BLD	5	BLD	0.6	8	BLD
702	5	BLD	BLD	5	BLD	0.6	4	BLD
715	15	BLD	BLD	10	BLD	0.4	1	BLD
720	BLD	BLD	BLD	8	BLD	0.4	1	BLD
738	BLD	1	BLD	17	BLD	0.6	1	BLD
743	BLD	1	BLD		BLD	0.4	1	BLD
757	BLD	1	BLD	5	BLD	0.5	3	BLD
762	BLD	1	16	5	BLD	0.4	3	BLD
772	BLD	BLD	BLD	5	BLD	0.5	36	BLD
781	15	BLD	BLD	44	BLD	3.6	5	BLD
788	20	BLD	BLD	5	BLD	0.4	3	BLD
790	BLD	BLD	BLD	5	BLD	0.7	2	BLD
791	BLD	BLD	BLD	5	BLD	0.5	1	BLD
792	15	1	23	7	3	1.8	3	BLD
794	BLD	BLD	8	5	BLD	0.8	1	BLD
796	20	BLD	BLD	BLD	BLD	0.2	1	BLD
797	BLD	BLD	7	BLD	3	8.9	1	BLD
798	5	BLD	5	5	BLD	0.5	3	BLD
799	BLD	BLD	10	BLD	BLD	2.3	1	BLD
800	BLD	BLD	BLD	BLD	BLD	1.9	4	BLD
801	BLD	BLD	BLD	9	BLD	1.3	1	BLD
802	BLD	BLD	BLD	BLD	BLD	1.1	1	BLD
803	5	1	BLD	7	BLD	0.7	13	BLD
210702 dup.	20	BLD	BLD	BLD	BLD	0.4	2	BLD
210802 dup.	13	1	BLD	5	BLD	2.8	1	BLD
Detection Limit	<5	<1	<5	<5	<3	<0.2	<1	<5

dup = duplicate sample

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2.3.2 Distribution and Chemistry of the Platinoids

A strong association between the dunites and the platinum group minerals was first noted by Twelvetrees (1914). Since then it has been shown that the olivine inclusions in the platinum group minerals are Fo 94-89 in composition and that olivines which are this magnesian in the ultramafic rocks of the Heazlewood Igneous Complex are only found in the dunites. The olivines from the layered sequence overlying the dunites (i.e. olivine pyroxenites) are more Fe-rich (Fo 88-79).

In the Heazlewood area the largest producing alluvial placer deposits were in the Nineteen Mile Creek, which drains the outcrop of the tectonized dunite sequence.

Ford (1981) showed that the platinoids from Bald Hill area are relatively ruthenium rich, and occur as rutheniridosmine (Ru-Ir-Os), with minor iridosmine (Ir-Os); minor Pt rich alloys occur, namely the alloy rhodian iron platinum (Rh-Fe-Pt).

In summary, the following modes of occurrence exist for the PGE in the Bald Hill area.

- a. Free Ru-Ir-Os grains.
- b. Ru-Ir-Os enclosed by chromite.
- c. Pt-Au, and Rh-Fe-Pt alloys.
- d. Ru-Ir-Os-Au alloys
- e. Ru-Ir-Os sulphides.

2.3.3 Comment

As previously mentioned olivine inclusions within the platinoid grains are the high magnesian variety forsterite (Fo. 94-89). Roeder and Emslie (1970) have related olivine composition to temperature and indicated temperature for crystallisation of Fo olivine from basaltic magmas to range up to 1700°C. Crystals of this composition occurring as inclusions within iridosmine grains indicate formation temperature for the platinum group minerals to be much lower than that for the molten alloy.

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3. WORK COMPLETED

3.1 Introduction

Exploration activities completed during the first year of the licence include a literature review of Mines Department records, logging of drill core, grab/chip sampling, stream sampling, and mapping, both photo and grid controlled.

3.2 Reconnaissance Sampling

Reconnaissance grab sampling of some of the old workings, along the west side of Caudry's Hill was completed.

A total of twenty four samples were dispatched to Nuclear Activation Services in Canada with sample preparation being completed by S.G.S. in Sydney.

The samples were analysed for ruthenium (Ru), rhodium (Rh), osmium (Os), iridium (Ir), rhenium (Re), platinum (Pt), palladium (Pd) and gold (Au) using the neutron activation technique which involves the classical fire assay collection of PGE followed by neutron activation analysis of the dore bead.

The results are presented in Table 1.

The results of this initial sampling were disappointingly low, with most elements occurring in the low part per billion range. Due to the delicate nature of P.G.E. analysis it was decided to assay splits from six samples analysed via neutron activation, for alternative analysis by inductively coupled plasma-mass spectrometry (ICP-MS). This method involved a fire assay style of preconcentration utilising a nickel sulphide collector, following which the PGE sulphides were digested in aqua regia and in preparation for final determinations. The results of this comparative exercise are shown in Table 2, where it can be seen that the two methods provide compatible results for some of the PGE, (mainly Ru, Ir and Rh), but not for Pt and Pd.

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TABLE 2 Comparison of Analyses by Neutron Activation and I.C.P. Techniques

Sample Number	Ru	Rh	Pd	Ir	Pt
210509 N	24	1	16	7	BLD
210509 I	5.2	0.47	0.5	5.7	1.6
210535 N	BLD	1	18	38	BLD
210535 I	13	1.1	1.1	38	6.8
210615 N	30	1	BLD	3.1	20
210615 I	4.3	0.67	0.4	3.7	1.7
210627 N	BLD	1	BLD	42	27
210627 I	15	1.3	0.7	17	1.7
210781 N	15	BLD	BLD	3.6	44
210781 I	17	3.5	0.5	4.0	33
210792 N	15	1	23	1.8	7
210792 I	4.0	0.57	0.3	2.3	3.3

N = Assayed by Neutron Activation
I = Assayed by I.C.P./Mass Spectrometry

Nb: Samples 210781, 210792 are from Heazlewood District, while the remainder are from Adamsfield.

3.3 Stream Sampling

A broad stream sediment sampling program covering the entire igneous complex north of the Corinna Road was completed with the collection of 66 samples.

The method of collection of the Heazlewood stream samples differed from that used at Adamsfield in December 1985, in that a variation of the old loaming technique (for soils) was adopted. The technique involved the collection of 3 to 5 sub-samples (as partial heavy mineral concentrates) spread over about 0.5 km of stream length, which were then combined into a single sample weighing approx. 1 kg.

A reference sample weighing 100g was also collected.

The effectiveness of this method has yet to be fully assessed, although preliminary results indicate it to be a viable technique. A total of 13 samples contained visible osmiridium as follows:

Samples 2 and 38:	near Caudry's Prospect
" 5,6,9,16,19:	tributaries to 19 Mile Creek, including Fenton's Prospect.
" 39, 41, 43,48:	Jones Creek, north east of Basalt Hill
" 50	near Bronzite Hill
" 47	Nickel Creek, west of Brassey Hill

The stream sampling has thus confirmed the prospectivity of the Caudrys-Fenton Prospects interval of the 19 Mile Creek dunites and has extended this interval of 4 km out to 8 km as far as Bronzite Hill at the north east extremity of the dunites.

Sample 38 was collected differently to the remainder, namely by the meticulous retrieval of silt and sand size grains from the bottom of a pot hole in the creek. This technique yielded 30 grains of osmiridium and 4 of gold from 2 pan fulls of sediment. All the heavy minerals were approx. pinhead size.

Sample values for Ir, Au, Pt and Pd are shown in Table 3 and sample locations are depicted in Figure 2.

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TABLE 3

Sample	Au	Ir	Pt	Pd	Sample	Au	Ir	Pt	Pd
HZSS01	<0.005	<0.01	0.010	<0.001	HZSS34	<0.005	<0.01	0.004	<0.001
02	"	"	0.009	"	35	"	"	0.002	"
03	"	"	0.007	"	36	"	"	0.002	"
04	0.005	"	0.010	"	37	"	"	0.002	"
05	<0.005	"	0.015	"	38	0.005	(68.0)	-	-
06	"	"	0.020	"	39	<0.005	<0.01	0.001	<0.001
07	"	"	0.006	"	40	"	"	0.010	0.005
08	"	"	0.025	"	41	"	(12.0)	0.004	<0.001
09	"	"	0.015	"	42	0.005	<0.01	0.025	"
10	"	"	0.005	"	43	<0.005	"	<0.001	"
11	"	"	0.007	"	44	"	"	0.009	"
12	"	"	0.020	"	45	0.005	"	0.004	"
13	"	"	0.070	"	46	"	"	<0.001	"
14	"	"	0.025	"	47	<0.005	"	<0.001	"
15	"	"	-	-	48	"	"	0.005	0.005
16	"	(21.0)	0.015	0.002	49	"	"	0.003	<0.01
17	"	<0.01	0.024	<0.001	50	"	"	0.007	"
18	"	"	0.006	"	51	"	"	0.010	"
19	"	"	<0.001	"	52	"	"	0.008	"
20	"	"	0.005	"	53	"	"	0.010	"
21	"	0.09	0.045	"	54	0.005	"	0.004	"
22	"	<0.01	0.002	"	55	0.010	"	0.004	"
23	"	"	0.004	"	56	<0.005	"	0.003	"
24	"	"	0.003	"	57	"	"	<0.001	"
25	"	"	0.020	"	58	"	"	<0.001	"
26	"	(19.0)	0.035	"	59	"	"	0.002	"
27	"	<0.01	0.005	"	60	"	"	0.001	"
28	"	"	0.002	"	61	"	"	0.015	0.006
29	"	"	0.006	"	62	"	"	0.015	0.006
30	"	"	0.004	"	63	"	"	0.002	0.005
31	"	"	0.002	"	64	"	"	0.001	<0.01
32	"	"	0.006	"	65	"	"	0.015	"
33	"	"	0.004	"	66	"	"	0.006	"

Ir values shown in brackets - assayed by Alex Stewart, all other Ir (and the Au, Pt, Pd) values assayed by AMDEL.
All values in g/t

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3.4 Mapping

3.4.1 Introduction

Mapping by Rubenach (1973) showed the presence of three major rock groupings in the Heazlewood Igneous Complex, viz:
the Nineteen Mile Creek Dunites (on the western side)
the Bald (Caudry's) Hill Pyroxenites (in the south centre), and
the Brassey Hill Harzburgites (on the eastern side).

The current program of mapping has involved initial regional scale mapping using air photo interpretation (Figure 3), detailed mapping using enlarged air photos (Burgess and Brassey Hill sheets, Figures 4 and 5), grid controlled mapping (Caudry's Prospect, Figure 6), and uncontrolled mapping (South Fentons Area, Figure 7).

The Burgess and Brassey Hill map sheets cover the Brassey Hill Harzburgites (eastern area), with minor coverage of the other two groups, while the Caudry's and South Fentons area maps cover the Nineteen Mile Creek Dunites (Western area).

3.4.2 Lithologies

Western Area

Mapping at the Caudry's Prospect and in the South Fentons area (Figures 6 and 7) indicates the presence of dunite, orthopyroxenite, olivine orthopyroxenite, lherzolite (tectonite)? harzburgite and chromitite. The dunite and orthopyroxenite may be either massive or complexly interlayered, and the chromitite occurs as small lenses.

At the abandoned Caudry's workings, inspection of the material worked in the Leech Shear shows it to be a soft, slickensided white to yellowish green talcose, serpentinite, derived from rock rich in olivine and orthopyroxene. Petrographic examination of this material suggests it may have been a harzburgite, consisting essentially of olivine and bronzite, however it now consists dominantly of crysotile, lesser bronzite, remnant olivine, minor chromite and secondary magnetite.

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Eastern Area

Mapping of the Burgess Hill - Brassey Hill area (Figures 4 and 5) indicates the presence of harzburgite (variably granular, poikilitic and plagioclase bearing), dunite (+/- plagioclase), troctolite, anorthosite, orthopyroxenite (+/- olivine +/- chromite), chromitite, gabbro/norite, dolerite, and quartz diorite (shown as plagiogranite on Figures 4 and 5).

Minor lherzolite (variably poikilitic and plagioclase bearing) is also present on the southern flank of Brassey Hill. The rock types in the eastern portion of the complex are both more numerous and more complicated in their modes of occurrence; many have transitional and interlayered relations with adjacent lithologies (e.g. troctolites grade in to interlayered dunite/harzburgite/pyroxenite). Petrographic descriptions of samples from both areas are contained in Appendix 1.

3.4.3 Structure

The regional structural interpretation presented in Figure 3 shows two main groups of linears to occur

- a NE SW group representing magmatic layering and unit boundaries, and
- a NW SE group of fractures.

Other major linears trending N-S and W-E in the western area also appear to be fracture directions.

Regional airborne electromagnetic data (DIGHEM II, flown in 1980) also defines major linears, separating the complex into major geological domains.

The largest NW-SE trending linears are those present in the valley of Burgess Creek, and the Brassey-Gabbro Hill linear, which the mapping has shown to consist of a 0.5 km wide group of sheared zones.

This latter feature appears as the faulted contact between the Bald Hill Pyroxenites to the south, and the Brassey Hill Harzburgites to the north and east. In the vicinity of Caudry's workings, the main PGE mineralised shear zone (the Leech Shear) trends 310° - 320° , while the Caudry's Shear trends 090° .

On a local scale, the regional lineaments are manifest as strong jointing and shear zones

which vary in intensity according to the proximity to the axes of deformation, nature of host rock, etc. As a rule, the faults and shear zones exhibit a generally high degree of serpentinization, and as such have controlled the drainage system throughout the region.

Previous mapping by Rubenach (1973) has outlined a broad anticlinal structure trending north-east along Bald Hill.

Mapping of the eastern area, north of Brassey Hill has revealed both NW and NE trending folds, the regional significance of which has yet to be fully assessed.

Recent mapping at Caudry's Prospect has shown the facing of the interlayered dunite-pyroxenite sequences to be to the south east, a feature which if regionally significant would indicate either tighter folding than recognised to date, or overturning of the Bald Hill anticline.

3.4.4 Metamorphism

All rock units have suffered serpentinisation to some degree, with the massive pyroxenites being the least affected. Serpentinisation is most strongly developed along major fault zones, fractures and shears, which often separate distinct rock units.

Typical alteration products of the most common minerals are as follows:

Olivine - serpentine, magnetite
Orthopyroxene - serpentine, chlorite, talc, uralite
Clinopyroxene - as above, plus sericite
Plagioclase - saussurite, hydrogarnet, clays, sericite
Chromite - hematite, uvarovite, magnetite.

An unusual altered rock termed silica carbonate has been found on the southern and eastern flanks of Brassey Hill, and appears as the result of extensive replacement of both mafic and ultramafic lithologies. The carbonates present include magnesite and siderite and the ultramafic origin of some of these rocks is indicated by relict chromites, and minor orthopyroxenes.

4. GEOPHYSICS

A review of previous work by Comstaff Pty. Ltd., with emphasis on the DIGHEM survey flown in 1980, was performed by consulting geophysicist, D. Trussel.

The DIGHEM data was collected on flight lines 200m apart, an average bird height of 45 m, and an effective depth of search of 90 m.

A total of eight EM responses were considered anomalous in the ultramafic rocks, namely 5A, 17C, 19C, 19K, 21G, 23B, 31E and 44A.

These anomalies were located in the field, and in the majority of cases were seen to be situated in either fracture or shear controlled drainage channels.

Accordingly, in a region where topographic relief varies by 200 m, those anomalies located at distances in excess of 135 m below the bird (or 100 m below the average maximum elevation), are considered spurious. Other DIGHEM anomalies sourced from the search depth, are considered to be due to either saline water or alteration products (clays) in fault zones. Prior to the discovery of the sulphides near Fenton's Prospect, the DIGHEM technique was deemed unsatisfactory for the location of the PGM disseminations in the host ultramafics.

Consequently, certain anomalies will require re-assessment in terms of their suitability for ground EM coverage.

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5. MINERALIZATION

5.1 Platinoid Group Elements (PGE)

The western portion of the Heazlewood igneous complex is well known for its production of "osmiridium" from both alluvial and hardrock sources.

All the available evidence points to the Nineteen Mile Creek Dunites as being the host rocks for the osmiridium (PGE), although the actual styles of this PGE mineralization have yet to be rigorously established.

Possible modes of occurrence include:

- 5.1.1 Chromitite hosted PGE
- 5.1.2 Nickel sulphide hosted PGE
- 5.1.3 Olivine (dunite) hosted PGE
- 5.1.4 Hydrothermal introduction (?remobilization) of PGE.

The best exposed hard rock workings are present at Caudry's prospect, discovered by W. Caudry by loaming up the hill on the north side of McGinty Creek. The osmiridium was mined from a north west trending sheared zone, although adits driven in an easterly direction suggest a further group of shears. The material (?ore) worked in the main (Leech) shear consists of blue grey talcose serpentinite, associated with magnesite and opaline silica.

However, the minor steatitisation and carbonate alteration (?associated with the shearing), in conjunction with some locally elevated Au values in grab samples of ultramafic rocks in the general area, hint at minor gold mineralization also.

Possible hydrothermal concentrations of PGE occur in silica carbonate rocks in the eastern area, with the following maximum values.

Cu - maximum value	0.13%
Pb - "	0.76%
Zn - "	5.70%
As - "	0.12%
Sb - "	280 ppm
Ni - "	0.18%
Au - "	70 ppb
Pt - "	40 ppb
Pd - "	42 ppb

020

The PGE potential of the eastern area is still being assessed, and preliminary results of chromite analyses from Chromite Ridge (west of Burgers Hill) indicate a more iron rich and less refractory composition compared to those in the western area.

5.2 Nickel

The type locality for heazlewoodite (Ni_2S_3) is in the Lord Brassey mine on the summit of Brassey Hill. Other evidence of nickel mineralisation in the same area occurs in the form of zaratite and helyerite, and the heazlewoodite is clearly shear hosted (and related?). A likely genesis for this mineralization would involve sulphur bearing serpentinising? fluids which were channeled into the shear after reaction with silicate - shed nickel.

A different type of nickel mineralization occurs in a dunite breccia on Fentons knob in the western area; the matrix to the breccia is formed of pentlandite and the evidence in favour of either a magmatic or secondary origin is contradictory.

Sampling and analyses of this breccia has returned grades of 0.35% to 1.23% Ni, but with only very low values of Pt and Pd.

A bulk (channel) sample from the Lord Brassey Mine returned a value of 7.66% Ni, but with only low PGE values.

Pentlandite has also been observed in silica carbonate rock in association with galena and sphalerite, and appears as an example of hydrothermally mobilised nickel.

5.3 Chromite

As indicated in section 5.1, only limited analytical data for chrome bearing spinels is available at present, the Nineteen Mile Creek Dunites appear to host the most Cr rich spinels, and Chromite Hill consists of dunite with 5-20% chromite. Elsewhere, as Chromite Ridge, both troctolite and anorthosite host chromites.

5.4 Base Metals

Silica carbonate altered mafic and ultramafic rock types frequently carry visible sphalerite-galena-pyrite-chalcopyrite, and a Devonian age for the metasomatism is suspected. minor pyrite and chalcopyrite occur in the dolerites

021

(late stage sills?) and minor chrysocolla is present in a harzburgite 750m NE of Brassey Hill.

Maximum values of Cu, Pb, Zn etc. are shown in Section 5.1.

022

6. DISCUSSION

6.1 PGE Assay Assessment

Following the poor reconciliation of visible osmiridium with analytical Ir data for the stream samples, this company has embarked on a major program of PGE analysis assessment.

Platinoid group element (PGE) analytical techniques appear to be reasonably well tested for Pt, Pd and Rh, but not for Os, Ir and Ru. This company has conducted extensive investigations into analytical methods for Os and Ir, with the object of obtaining reliable analyses, and these studies are continuing.

Commercial laboratories and other organizations used to analyse drill core (Adamsfield), stream samples (Heazlewood) and artificial (or spiked) stream samples, are as follows:

- Australian Mineral Development Laboratories (AMDEL) Australia
- Alex Stewart Assayers Ltd. UK
- Johnson Matthey Technology Centre UK
- Resource Development Group Australia
- Neutron Activation Services Canada
- Genalysis Laboratory Services Pty. Ltd. Australia
- Australian Metallurgical & Testing Consultants Pty. Ltd. (AMTEC) Australia
- Central Mineralogical Services Australia
- Analytical Services (W.A.) Pty. Ltd. UK
- *Robertson Research International UK
- *Comlabs Pty. Ltd. Australia

(*Analyses in Progress)

Preliminary assessment of the results obtained to date are that most laboratories do not have satisfactory techniques for determining the elements Os and Ir, the exceptions being:

- (1) Analytical Services - probably satisfactory results for both Os and Ir, for both core and stream samples;
- (2) Neutron Activation Services - probably satisfactory results for Ir only (core samples);
- (3) AMDEL - probably satisfactory for Ir only in core samples, but very erratic for the stream samples;
- (4) Alex Stewart Assayers Ltd. - probably satisfactory results for Ir only in stream samples.

603

The most promising development in PGE analyses may be the method recently registered with Comlabs Pty. Ltd. by a Canadian organisation; the method involves bulk leaching using a cold chlorine based reagent, ozone induced oxidation, extraction of the PGE chlorides with an organic solvent, and finished with carbon rod/AAS.

6.2 Brassey Hill Harzburgites

The recent program of mapping has confirmed the observation made by Rubenach that this group of rocks contained some plagioclase bearing units.

However, the feldspar is widespread, ranging in content from \approx 5% in plagioclase bearing dunites and harzburgites, to higher levels in troctolites, gabbros and anorthosites. Current modelling, as an aid to assessing the PGE potential of the eastern area, suggests these feldspar bearing rocks may be formed as a result of mixing of first stage melts with second stage melts.

Pending the analytical results of a large suite of samples, further comments on sulphur saturation levels and PGE content cannot be made at present.

EXPENDITURE STATEMENT

I, IAN RAYMOND HOLZBERGER OF 4 LIDDELL HEIGHTS LEEMING, in the STATE OF WESTERN AUSTRALIA, do solemnly and sincerely declare:-

THAT an amount of \$83,815 has been expended on Exploration licence No 21/85 Heazlewood during the twelve month period to November 30 1986 and is made up as follows:

	\$
Technical Services	49,730
Air Photos and Mapping	3,766
Assays	5,648
Drafting	119
Field expenses	1,147
Freight	469
Power	178
General Expenses	3,199
Vehicle Costs	3,537
Metallurgical Test work	1,547
Petrology	1,926
Communications	153
Tenement Administration	610
Travel and Accomodation	2,900
Contractors/Labour	5,777
Leases Expenses	271
Site Preparation	2,560
Legal Expenses	278
	<hr/>
Total	83,815
	<hr/>

And I make this solemn declaration conscientiously believing the same to be true and by virtue of the provison of an Act of Parliament of Western Australia rendering persons making false declaration punishable for wilful and corrupt perjury.

Ian R Holzberger

Declared before me at Perth)
this 9th day of January 1987)

g/expst/lyb
hwdexpst

Brian R Crowder
BRIAN R. CROWDER
COMMISSIONER FOR DECLARATIONS

025

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HAZLEWOOD RIVER COMPLEXSAMPLE NO. 8646 - 201

(Upper reaches of Baring Meg Creek)

MINERALOGY

	(%)
Olivine -	70
Plag -	20
Opx -	5
Cpx -	<5
Chromite -	<1
	100

TEXTURE

Medium-grained, with serpentinized cumulate olivine (subrounded) encompassed by patchy, anhedral interstitial plagioclase, and less commonly surrounded by subhedral opx or cpx oikocrysts. Serpentinized olivine is characterized by anastomosing network of serpentine fibres yielding a mesh-like texture. Sample is cut by thin serpentine veins, some of which are probably chrysotile.

Hand sample displays spindly weathering surface due to differential weathering (plagioclase being more resistant)

- Alteration
- Olivine → Serpentine (partial)
 - Plag → Clays (total)
 - Pyroxenes → Chlorite (partial)
 - Pyroxenes → Serpentine (minor)

PARAGENESIS

Olivine + Chromite (cumulus)



Opx, Cpx, Pl (post-cumulus)

SULPHIDES

- v.f.g (<10 μm) highly reflective opaque
- white in reflected light
- evenly disseminated in trace amounts in serpentinized zones.

LITHOLOGIC NAME (I.U.G.S.)

Troctolite (pyroxene-bearing)

HEAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646 - 202
(Fenton's Spur)

<u>MINERALOGY</u>	<u>%</u>
Olivine	- ≈ 60%
Cpx	- ≈ 30%
Opx	- ≈ 10%
Chromite	- trace
	100%

TEXTURE Medium-grained serpentized sample in which primary textures are not obvious. Largest grains ^(pyroxenes) are < 4 mm. Evidence of rigid rotation of olivine subgrains given by slight variation in extinction positions. Serpentized zones are best developed in the alteration halos around olivine cores. Olivine grains were probably ≈ 1mm in size prior to alteration + slight rigid rotation.

Hand sample characterized by massive appearance, with black serpentinite intergrown to greenish brown altered pyroxene.

<u>Alteration</u>	
Olivine	→ Serpentine (partial)
Opx, Cpx	→ Serpentine (partial)
Chromite	→ Magnetite (rims + along fractures)

PARAGENESIS Olivine + Chromite (cumulus) (?)
↓
Dpx + Cpx (post-cumulus)

SULPHIDES None IDENTIFIED

LITHOLOGIC NAME (I.U.G.S.)
Herzolite

HEAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646 - 203
(Fenton's Knob)

MINERALOGY

Olivine - 98%

Chromite - < 1%

Pentlandite - < 1%

TEXTURE

Medium-grained (1-2mm), equant olivine grains are broken into smaller subgrains and rotated a few degrees relative to one another. Most are recrystallized to anastomosing networks of flaky serpentine. Strain lamellae are present in some of the relict olivines. Rare chromite euhedra are dispersed in the rock, and are fine-grained (< 0.2mm). Sample appears to be an accumulation (low porosity).

The Equigranular texture is readily observed in hand sample; fresh olivine grains are distinctive.

Alteration

Olivine → Serpentine (~~total~~) (partial)

Olivine, Chromite → Magnetite (reaction rims; exsolution)

PARAGENESIS

Olivine + Chromite (cumulus)

Olivine (post cumulus)

SULPHIDES

Fine-grained coppery sulphides occur as patchy anhedral masses associated with serpentine veins (and are probably hydrothermal) - appears to be pentlandite.

LITHOLOGIC NAME (I.U.G.S.)

Dunite

HEAZLEWOOD RIVER COMPLEXSAMPLE NO. 8646 - 204

(Above Fenton's Workings)

MINERALOGY %

Chromite - 90

Chlorite - 10

TEXTURE

Massive chromitite grading to fine-grained granular aggregates of subhedral chromite. Irregular wedges and seams of interstitial chlorite (colorless, normal birefringence) are abundant. The chromite does not display alteration features, and retains a uniform brown colour in transmitted light. Some serpentine veinlets cut the sample.

In hand sample, the chromitite is very dense, and massive looking

Alteration NonePARAGENESIS

Chromite - cumulus

Chlorite - low temperature alteration of intercumulus ferromagnesian minerals;

SULPHIDES

None observed

LITHOLOGIC NAME (I.U.G.S.)

Chromitite

HEAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646 - 207

(Roaring Meg Track; Downslope from Troctolite Knob)

MINERALOGY

	%
Olivine	58
Plagioclase	40
Clinopyroxene	2
Chromite	< 1
	100

TEXTURE

Massive, medium-grained cumulate with totally serpentinized cumulus olivine enclosed in a nearly contiguous network of anhedral, intercumulus plagioclase. Minor cumulus chromite euhedra (≤ 0.2 mm) and medium-grained, unaltered clinopyroxene grains are rare. Pyroxene is partially enclosed by the plagioclase. Some plagioclase patches are poikilitic, enclosing small grains of both olivine and chromite. The hand sample displays the spindly, uneven weathering surface typical

Alteration of the Olivine + PLAS-rich rocks in the area.

Olivine \rightarrow Serpentine (100%)Plagioclase \rightarrow clays (amorphous)Plagioclase \rightarrow colorless garnet (hydrogrossular?)PARAGENESIS

Olivine + Chromite (cumulus)

Cpx \rightarrow Plagioclase (post cumulus)SULPHIDES

Traces of vfg, highly-reflective opaques were observed in the serpentinized olivines

LITHOLOGIC NAME (I.U.G.S.)

Troctolite

HEAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646 - 208

(Roaring Meg Tract downslope from Tractolite Knob)

MINERALOGY

	90
Plagioclase	50
Clinopyroxene	45
Orthopyroxene	5
	100

TEXTURE

Fine to medium-grained gabbroic texture with interlocking, subhedral plagioclase and pyroxene. Alteration effects are pervasive and include uranilization, chloritization + steatization of pyroxene and saussuritization of plagioclase. Some veins and patchy growths of serpentine are associated with orthopyroxene grains.

The hand sample displays a distinct gabbroic texture, with white plagioclase and green to black clinopyroxene predominant.

Alteration

Cpx → Tremolite, talc, chlorite
Opx → uranilite, serpentinite, chlorite
Plag → saussurite

PARAGENESIS Opx → Plag + CpxSULPHIDES None observedLITHOLOGIC NAME (I.U.G.S.)

Gabbro

HEAZLEWOOD RIVER COMPLEXSAMPLE NO. 8646 - 209

(East Flank of Swordgrass Hill)

MINERALOGY

Orthopyroxene - 100 %

TEXTURE

Very fresh sample of medium to coarse-grained orthopyroxenite. Consists of euhedral to subhedral, equant opx grains showing varying degrees of granulation (strain-softening). Coarsest grains are 1-2 cm in length. Development of sutured subgrain contacts and strain lamellae associated with brittle deformation. Some recovery occurred, as shown by triple-junctions occurring in the granulated zones. The hands sample comprises abundant bronze-coloured opx megacrysts + minor chromite.

AlterationOpx \rightarrow talc (minor; confined to grain boundaries)PARAGENESIS

Opx - cumulus/postcumulus

SULPHIDES

None observed

LITHOLOGIC NAME (I.U.G.S.)

Orthopyroxenite

HEAZLEWOOD RIVER COMPLEXSAMPLE NO: 8646 - 210

(Swordgrass Creek at Southern End of Chromite Hill)

MINERALOGY Orthopyroxene - $\approx 100\%$
Chromite - traceTEXTURE very similar to sample 209. A Coarse-grained orthopyroxene cumulate(?) which has been strained and recrystallized to a large degree to finer-grained patches of opx subgrains. In hand sample the pyroxenes are light brown or tan in color and reach 2cm in length. Some streaks of chromite-euhedra are visible in the ^{hand} sample.Alteration Opx \rightarrow talc (minor)
Chromite \rightarrow hematite (complete)PARAGENESIS Opx + Chromite (cumulus)
Opx (postcumulus enlargement)SULPHIDESLITHOLOGIC NAME (I.U.G.S.)
Orthopyroxenite

HEAZLEWOOD RIVER COMPLEXSAMPLE NO: 8646 - 211

(Summit of Swordgrass Hill)

MINERALOGY

Orthopyroxene - 99%

Chromite - trace

TEXTURE

A granulated orthopyroxenite, in which most of the originally coarse-grained opx grains have totally recrystallized to fine-grained mosaic masses, with irregular, or less commonly, cusped (recovered) subgrain contacts. Streaky fabric present in the sample defines a crude tectonic foliation. Evidence of brittle deformation includes the granulated opx grains, and broken twin planes and cleavage traces. Chromite grains are not observed, but hematite patches have probably replaced chromite grains.

Alteration

Opx → Talc (minor)

Chromite → Hematite

PARAGENESIS

Opx + Chromite - Cumulus

Opx

- post cumulus (enlargement)

SULPHIDES

None Seen

LITHOLOGIC NAME (I.U.G.S.)

Orthopyroxenite

HAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646-212

(Swordgrass Hill; 100m N of 211)

MINERALOGYOpx (?) 99% (?)
Chromite - <1%TEXTURE

Sample is totally serpentized. Serpentine does not form the anastomosing "mesh" texture which is typical of dunitites and appears to be pseudomorphing ^{tabular} pyroxenes - probably Opx (Cpx is generally more resistant). Chromite euhedra are rare, and are commonly rimmed by magnetite or replaced by hematite. Magnetite also occurs as ragged fine-grained masses disseminated throughout the sample (secondary).

The hand sample consists of waxy, grey-green

Alteration

serpentine + minor altered chromite.

Ferromagnesian Mineral → Serpentine

Chromite → Magnetite, hematite

PARAGENESIS

(likely) opx + chromite - cumulus

opx

- post cumulus (enlargement)

SULPHIDES

None seen.

LITHOLOGIC NAME (I.U.G.S.)Serpentinite (probably after orthopyroxenite)
but possibly after dunite

HEAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646 - 213

(Swordgrass Hill; 200mN of 211)

MINERALOGY

Orthopyroxene - 99%

Chromite - 4%

TEXTURE

A distinct tectonic fabric marked by sub-parallel lenses of granulated opx separating subhedral, coarser, undeformed opx grains. Similar to sample 210 + 211. See abundant bent and broken twin lamellae and cleavage traces, and many sutured subgrain contacts.

The hand sample displays little evidence of the foliation. Coarse opx crystals (up to 2cm) have a distinctive tan color. Some patches (streak) of chromite are present.

ALTERATION

Opx → talc (minor)
Chromite → Magnetite, hematite (total)

PARAGENESIS

Opx + Chromite - cumulus
Opx - postcumulus (enlargement)

SULPHIDES

None observed

LITHOLOGIC NAME (I.U.G.S.)

Orthopyroxenite (sheared)

HEAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646-214

(FENTON'S SPUR)

MINERALOGY

Olivine (?) - $\approx 75\%$
 Opx + Cpx - $\approx 25\%$
 Chromite - $< 1\%$

TEXTURE

Serpentinized olivine grains ($< 5\text{mm}$) and serpentinized ^{coarse-grained} opx + cpx ($< 1\text{cm}$) are broken and streaked out into a distinctive tectonite fabric. Olivine grains are pseudomorphed by colorless, anastomosing fine-gr. serpentine. Pyroxenes are only partially serpentinized. They are altered to a green coloured variety of serpentine which often grew along cleavage traces. Many vein of cross-fibre asbestos cut the sample.

The relict olivines are enclosed by secondary magnetite,

Alteration

~~Olivine~~ which defines the streaky foliation in the rock. In hand sample, the rock displays a mesh texture. Olivine grains appear as black serpentine. Pyroxene grains appear white + are more deeply weathered.

PARAGENESIS

Ol + Chromite - cumulus
 Opx + Cpx - postcumulus

SULPHIDES

None observed

LITHOLOGIC NAME (I.U.G.S.)

Lherzolite (tectonite)

HEAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646 - 215
(Fenton's Spur)

MINERALOGY

Orthopyroxene - <70
Olivine - 15-20
Clinopyroxene - 10-15
Chromite - <1

TEXTURE

Coarse-grained opx and lesser cpx (up to 3cm) (euhedral) occur as megacrysts which include fine-grained anhedral olivine and rare euhedral chromite. Most of the olivine in the sample occurs between the coarser pyroxenes as irregular to subhedral medium-grained crystals which are commonly well-preserved. Some deformation features are present (bent + broken cleavage traces + deformation lamellae in pyroxene). Exsolution lamellae of cpx in opx are common. Chromite euhedra are rare. Opx megacrysts are distinctive in hand sample.*

Olivine → Serpentine (partial to total) + magnetite
Opx, Cpx → talc (minor)

PARAGENESIS

Olivine + Chromite (early cumulus)

↓

olivine + Opx + Cpx (late cumulus/postcumulus)

SULPHIDES

None observed

LITHOLOGIC NAME (I.U.G.S.)

Granular Pyroxenite (? oliv. opx)

HEAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646 - 216

(~200 m W of Heazlewood R. + 500 m N of Bridge on Heazlewood River logging track)

MINERALOGY

	%
Olivine	- 80
Plagioclase	- 20
Chromite	- < 1%
	100

TEXTURE

Typical medium-grained, mesh-like texture as observed in most Olivine-Plagioclase rocks from the area. Mesh pattern constitutes relict cumulus olivine + minor cumulus Chromite (being medium-grained + fine-grained respectively) partially enclosed by irregular, anhedral grains and wedges of plagioclase (intercumulus). The olivine is poorly preserved and has been pseudomorphed by serpentine-magnetite intergrowths. In hand sample, the plagioclase stands above the weathered serpentinite as more resistant spindles.

Alteration Serpentine has a pitch-black colour on fresh surfaces.

Olivine → serpentine + magnetite (total)
Plagioclase → clays

PARAGENESIS

Olivine + Chromite - Cumulus
Plagioclase - postcumulus

SULPHIDES

None observed

LITHOLOGIC NAME (I.U.G.S.)

Mela Troctolite

HEAZLEWOOD RIVER COMPLEX

SAMPLE NO: 8646 - 217
(- 150m W of 216)

MINERALOGY Orthopyroxene - 70
Olivine - 30
Chromite - <1
100

TEXTURE Medium-grained (1-5mm) orthopyroxenes (subhedral) enclose or are in contact with stubby ~~(~~prismatic~~)~~ (commonly six-sided prismatic forms) subhedral to euhedral olivines, which range from <0.5mm to >2mm. Both minerals are commonly transected by serpentine veinlets, and in places are totally serpentized. Chromite euhedra are rare, and are observed within opx grains or along olivine/opx grain boundaries. Opx exsolution lamellae occur in some opx crystals. Hand sample displays granular or nodular texture.

Alteration on weathered surface.

Olivine → Serpentine + magnetite (partial)
Opx → Chlorite, serpentine (partial)
Chromite → magnetite

PARAGENESIS Olivine + Chromite (early cumulus)
Olivine + Opx + Chromite (late cumulus or post cumulus)

SULPHIDES Traces of vfg highly reflective opaques (a few μ in diameter) occur in serpentized parts of the sample - (sulphide or PGE?)

LITHOLOGIC NAME (I.U.G.S.)

Granular Olivine Orthopyroxenite

GAI PETROGRAPHIC DESCRIPTIONSHEAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646 - 218

(North end of "pyroxenite dyke")

↳ CHROMITE RIDGE, 0.5 km West of Burgas (L.21)

%

MINERALOGY

Olivine - ~60

Plagioclase - ~40

Chromite - <1

Cpx - <1

100

TEXTURE

Equant, medium-grained olivine is supported by a framework of irregular plagioclase, forming a mesh-like orthocumulate texture. There is minor interstitial clinopyroxene + disseminated cumulus chromite in the section. Olivine is replaced (totally) by flaky serpentine intergrowths which form a box-like grid pattern.

The hand sample displays the irregular, spindly weathering characteristic of ^{the} troctolites.

Alteration The serpentine appears black to purple-black in hand sample.

Olivine → Serpentine (total)

Plagioclase → sericite* / saussurite / hydrogarnet

*often forms radial structures

Chromite → Fe-oxides

PARAGENESIS

Olivine + Chromite (cumulus)

Cpx, Plagioclase (post cumulus)

SULPHIDES

Traces of vfg, highly reflective opaque in serpentine. In reflected light it is white in colour, <10 μ in diameter, isotropic + displays no bireflectance/pleochroism.

LITHOLOGIC NAME (I.U.G.S.)

TROCTOLITE

HAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646 - 219
 (North end of "Pyroxenite Dyke")

MINERALOGY

TROCTOLITE		ANORTHOSITE LAYER	
	%		%
Olivine	- 70	Plagioclase	- 90
Plagioclase	- 30	Px or Olivine	- 10
Chromite	- <1	Chromite	- Tr.
Cpx	- tr		100
	100		

TEXTURE

A massive plagioclase cumulate(?) layer grading into a serpentinized troctolite. The plag-rich layer consists of megacrysts of plagioclase of indeterminable size & shape due to pervasive alteration to clays. The plagioclase contains inclusions of very irregular-shaped altered olivines and/or pyroxenes which have been totally replaced by serpentine/chlorite assemblages. The troctolite is medium-grained & comprises serpentinized olivine, altered plagioclase & disseminated, fine-grained chromite. The layer alteration contacts are abrupt & of the ratio type. In hand sample, the plag-rich layer appears cherty.

Olivine → serpentine (total)
 Plag → clays + hydrogarnet (total)

<u>PARAGENESIS</u>	Olivine ^{+chromite} - cumulus	} TROCTOLITE
	Plag - post cumulus	
(Px and/or Olivine) + Plag	- cumulus	} ANORTHOSITE
	Chromite + Olivine - cumulus	
<u>SULPHIDES</u>	Plag - post cumulus	} TROCTOLITE

Angular, vfg. euhedral to anhedral, very highly reflective opaques disseminated in serpentinized olivines in troctolitic layers.

LITHOLOGIC NAME (I.U.G.S.)

INTERLAYERED TROCTOLITE/ANORTHOSITE

HEAZLEWOOD RIVER COMPLEXSAMPLE NO. 8646-220MINERALOGYGROUNDMASS

Clinopyroxene - 35

Plagioclase - 30

Quartz - 10

Amphibole - 20

Magnetite - 5

TEXTURE

Aphyric, massive, fine-grained, holocrystalline texture. Relatively fresh pleochroic clinopyroxene, and labradorite, quartz and minor magnetite form an equigranular, interlocking matrix. Amphibole is a late magmatic ~~phase~~ ^{phase} which forms eikocrysts including all other minerals. The pleochroic scheme displayed by the amphibole is typical of hornblende. The sample contains xenoliths (?) of a coarse-grained mafic rock ^(gabbro/norite) containing cpx, plagioclase and quartz, and lesser opx and amphibole. The xenoliths have an oval form and are surrounded by a quartz halo & pass at either end to thin quartz stringers.

ALTERATION

NO SUBSTANTIAL ALTERATION EFFECTS

PARAGENESIS

Pl + Cpx(op) - early magmatic stage
 Qtz + Amphibole - late " "

SULPHIDES

Trace of disseminated, f. grained pyrite

LITHOLOGIC NAME (I.U.G.S.)

Hornblende Diorite o

HEAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646 - 221

(Middle of Burgess Hill)

MINERALOGY

	%
Hornblende -	50
Plagioclase (An ₄₀₋₅₀)	50
	100

TEXTURE Massive, medium grained ragged oikocrysts of hornblende enclose fine-grained, tabular plagioclase and rarely, medium-grained plagioclase lathes. Texture resembles that of a diabase^(subophitic), and the amphibole may have replaced primary pyroxene oikocrysts. This is partially supported by the presence of irregular magnetite intergrowths with some of the hornblende grains. Sample has a dark grey, massive, equigranular appearance in hand sample.

Alteration Plagioclase → saussurite

PARAGENESIS

Plagioclase (early magmatic)



Hornblende (late magmatic)

SULPHIDES

None Seen

LITHOLOGIC NAME (I.U.G.S.)

Hornblende Dolerite

HEAZLEWOOD RIVER COMPLEXSAMPLE NO. 8646 - 222

(Middle of Burgess Hill)

MINERALOGY

Clinopyroxene - 30

Plagioclase - 20

Quartz - 20

Hornblende - 30

Opx - trace

Magnetite -

TEXTURE

Massive, aphyric, holocrystalline, hypidiomorphic fine-grained. Amphibole grains (Hornblende?) are coarser than the other constituents and are poikilitic, enclosing cpx, plag, quartz. There are abundant triple junctions between cpx + plag + quartz + plag suggesting equilibrium crystallization. Hornblende has a replacive relationship to cpx, the latter containing reaction rims of the former. Unusual nodular weathered surface is difficult to explain since no glomerophosphs, phenocrysts or amygdals were observed.

Alteration

None observed

PARAGENESIS

~~Pyroxene~~ Pyroxene + Plag - EARLY MAGMATIC
 Quartz → Hornblende - Late Magmatic

SULPHIDES

Trace of pyrite disseminated in the matrix.

LITHOLOGIC NAME (I.U.G.S.)

Hornblende Dolerite

HEAZLEWOOD RIVER COMPLEX

SAMPLE NO: 8646-223

(North end of Burgess Hill)

MINERALOGY

	%
Olivine	- 45
Orthopyroxene	- 50
Clinopyroxene	- 5
Chromite	- <1
	100

TEXTURE

Serpentinization is pervasive. Relict megacrysts of opx in contact with medium-grained olivine (replaced by box-like serpentinite). Oscillatory zoning observed in one opx grain suggests opx was a cumulus phase. Olivine relicts are rarely seen as inclusions in opx. Cpx also occurs as a coarse-grained cumulus phase. Abundant patchy magnetite occurs in serpentinitized olivine. Chromite occurs as fine-grained, disseminated euhedra.

Hand sample displays granular or nodular alteration fabric seen in sample 215; pyroxenes are clearly euhedral cumulus grains which are more deeply weathered than the olivine-rich parts of the rock.

→ Ol → serpentine (partial) Opx → Cpx (exsolution)
 Opx, Cpx → serpentine/uralite/talc (partial)

PARAGENESIS

Olivine + Chromite	early cumulus
Opx + Olivine + Chromite	late cumulus
Opx + Cpx	post-cumulus

SULPHIDES

Traces of vfg, highly reflective opaques in serpentinite-rich zones

LITHOLOGIC NAME (I.U.G.S.)

Granular Harzburgite

HEAZLEWOOD RIVER COMPLEXSAMPLE NO. 8646 - 724

(North End of Burgess Hill)

MINERALOGY

Plagioclase - 60

Amphibole - 30

Quartz - 7

K-feldspar - 3

TEXTURE

Hypidiomorphic, medium to coarse-grained, massive fabric. Comprises subhedral lathes of plagioclase (<1cm in length) and interstitial amphibole (anhedral to subhedral; up to 1cm in length), quartz and K-feldspar. Fine to medium-grained intergrowths of ^{anhedral} Qtz - amphibole - K-feldspar occur as well defined wedges between earlier-formed plagioclase. Some Plagioclase displays patchy perthitic textures.

Alteration

Plagioclase → sericite

Amphibole (Hornblende) → secondary tremolite/actinolite

PARAGENESIS

Plagioclase

early magmatic

Hb → Qtz + K-feldspar

late magmatic

SULPHIDES

NONE OBSERVED

LITHOLOGIC NAME (I.U.G.S.)

Quartz Diorite

HEAZLEWOOD RIVER COMPLEX

SAMPLE NO: 8646 - 225
(Chromitite Spur)

MINERALOGY

Orthopyroxene - 80%

Olivine - 10%

Plagioclase - 5%

Clinopyroxene - 5%

opaques - tr.

TEXTURE

Medium-grained, equigranular, massive fabric. Opx forms some euhedral 8-sided prismatic grains, and olivine as anhedral patches in contact with the ^{ortho}pyroxene. Cpx and plag occur as irregular wedge-shaped crystals interstitial to coarser-grained and more idiomorphic olivine and opx. The rock contains traces of vfg opaques which may be chromite. In hand sample, euhedral medium-grained, brownish-grey to tan opx are distinctive.

Alteration

Olivine → minor serpentinization

Plagioclase → Saussurite (100%)

PARAGENESIS

Olivine + Orthopyroxene - cumulus

Clinopyroxene + Plag - post cumulus

SULPHIDES

Fairly abundant (0.5%) vfg, 1-10 μ -sized opaque minerals with high reflectivity of white colour (~~transmitted~~ ^{reflected} light). Most abundant in serpentine-rich veins.

LITHOLOGIC NAME (I.U.G.S.)

Olivine Orthopyroxenite

HEAZLEWOOD RIVER COMPLEX~~CEA~~

SAMPLE NO: 8646-226
(Chromite Knob)

MINERALOGY

Orthopyroxens - 60%
Chromite - 40%
Cpx - tr

TEXTURE Granoblastic texture with equigranular equidimensional opx + chromite grains forming abundant triple junctions. Grain sizes are generally $< 1\text{mm}$. Opx grains vary from fresh to highly altered (uralitized, chloritized). A thin chromite lens is present in the section, + comprises 90% euhedral chromite and massive chromite. Cpx occurs as an interstitial phase (anhedral).

In the hand sample, the rock grades from a med.-grained orthopyroxenite, grading to the chromite-opx layer which contains some

Alteration Opx \longrightarrow uralite, chlorite* thin chromite lenses

* chloritization imparts a distinctive green alteration colour to the opx on weathered surfaces.

PARAGENESIS Opx + Chromite - (cumulus)
Cpx (post cumulus)

SULPHIDES A trace amount of vfg, white ~~reflected light~~ (reflected light) opaques with very high reflectance, occur in the orthopyroxene grains.

LITHOLOGIC NAME (I.U.G.S.)

Chrome-rich Orthopyroxenite

HEAZLEWOOD RIVER COMPLEXSAMPLE NO. 8646-227

(Halfway up Brassy Hill Track to Adit)

MINERALOGY

Plagioclase - 70%

Orthopyroxene - 25%

Clinopyroxene - 5%

TEXTURE

Coarse-grained, hypidiomorphic.

Subhedral, blocky opx crystals and lesser cpx are surrounded by a framework of anhedral, variably-altered plagioclase, which ranges from >1cm-sized oikocrysts (enclosing opx) to <1mm-sized interstitial grains. Opx grains range from <1mm to >7mm.

The rock shows some evidence of post-solidification strain in the form of bent & broken cleavage traces in pyroxene and serrated subgrain contacts in pyroxene.

Alteration

Opx, Cpx → Tremolite, Chlorite

Plagioclase → Saussurite, Sericite

PARAGENESIS

Opx + Cpx - early magmatic

↓

Plagioclase - late magmatic

SULPHIDES

NONE OBSERVED.

LITHOLOGIC NAME (I.U.G.S.)

(Gabbro)horite

HAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646 - 229
(Near Lord Brassy Mine)

MINERALOGY

	%	
Olivine -	50	} ?
(Orthopyroxene -	45	
Plagioclase -	5	
chromite -	<1	
	100	

TEXTURE

Totally serpentinized rock (excluding plagioclase and chromite) displaying mesh-type serpentine after olivine and more regular serpentine growth after opx. (controlled by pyroxene cleavage). Sample is cut by several thin veins of cross-fibre asbestos. Primary grain sizes were probably between 1mm + 1cm. Plagioclase is an intercumulus phase and forms irregular wedges between the olivine + pyroxene relicts. In hand sample the

Alteration

pyroxene displays a pinkish-brown colour where weathered (are less resistant than surrounding serpentinized olivines) and bronzy colour on fresh surface

Pyroxene	→	idocrase, serpentine	(100%)
Olivine	→	serpentine	(100%)
Plag	→	clays	(100%)

PARAGENESIS

Chromite + Olivine + Pyroxene Cumulus
↓
Plagioclase post cumulus

SULPHIDES Trace of white (reflected light), highly reflective, vfg opaque in serpentinized olivine grains, rarely intergrown with chromite or magnetite

LITHOLOGIC NAME (I.U.G.S.)

Serpentinite (after Harzburgite?)

HEAZLEWOOD RIVER COMPLEX

SAMPLE NO. 8646 - 230
(Brassy Mine Track)

MINERALOGY

Plagioclase - 70% (An=60)
Orthopyroxene - 20%
Clinopyroxene - 10%

TEXTURE

Medium to coarse-grained, hypidiomorphic texture. Subhedral opx and lesser cpx intergrown with altered, subhedral plagioclase. In hand sample, the gabbroic rock described above grades into a medium-grained orthopyroxenite. (~~phase~~ contact). Along the layer contact, some interfingering occurs.

ALTERATION

Plagioclase → Saussurite (partial)
Cpx, Opx → Chlorite (minor)
Cpx, Opx → Tremolite (minor)

PARAGENESIS

Pyroxene - cumulus } Gabbroic layer
Plagioclase - intercumulus }
Orthopyroxene - cumulus } orthopyroxenite layer

SULPHIDES

None observed

LITHOLOGIC NAME (I.U.G.S.)

Interlayered Leucocratic Gabbroanite / orthopyroxenite

PETROGRAPHIC DESCRIPTIONSHEAZLEWOOD RIVER COMPLEXSAMPLE NO. 8646-231

(Lord Brassy Adit - mullock Heap)

<u>MINERALOGY</u>		<u>%</u>
Olivine	-	75
Plagioclase	-	20 15
Orthopyroxene	-	5 10
Chromite	-	<1
		100

TEXTURE

Coarse-grained orthocumulate texture with coarse (up to 5cm) olivine crystals of orthopyroxene and contiguous (skeletal) intercumulus plagioclase enclosing serpentinized cumulus olivine and minor cumulus chromite (fine-grained). Plagioclase is replaced by clays, and opx to serpentine/chlorite. Olivine grains are medium-grained and equant to stubby in form, and are replaced by ~~irregular~~ irregular intergrowths of magnetite and fibrous serpentine. The mesh-like orthocumulate texture is readily observed in the

Alteration hand sample, and the bronze coloured opx olivine are distinctive.

Plagioclase → clays (100%)

Olivine → serpentine + magnetite (100%)

Opx → chlorite + serpentine (nearly complete)

PARAGENESIS Chromite → magnetite (fims + fracture fillings)

Olivine + Chromite - (cumulus)

Opx + Plag - (post cumulus)

SULPHIDES

A few flecks of irregular, micron-size, highly reflective opaques observed in pale yellow white cobalt in reflected light.

LITHOLOGIC NAME (I.U.G.S.)

POIKILITIC Plagioclase Harzburgite

HEAZLEWOOD RIVER COMPLEXSAMPLE NO. 8646-234

(Brassy Hill - South Knob)

MINERALOGY

	<u>%</u>
Olivine	- ≈ 60
Plagioclase	- ≈ 20
Orthopyroxene	- ≈ 10
Clinopyroxene	- ≈ 10
Chromite	- ≈ 1-2
	100

TEXTURE

Very distinctive mesh-like orthocumulate texture with subrounded, serpentinized cumulus olivine (medium-grained) separated by oikocrysts of medium-coarse-grained pyroxene and intercumulus plagioclase. Where in contact, cpx rims opx and hence the former was the later phase to crystallize. Orthopyroxene forms the most well defined oikocrysts, whereas plagioclase and cpx tend to occur as less uniform intercumulus grains (wedges). Euhedral fine-grained chromite is disseminated throughout.

Alteration

and some occur as inclusions in cumulus olivine. The opx oikocrysts are readily observed on fresh surfaces in hand sample/the serpentine appears black!

Plagioclase → clays (100%)

Olivine → serpentine (± magnetite) - (100%)

PARAGENESIS Cpx, Opx → serpentine + chlorite (partial)

Chromite → magnetite (partial)

Chromite → olivine + Chromite (Cumulus)

Opx → Opx + Cpx + Plag (post cumulus)

SULPHIDES

Fairly abundant disseminated, vfg, highly reflective opaque, with white color in reflected light.

Isotropic (but not complete extinction), no birefractance/pleochroism, less than 10μ in size. Triangular forms are common.

LITHOLOGIC NAME (I.U.G.S.)

Poikilitic Plagioclase Herzolite

056

942057

M.E.L. Laboratory
 cnr. Lionel & Holmes St.
 Boulder, W.A. 6432

To ANDAMBA P/L
14 TIRKELL ST
CODEE

PROPERTY MENZLEWOOD

MAP REFERENCE
 OR DRAWING No.

less addressed otherwise.

CONSIGNMENT DETAILS

Total number of samples in consignment: 130 (total of all orders)
 Packed in: discarded + dispatched
 Freight company: ANSET AIR FREIGHT
 Consignment Note No.: _____ Dated: 24.11.86
 From (town): Melbourne

OR SEE
 CONSIGNMENT
 DETAILS ON
 ANALYSIS
 ORDER

No. _____

*Crab + chip samples of
 the eastern half of EL24/85
 - collected by G. Anderson
 + K. Morrison.
 (July - Oct 1986)*

ONLY for orders to M.E.L. Lab.
 M.E.L. ACCOUNT CODE or prospect / project

INSTRUCTIONS

Preparation
Crab/chip ground entire
 Sample to - 100#

Elements & Analytical Methods Required.

As }
 Pt } - 50g charge - fine assay
 Pd } with 0.008 ppm DL.
 S - DL 25 ppm
 Se - DL 0.1 ppm - (100 ppm)
 Cu Pb Zn Ni - AAS

Special Instructions

As discussed for S, Se

JOB PRIORITY:

ROUTINE
 PRIORITY
 URGENT (authorised by Explor. Mgr.)

ASSAY RESULTS:

a copy of results to addresses listed below.

1 CHIEF DRAFTSMAN, EXPLORATION DEPT.
 METALS EXPLORATION LIMITED

2 Mr. Anderson
14 Tirkell St
Codee

INVOICE: Send invoice to above address indicated by

ORDER PREPARED BY:

T.L. Summers
 Print Name
 DATE: 24 / 11 / 86
 Day Month Year

LOCATION AND OTHER DETAILS

PREPARE COLUMNS & HEADINGS TO SUIT

M.E.L. Analytical Report Sheets	SAMPLE TYPE (Soil, Drill Core, etc.)		(Hole No., Site, etc.)	(Interval, Position, etc.)	(NOTE)
	FIRST SAMPLE No.	LAST SAMPLE No.			
	SAMPLE No.	MATERIAL			
1	231001		serp. dunite (minor plug)		
2	231002		- " - (ab. plug)		
3	003		pegmatitic gabbro / hornite		
4	004		coarse tract.		
5	005		hornblende		
6	006		coarse tract		
7	007		poik. hornblende		
8	008		serp. layered dunite / hornb.		
9	009		plug hornb.		
10	010		interl. serpentinitized dunite / hornb		
11	011		poik. hornblende		
12	012		pyroxenite / poik. hornb.		
13	013		interl. plug hornb / plug dunite		
14	014		plug hornb.		
15	015		serp. dunite		
16	016		sheared serp. dunite		
17	017		troctolite		
18	018		med. grained troctolite		
19	019		interlayered hornb / dunite / pyroxenite		
20	020		serp. hornb grading to plug / dunite		
21	021		troctolite		
22	022		fine - med grained hornb.		
23	023		plug hornb.		
24	024		tract.		
25	025		plug hornb.		
26	026		serpentinitized + gabbro (dyke)		
27	027		serpent. plug hornb.		
28	028		med - fine grained plug hornb.		
29	029		poik. hornb.		
30	231030		serp. dunite / poik. hornb (minor)		

057

842058

To M.E.L. Laboratory
 cnr. Lionel & Holmes St.
 Boulder, W.A. 6032

To _____

PROPERTY HEAZLEWOOD
 MAP REFERENCE OR DRAWING No. _____

unless addressed otherwise.

CONSIGNMENT DETAILS

Total number of samples in consignment: _____ (total of all orders)
 Packed in: _____
 Freight company: _____
 Consignment Note No.: _____ Dated: _____
 From (town): _____

OR SEE CONSIGNMENT DETAILS ON ANALYSIS ORDER
 No. 19001

ONLY for orders to M.E.L. Lab.
 M.E.L. ACCOUNT CODE or prospect / project

INSTRUCTIONS

1. Preparation
 Elements & Analytical Methods Required.

Special Instructions

JOB PRIORITY:

ROUTINE
 PRIORITY
 URGENT (authorised by Explor. Mgr.)

SAY RESULTS:

a copy of results to addresses listed below.
 CHIEF DRAFTSMAN, EXPLORATION DEPT.
 METALS EXPLORATION LIMITED

2

INVOICE: Send invoice to above address indicated by

ORDER PREPARED BY:

 Print Name
 DATE: ___/___/___
 Day Month Year

LOCATION AND OTHER DETAILS

PREPARE COLUMNS & HEADINGS TO SUIT

M.E.L. Analytical Report Sheets	SAMPLE No.	MATERIAL	(Hole No., Site, etc.)	(Interval, Position, etc.)	(NOTE)
1	231031		serp. durite / ^{poik} / pyroxenite		
2	32		serp. hornb. / pyroxenite		
3	33		gabbaro / olivine		
4	34		" "		
5	35		granular pyroxenite		
6	36		serpentine (carbonates veins up to		
7	37		serp. durite / pyroxenite (10cm)		
8	38		f. grain play hornb.		
9	39		gabbaro / olivine		
10	40		durite		
11	41		f. grained hornb.		
12	42		gabbaro / olivine		
13	43		fresh pyroxenite		
14	44		serp. poikilitic hornb. / durite		
15	45		serp. durite in shear zone ^{minor gabbaro}		
16	46		pyroxenite dyke in shear zone		
17	47		fine grained play hornb.		
18	48		(shear zone) Serpentine		
19	49		fine play hornb.		
20	50		basalt		
21	51		gabbaro / olivine		
22	52		serp. poik. hornb.		
23	53		gabbaro / olivine		
24	54		interlayered serp. hornb. / olivine		
25	55		assorted rocks from NE of Basey Adit		
26	56		ASSAYED 232 298-9 & 214 338		
27	57		pyroxenite		
28	58		ASSAYED 214 339		
29	59		poik. hornb. (magnetite sheets)		
30	60		" "		

942039

058

To M.E.L. Laboratory
 cnr. Lionel & Holmes St.
 Boulder, W.A. 3082

To: _____

PROPERTY HEAZLEWOOD

MAP REFERENCE
 OR DRAWING No.

Unless addressed otherwise.

CONSIGNMENT DETAILS

Total number of samples in consignment: _____ (total of all orders)
 Packed in: _____
 Freight company: _____
 Consignment Note No.: _____ Dated: _____
 From (town): _____

OR SEE
 CONSIGNMENT
 DETAILS ON
 ANALYSIS
 ORDER

No. 19001

ONLY for orders to M.E.L. Lab.
 M.E.L. ACCOUNT CODE or prospect / project

INSTRUCTIONS

- Preparation
- Elements & Analytical Methods Required.

ORDER PREPARED BY: _____
 Print Name _____
 DATE: ____/____/____
 Day Month Year

LOCATION AND OTHER DETAILS

PREPARE COLUMNS & HEADINGS TO SUIT

M.E.L. Analytical Report Sheets	SAMPLE No.	MATERIAL	(Hole No., Site, etc.)	(Interval, Position, etc.)	(NOTE)
1	231061	serpentinized + diagenetic			
2	62	ASSAYED	214340		
3	63	hornblende			
4	64	hand (sorted rocks from the dump)			
5	65	ASSAYED	232293-5		
6	66	silica-carbonate rock			
7	67	sorted magnetite in serp. dunite			
8	68	gabbro/dolerite			
9	69	ASSAYED	232296-7		
10	70	silica-carbonate rock			
11	71	gabbro-dolerite float			
12	72	" "			
13	73	ASSAYED	214341-2		
14	74	Amphibole			
15	75	pink plug hand.			
16	76	dunite			
17	77	hand.			
18	78	granular hand.			
19	79	hand.			
20	80	serp. dunite			
21	81	serp. dunite			
22	82	tertiary basalt			
23	83	dolerite			
24	84	troctolite			
25	85	siliceous wuggy serpentinized			
26	86	" "			
27	87	" "			
28	88	gabbro serpentinized			
29	89	E Basalt			
30	231090	troctolite			

Special Instructions:

JOB PRIORITY:

- ROUTINE
 PRIORITY
 URGENT (authorised by Explor. Mgr.)

SAY RESULTS:

Send a copy of results to addresses listed below.

1 CHIEF DRAFTSMAN, EXPLORATION DEPT.
 METALS EXPLORATION LIMITED

2

INVOICE: Send invoice to above address indicated by

059

942000

To M.E.L. Laboratory
 cnr. Lionel & Holmes St.
 Boulder, W.A. 3032

To _____

PROPERTY HETHEZEEWORTS
 MAP REFERENCE _____
 OR DRAWING No. _____

unless addressed otherwise.

CONSIGNMENT DETAILS

Total number of samples in consignment: _____ (total of all orders)
 Packed in: _____
 Freight company: _____
 Consignment Note No.: _____ Dated: _____
 From (town): _____

OR SEE
 CONSIGNMENT
 DETAILS ON
 ANALYSIS
 ORDER

No. 1901

ONLY for orders to M.E.L. Lab.
 M.E.L. ACCOUNT CODE or prospect / project

INSTRUCTIONS

- 1. Preparation
- 2. Elements & Analytical Methods Required.
- 3. Special Instructions

JOB PRIORITY:
 ROUTINE
 PRIORITY
 URGENT (authorised by Explor. Mgr.)

ASSAY RESULTS:
 If a copy of results to addresses listed below.
 CHIEF DRAFTSMAN, EXPLORATION DEPT.
 METALS EXPLORATION LIMITED

2 _____

INVOICE: Send invoice to above address indicated by

ORDER PREPARED BY:

 Print Name
 DATE: ___ / ___ / ___
 Day Month Year

LOCATION AND OTHER DETAILS

PREPARE COLUMNS & HEADINGS TO SUIT

M.E.L. Analytical Report Sheets	SAMPLE TYPE (Soil, Drill Core, etc.)		(Hole No., Site, etc.)	(Interval, Position, etc.)	(NOTE)
	FIRST SAMPLE No.	LAST SAMPLE No.			
	SAMPLE No.	MATERIAL			
1	231091		plag. hand		
2	92		troct.		
3	93		serp. dumite		
4	94		poik. hand / pyrox. / serp. dumite		
5	95		poik. hand		
6	96		troct.		
7	97		dumite (veinlets - seems of magnetite)		
8	98		10-15 cm thick smooth. dikes hosted in		
9	99		fissure filled veins of magnetite		troct. in these dummies
10	231100		hand.		
11	101		magnetite		
12	102		fine grained plag. hand.		
13	103		poik. plag. hand		
14	104		gabro / plaserite		
15	105		anorthosite		
16	106		plagi - granite		
17	107		vein quartz		
18	108		poik. hand		
19	109		plagi granite		
20	110		anorthosite? / plag. granite? float		
21	111		silica - carbonate rock		
22	112		basalt		
23	113		anorthosite		
24	114		anorthosite MISSING		
25	115		anorthosite		
26	116		chromite with green sec. mineral		
27	117		chromite / anorthosite		
28	118		poik. plag. hand		
29	119		silica - carbonate rock (no visible minerals)		
30	231120		gabro / plaserite cont. sufficiently		

060

PROPERTY HEAZLEWOOD

To M.E.L. Laboratory
cnr. Lionel & Holmes St.
Boulder, W.A. 3083

To: _____

MAP REFERENCE
OR DRAWING No. _____

942061

Unless addressed otherwise.

CONSIGNMENT DETAILS

Total number of samples in consignment: _____ (total of all orders)
Packed in: _____
Freight company: _____
Consignment Note No.: _____ Dated: _____
From (town): _____

OR SEE
CONSIGNMENT
DETAILS ON
ANALYSIS
ORDER

No. **1901**

ONLY for orders to M.E.L. Lab.
M.E.L. ACCOUNT CODE or prospect / project

INSTRUCTIONS

Preparation

Elements & Analytical Methods Required.

Special Instructions

JOB PRIORITY:

- ROUTINE
 PRIORITY
 URGENT (authorised by Explor. Mgr.)

ASSAY RESULTS:

Send a copy of results to addresses listed below.

CHIEF DRAFTSMAN, EXPLORATION DEPT.
METALS EXPLORATION LIMITED

INVOICE: Send invoice to above address indicated by

ORDER PREPARED BY:

Print Name _____
DATE: ____/____/____
Day Month Year

LOCATION AND OTHER DETAILS

PREPARE COLUMNS & HEADINGS TO SUIT

M.E.L. Analytical Report Sheets	SAMPLE TYPE (Soil, Drill Core, etc.)		(Hole No., Site, etc.)	(Interval, Position, etc.)	(NOTE)
	FIRST SAMPLE No.	LAST SAMPLE No.	SAMPLE No.	MATERIAL	
1	231	121		chromite (Gabbro Hill)	
2	231	122		magnetite in serp. shaled serp. dur.	
3		123		chromite - anorth. fuchsite	
4		124		banded chromite & norite interlay	
5		125		massive chromite & fuchsite	
6		126		norite (breccia)	
7		127		pebble in Bury. Creek - serp. chromite	
8		128		peg - norite	
9		129		siliceous rock (North Bury Hill)	
10		130		siliceous carbonate rock	
11		131		" "	
12		132		" "	
13		133		dolerite with v. minor pyrite	
14		134		gossanous (sulphide rich) carbonated	
15		135		strongly carbonated ^{and shaled with} silicified with	
16		136		siliceous carbonate rock	
17		137		serp. hamburgite with spinel	
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					

051

ANALABS

942062

Phone (09) 458 7999

A division of MacDonold Hamilton & Co. Pty. Ltd.
52 Murray Road, Warragul, W.A. 6106

Telex AA92560

ANALYTICAL REPORT No.

142.2.08.04005

THIS REPORT MUST BE READ IN CONJUNCTION WITH THE ACCOMPANYING ANALYTICAL DATA

ORDER No.

PROJECT

Metals Exploration Ltd.,
80 Collins St.,
Melbourne
Victoria 3000

DATE RECEIVED

RESULTS REQUIRED

24/11/86

ASAP

No. OF PAGES
OF RESULTSDATE
REPORTEDNo.
OF COPIES

TOTAL No. OF SAMPLES

6

13/01/87

1

131

PRE-TREATMENT

ANALYSIS

REFER BELOW	SAMPLE NUMBERS	PRE-TREATMENT							ANALYSIS			
		DRY	CRUSH	SPLIT	PUL- VERISE	SIEVE	OTHER SEE REMARKS	NONE	REFER TO ANALYSIS SECTION	PREPARATION	METHOD	
Various		RD	Prep	006,018						Cu, Pb, Zn, Ni / 101		
Various		RD								Se / 116, S / 199, Au / 309, Pt, Pd / 311		

REMARKS

RESULTS

TO

Metals Exploration Ltd.,
80 Collins St.,
Melbourne
Victoria 3000

RESULTS

TO

STATE OF SAMPLES		ANALYSIS — PREPARATION				ANALYSIS — METHOD	
whole core	WC	perchloric acid	A1	cold acid	CA	atomic absorption	AAS
split core	SC	hydrochloric acid	A2	specific sulphide	SS	x-ray fluorescence	XRF
cutting	CU	nitric acid	A3	other mixed acids	MA	spectrophotometry	SPEC
rock	RO	aqua regia	A4	alkaline attack	AA	colorimetry	COL
soil	SO	nitric-perchloric	A5	volatilization	VO	chromatography	CHR
slip	PI	HF mixture	A6	ignition	IG	titration	TIT
water	WA	HF under pressure	A7	pressed powder (XRF)	PP	other chemical means	CHEM
slieve	TL	fusion	A8	glass fusion (XRF)	GF	miscellaneous	MISC
stream sediment	SS					fluorescence	FLUOR
heavy mineral	HM					inductively coupled plasma	ICP

AUTHORISED OFFICER

[Signature]

662

ANALABS

942063

A division of MacDONALD Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

PAGE

142.2.08.04005

13/01/87

1 OF 6

TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ni	Se	Pd	Pt	Au	S
1	231001	<5	5	45	1550	<0.05	<0.001	0.009	<0.008	180
2	231002	<5	10	35	1250	<0.05	0.001	<0.008	<0.008	140
3	231003	<5	10	15	65	<0.05	0.001	<0.008	<0.008	40
4	231004	15	5	15	630	<0.05	0.036	<0.008	<0.008	100
5	231005	<5	5	55	995	<0.05	<0.001	<0.008	<0.008	420
6	231006	<5	<5	25	310	<0.05	0.028	<0.008	<0.008	80
7	231007	<5	5	50	1100	<0.05	0.002	<0.008	<0.008	240
8	231008	<5	5	50	1350	<0.05	<0.001	0.018	<0.008	170
9	231009	40	<5	20	50	0.05	0.034	0.018	<0.008	80
10	231010	<5	10	35	1500	<0.05	<0.001	0.010	<0.008	130
11	231011	<5	10	30	200	<0.05	<0.001	0.020	<0.008	80
12	231012	<5	5	20	230	<0.05	<0.001	0.021	<0.008	40
13	231013	5	5	35	1550	<0.05	0.004	<0.008	<0.008	150
14	231014	5	10	45	1250	<0.05	0.004	<0.008	<0.008	140
15	231015	<5	<5	65	880	<0.05	<0.001	<0.008	<0.008	200
16	231016	<5	5	40	480	<0.05	0.001	0.010	<0.008	150
17	231017	5	10	40	270	<0.05	0.007	0.025	<0.008	120
18	231018	<5	10	30	860	<0.05	0.002	<0.008	<0.008	500
19	231019	<5	<5	45	1100	<0.05	0.001	0.009	<0.008	230
20	231020	<5	5	40	1450	<0.05	0.003	<0.008	<0.008	130
21	231021	<5	5	35	880	<0.05	0.001	<0.008	0.050	190
22	231022	5	5	40	765	<0.05	0.008	<0.008	<0.008	120
23	231023	10	<5	45	990	<0.05	0.011	<0.008	<0.008	200
24	231024	<5	<5	30	815	<0.05	<0.001	<0.008	<0.008	190
25	231025	<5	<5	40	640	<0.05	0.003	<0.008	<0.008	150

Results in ppm unless otherwise specified

- ✓ element present, but concentration too low to measure
- ✗ element concentration is below detection limit
- element not determined

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ANALABS

942064

A Division of MacDonnell Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

PAGE

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13/01/87

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TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ni	Se	Pd	Pt	Au	S
1	231026	<5	10	45	1600	<0.05	0.001	<0.008	<0.008	190
2	231027	<5	10	55	1950	<0.05	0.001	<0.008	<0.008	150
3	231028	5	5	20	90	<0.05	0.018	<0.008	<0.008	70
4	231029	5	10	55	890	<0.05	<0.001	0.009	<0.008	250
5	231030	<5	<5	30	1350	<0.05	0.002	<0.008	<0.008	100
6	231031	<5	10	30	535	<0.05	<0.001	0.026	<0.008	140
7	231032	<5	5	50	1200	<0.05	<0.001	<0.008	<0.008	230
8	231033	15	15	25	30	<0.05	0.011	<0.008	<0.008	30
9	231034	<5	5	10	90	<0.05	0.010	0.013	<0.008	10
10	231035	<5	5	45	145	<0.05	0.001	0.012	<0.008	40
11	231036	<5	15	10	220	<0.05	0.001	<0.008	<0.008	40
12	231037	<5	5	35	1250	<0.05	<0.001	0.032	<0.008	160
13	231038	<5	5	35	1450	<0.05	0.016	<0.008	<0.008	120
14	231039	<5	20	40	30	<0.05	0.008	<0.008	<0.008	140
15	231040	<5	10	45	1500	<0.05	0.003	<0.008	<0.008	120
16	231041	10	5	35	2350	<0.05	0.004	<0.008	<0.008	90
17	231042	10	5	20	90	<0.05	0.001	<0.008	<0.008	40
18	231043	10	<5	15	85	<0.05	0.001	<0.008	<0.008	10
19	231044	15	<5	45	1150	<0.05	0.002	<0.008	<0.008	170
20	231045	5	10	25	2500	<0.05	0.018	<0.008	<0.008	100
21	231046	15	5	15	75	<0.05	0.004	0.021	<0.008	10
22	231047	25	<5	40	1300	<0.05	0.003	<0.008	<0.008	250
23	231048	10	10	360	790	<0.05	0.009	0.089	<0.008	150
24	231049	20	5	50	1250	0.05	0.008	<0.008	<0.008	330
25	231050	60	10	20	85	0.05	0.007	0.011	<0.008	80

Results in ppm unless otherwise specified
 T = element present, but concentration too low to measure
 X = element concentration is below detection limit
 - = element not determined

AUTHORISED OFFICER



ANALABS

942065

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

PAGE

		142.2.08.04005				13/01/87				3 OF 6	
TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ni	Se	Pd	Pt	Au	S	
1	231051	130	<5	15	70	<0.05	0.004	<0.008	<0.008	30	
2	231052	35	5	35	1450	<0.05	0.005	0.008	<0.008	120	
3	231053	15	5	15	60	<0.05	0.003	<0.008	<0.008	10	
4	231054	20	10	50	1900	<0.05	0.003	0.011	<0.008	180	
5	231055	10	5	135	750	<0.05	0.003	<0.008	<0.008	140	
6	231057	10	<5	15	155	<0.05	<0.001	<0.008	<0.008	90	
7	231059	45	5	185	1400	<0.05	0.001	<0.008	<0.008	200	
8	231060	25500	5	570	2000	<0.05	0.003	<0.008	4.330	250	
9	231061	80000	5	215	5800	<0.05	0.022	<0.008	18.330	200	
10	231063	195	10	115	255	<0.05	0.017	<0.008	<0.008	120	
11	231064	90	5	20	47000	11.30	0.030	<0.008	0.400	8800	
12	231066	20	10	25	145	<0.05	0.008	<0.008	<0.008	20	
13	231067	20	10	35	2450	<0.05	0.002	<0.008	<0.008	170	
14	231068	40	250	40	65	<0.05	0.012	0.011	<0.008	100	
15	231070	10	5	10	35	<0.05	0.019	0.010	<0.008	10	
16	231071	10	<5	15	80	<0.05	0.011	0.008	<0.008	100	
17	231072	15	5	25	50	<0.05	0.008	0.008	<0.008	80	
18	231074	10	5	15	135	<0.05	0.001	<0.008	<0.008	50	
19	231075	10	<5	45	940	<0.05	0.014	<0.008	<0.008	190	
20	231076	5	<5	25	1800	<0.05	<0.001	<0.008	<0.008	190	
21	231077	10	<5	45	1350	<0.05	<0.001	<0.008	<0.008	140	
22	231078	5	40	55	1000	<0.05	<0.001	<0.008	<0.008	130	
23	231079	<5	<5	45	1200	<0.05	0.001	0.021	<0.008	180	
24	231080	<5	<5	40	2850	<0.05	<0.001	<0.008	<0.008	170	
25	231081	15	5	40	1900	<0.05	<0.001	<0.008	<0.008	380	

Results in ppm unless otherwise specified
 = element present, but concentration too low to measure
 X = element concentration is below detection limit
 = element not determined

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A division of MacDonnell Hamilton & Co. Pty. Ltd.

942066

ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

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TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ni	Se	Pd	Pt	Au	S
1	231082	45	5	85	270	<0.05	<0.001	<0.008	<0.008	270
2	231083	10	10	170	440	0.05	<0.001	0.011	<0.008	450
3	231084	<5	<5	55	1050	0.05	<0.001	<0.008	<0.008	230
4	231085	5	<5	20	650	0.05	<0.001	<0.008	<0.008	130
5	231086	5	5	10	415	<0.05	<0.001	<0.008	<0.008	180
6	231087	5	<5	5	805	<0.05	<0.001	<0.008	<0.008	<10
7	231088	10	5	20	60	<0.05	0.015	<0.008	<0.008	40
8	231089	30	<5	20	30	0.05	0.020	0.012	<0.008	110
9	231090	10	<5	35	755	<0.05	0.005	<0.008	<0.008	240
10	231091	5	10	50	1800	<0.05	<0.001	<0.008	<0.008	230
11	231092	5	<5	30	2260	<0.05	0.002	<0.008	<0.008	200
12	231093	5	<5	20	945	<0.05	0.006	<0.008	<0.008	180
13	231094	5	<5	40	1500	<0.05	0.001	<0.008	<0.008	210
14	231095	10	<5	40	2000	<0.05	0.001	<0.008	<0.008	180
15	231096	5	<5	55	1400	<0.05	0.001	0.016	<0.008	340
16	231097	5	<5	35	1400	<0.05	0.001	<0.008	<0.008	150
17	231098	5	<5	30	325	<0.05	<0.001	<0.008	<0.008	180
18	231099	5	10	20	1350	<0.05	<0.001	<0.008	<0.008	500
19	231100	5	<5	25	750	<0.05	0.001	<0.008	<0.008	180
20	231101	10	10	775	415	0.05	<0.001	<0.008	<0.008	250
21	231102	10	<5	45	1950	<0.05	0.001	<0.008	<0.008	190
22	231103	35	<5	50	830	0.05	0.014	0.008	0.017	260
23	231104	30	<5	10	30	0.05	0.008	<0.008	<0.008	20
24	231105	10	5	25	200	<0.05	0.001	<0.008	<0.008	100
25	231106	5	<5	5	35	<0.05	0.001	<0.008	<0.008	30

Results in ppm unless otherwise specified
 ✓ = element present, but concentration too low to measure
 X = element concentration is below detection limit
 - = element not determined

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ANALABS

942067

A division of MacDonnell Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

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CLIENT ORDER No.

PAGE

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TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ni	Se	Pd	Pt	Au	S
1	231107	5	5	35	85	<0.05	0.009	<0.008	<0.008	70
2	231108	10	<5	55	1550	0.05	0.014	<0.008	<0.008	200
3	231109	5	<5	10	25	<0.05	<0.001	<0.008	<0.008	<10
4	231110	5	<5	15	20	<0.05	0.001	<0.008	<0.008	<10
5	231111	10	10	30	90	<0.05	<0.001	<0.008	<0.008	350
6	231112	55	<5	105	150	0.10	0.003	<0.008	<0.008	180
7	231113	15	30	70	80	0.05	<0.001	<0.008	<0.008	700
8	231114	10	10	15	45	<0.05	<0.001	<0.008	<0.008	120
9	231115	10	20	30	165	<0.05	0.001	<0.008	<0.008	70
10	231116	10	15	440	780	<0.05	0.009	0.142	<0.008	200
11	231117	5	<5	20	395	0.05	<0.001	<0.008	<0.008	80
12	231118	10	<5	55	1150	<0.05	0.006	<0.008	<0.008	220
13	231119	5	<5	45	1000	<0.05	<0.001	0.010	<0.008	250
14	231120	450	10	40	95	0.25	0.034	0.010	0.008	550
15	231121	15	10	1950	440	<0.05	<0.001	0.089	<0.008	150
16	231122	10	5	40	1700	<0.05	<0.001	0.008	<0.008	180
17	231123	10	10	245	530	<0.05	0.006	0.034	<0.008	200
18	231124	10	<5	120	1450	<0.05	0.005	0.013	<0.008	400
19	231125	15	10	405	785	<0.05	0.003	0.142	<0.008	350
20	231126	5	<5	40	800	<0.05	<0.001	<0.008	<0.008	110
21	231127	5	5	50	2100	<0.05	<0.001	0.009	<0.008	180
22	231128	10	5	20	55	<0.05	0.003	<0.008	<0.008	40
23	231129	10	1950	13000	1850	<0.05	0.005	<0.008	<0.008	150
24	231130	70	2900	11500	1150	<0.05	<0.001	<0.008	<0.008	3500
25	231131	625	155000	39000	320	<0.05	<0.001	<0.008	0.008	7100

Results in ppm unless otherwise specified
 P = element present; but concentration too low to measure
 X = element concentration is below detection limit
 - = element not determined

AUTHORISED OFFICER



ANALABS

942068

A division of MacDonald Hamilton & Co. Pty. Ltd.

ANALYTICAL DATA

SAMPLE PREFIX

REPORT NUMBER

REPORT DATE

CLIENT ORDER No.

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142.2.08.04005

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TUBE No.	SAMPLE No.	Cu	Pb	Zn	Ni	Se	Pd	Pt	Au	S
1	231132	35	50	60	85	<0.05	<0.001	<0.008	0.100	39500
2	231133	35	20	55	90	<0.05	0.014	0.013	<0.008	190
3	231134	275	31500	23500	585	<0.05	<0.001	<0.008	0.032	8600
4	231135	10	190	230	1350	<0.05	0.004	<0.008	<0.008	320
5	231136	120	33000	73500	1650	<0.05	0.001	<0.008	0.032	37000
6	231137	10	35	85	885	<0.05	<0.001	0.012	<0.008	110
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21	NOTE: Sample No. 231061 assayed for Au by Method 310									
22	Result = 14.17									
23	DETECTION	5	5	5	5	0.05	0.001	0.008	0.008	10
24	UNITS	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM
25	METHOD	101	101	101	101	116	311	311	309	199

Results in ppm unless otherwise specified
 T = element present but concentration too low to measure
 X = element concentration is below detection limit
 - = element not determined

AUTHORISED OFFICER

[Signature]



SPARE COPY
(Leave in book if not required)

ANALYSIS ORDER No. 17829

To M.E.L. Laboratory
cnr. Lionel & Holmes St.
Boulder, W.A. 6432
less addressed otherwise.

To AMCEL
11A GREENE ST
WINDYBUSH
TASMANIA 7250

PROPERTY HEAZLEWOOD
MAP REFERENCE OR DRAWING No. A.M.G
1:100,000.

CONSIGNMENT DETAILS
Total number of samples in consignment: (total of all orders)
Packed in:
Freight company:
Consignment Note No.: Dated:
From (town):
OR SEE CONSIGNMENT DETAILS ON ANALYSIS ORDER No.

942069

ONLY for orders to M.E.L. Lab.
M.E.L. ACCOUNT CODE or prospect / project

INSTRUCTIONS

1. Preparation
Amcel asked to always refer to instructions for water samples.

2. Elements & Analytical Methods Required.
Ir (Method A72)
Ni (Method A1-1)

Special Instructions
Cu Pb Zn
Ni Co Cr. Sg.
Au Pt Pd
Also, see samples 232, 139, 140, 198.
Packed in bag 198L

PRIORITY:
 ROUTINE
 PRIORITY
 URGENT (authorised by Explor. Mgr.)

SAY RESULTS:
I a copy of results to addresses listed below.

1 CHIEF DRAFTSMAN, EXPLORATION DEPT.
METALS EXPLORATION LIMITED
29 LEVEL, NAURU HOUSE
30 COLLINS STREET
MELBOURNE, AUSTRALIA, 3000

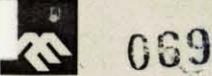
2 Simon Dudd
MELB.
(12) 15724

INVOICE: Send invoice to above address indicated by

ORDER PREPARED BY:
SIMON DUDD
Print Name
DATE: 24 / 4 / 96
Day Month Year

LOCATION AND OTHER DETAILS
PREPARE COLUMNS & HEADINGS TO SUIT

M.E.L. Analytical Report Sheets	SAMPLE TYPE (Soil, Drill Core, etc.)		(Hole No., Site, etc.)	(Interval, Position, etc.)	(NOTE)
	FIRST SAMPLE No.	LAST SAMPLE No.	Fentons.		
	SAMPLE No.	MATERIAL			
		GRAPE			
1	222100		358150	5410560	
2	101		358470	5411730	
3	102		358250	5411580	
4	103		358300	5411540	
5	104		357680	5411280	
6	105		356940	5411150	
7	106		357080	5409980	
8	107		" "	" "	
9	108		" "	" "	
10	109		357870	5410840	
11	282110		357820	5410910	Fluctuous specimen sulphides.
12	111		357820	5410910	
13	112		357820	5410910	
14	113		357820	5410910	
15	114		357820	5410910	
16	115		357750	5410720	
17	116		357720	5410730	
18	117		357700	5410740	
19	118		357690	5410745	
20	119		357670	5410755	
21	120		357640	5410770	
22	121		357630	5410780	
23	122		357720	5410625	
24	123		357705	5410630	
25	124		357690	5410640	
26	125		357670	5410650	
27	126		357655	5410660	
28	127		357635	5410670	
29	128		357615	5410680	
30	222129		357600	5410690	



To M.E.L. Laboratory
cnr. Lionel & Holmes St.
Boulder, W.A. 6432

To AMDEL
11 A GIBBELL ST
WYVONVILLE
PHONE 100 7520

PROPERTY HEAZLEWOOD

MAP REFERENCE
OR DRAWING No.

942070

CONSIGNMENT DETAILS (total of all orders)

Total number of samples in consignment: _____

Packed in: _____

Freight company: _____

Consignment Note No.: _____ Dated: _____

From (town): _____

OR SEE CONSIGNMENT DETAILS ON ANALYSIS ORDER No. _____

ONLY for orders to M.E.L. Lab.
M.E.L. ACCOUNT CODE or prospect / project

ORDER PREPARED BY:
Simon Dudd
Print Name
DATE: 24 / 4 / 86
Day Month Year

LOCATION AND OTHER DETAILS

PREPARE COLUMNS & HEADINGS TO SUIT

INSTRUCTIONS

- Preparation
- Elements & Analytical Methods Required.

M.E.L. Analytical Report Sheets	SAMPLE TYPE (Soil, Drill Core, etc.)		(Hole No., Site, etc.)	(Interval, Position, etc.)	(NOTE)
	FIRST SAMPLE No.	LAST SAMPLE No.			
	SAMPLE No.	MATERIAL			
	GRAB				
			FENTONS		
			E	N	
1	232130		357575	5410700	
2	131		357530	5410720	
3	132		357735	5410600	
4	133		357700	5410580	
5	134		357700	5410580	
6	135		357530	5410465	
7	136		3578410	5410415	
8	137		357560	5410280	
9	138		357600	5410795	
10	232137		357870	5410840	Fenton silts. Amel.
11	140		357870	5410840	
12	141		357955	5410500	
13	142		357540	5410530	
14	143		547800	5410600	
15	144		547950	5410600	
16	145		547680	5411275	
17	146		357820	5410910	
18	147		357820	5410910	
19	148		358310	5409520	
20	149		358335	5409565	
21	150		358320	5409620	
22	151		358310	5409670	
23	152		358460	5410980	
24	153		" "	" "	
25	154		" "	" "	
26	155		357915	5410975	
27	156		357880	5411020	
28	157		357835	5411020	
29	158		357875	5411015	
30	232159		357940	5411080	

Ir (method A72)
Ni (method A1-1)

Special Instructions
Assigned in May 1986.

JOB PRIORITY:

ROUTINE

PRIORITY

URGENT (authorised by Explor. Mgr.)

SAY RESULTS:
If a copy of results to addresses listed below.

1 CHIEF DRAFTSMAN, EXPLORATION DEPT.
METALS EXPLORATION LIMITED
29 LEVEL, NAURU HOUSE
80 COLLINS STREET
MELBOURNE, AUSTRALIA, 3000

2 Simon Dudd
Melb

NOTE: Send invoice to above address indicated by



To M.E.L. Laboratory
 cnr. Lionel & Holmes St.
 Boulder, W.A. 6432

To AMDEL
110 CARTELLI ST.
WYVANHICE
TENNANT TO 730

PROPERTY HEAZLEWOOD

MAP REFERENCE OR DRAWING No.

942071

CONSIGNMENT DETAILS (total of all orders)

Total number of samples in consignment: _____

acked in: _____

eight company: _____

Consignment Note No.: _____ Dated: _____

rom (town): _____

OR SEE CONSIGNMENT DETAILS ON ANALYSIS ORDER No. _____

ONLY for orders to M.E.L. Lab.
 ACCOUNT CODE or prospect / project

INSTRUCTIONS

1. Preparation

2. Elements & Analytical Methods Required.

Ir (method A72)
Ni (method A1-1)

Special Instructions

Assayed in May 1986

PRIORITY:

- ROUTINE
- PRIORITY
- URGENT (authorised by Explor. Mgr.)

SAY RESULTS:

1 a copy of results to addresses listed below.

1 CHIEF DRAFTSMAN, EXPLORATION DEPT.
 METALS EXPLORATION LIMITED
 29 LEVEL, NAURU HOUSE
 80 COLLINS STREET
 MELBOURNE, AUSTRALIA, 3000

2 SIMON DODD
MELB

INVOICE: Send invoice to above address indicated by

ORDER PREPARED BY:
SIMON DODD
 Print Name
 DATE: 24 / 4 / 86
 Day Month Year

LOCATION AND OTHER DETAILS

PREPARE COLUMNS & HEADINGS TO SUIT

M.E.L. Analytical Report Sheets	SAMPLE TYPE (Soil, Drill Core, etc.)		(Hole No., Site, etc.)	(Interval, Position, etc.)	(NOTE)
	FIRST SAMPLE No.	LAST SAMPLE No.			
	SAMPLE No.	MATERIAL	E	N	
	1 232190		1756E	ON	
	2 191		1756E	ON	
	3 192		1566E	ON	
	4 193		166E	ON	
	5 194		215E	ON	
	6 195		218E	ON	
	7 196		218E	ON	
	8 197		226E	ON	<u>Area</u>
	9 232198		BRASSY	NICKEL	<u>MINERALS</u>
	10 199		361720	5406880	<u>AMG.</u>
	11 232500		361720	5406880	
	12 501		359830	5406330	
	13 502		259830	5405960	
	14 503		257980	5405560	
	15 504		257820	5406620	
	16 505		357880	5406680	<u>V</u>
	17 506		50E	200E	<u>CAUDRY'S</u>
	18 507		90E	200E	<u>GRID</u>
	19 508		143E	200E	
	20 509		215E	200E	
	21 510		235E	200E	
	22 511		275E	200E	
	23 512		320E	200E	
	24 513		400E	200E	
	25 514		500E	500E	
	26 515		450E	ON	
	27 516		260E	ON	
	28				
	29				<u>V</u>
	30				

071

A O's No 17829, 11820, 17812

942072

Analysis code A1/1

Report AC 4509/86

Page G1

NATA Certificate

Results in ppm

Sample	Cu	Pb	Zn	Ni	Co	Cr
232110	40	<5	28	4800	195	810
232111	15	<5	25	3540	115	890
232112	170	<5	19	1.23%	395	910
232113	<2	<5	15	950	70	800
232114	84	<5	18	5250	175	580
232139	14	<5	31	5400	205	1220
232140	4	<5	28	1280	94	870
232198	120	<5	20	7.66%	1780	350
Detn limit	(2)	(5)	(2)	(5)	(5)	(10)

↑
ONLY
ASSAYS
DONE

Handwritten

Report AC 4509/86
Page 1

ANALYSIS

SAMPLE MARK	ANTIMONY Sb ppm	GOLD Au g/tonne	PALLADIUM Pd µg/g	PLATINUM Pt µg/g
232110	<4	0.1	<0.005	<0.005
232111	<4	0.1	<0.005	<0.005
232112	<4	0.1	<0.005	<0.005
232113	<4	0.1	<0.005	<0.005
232114	<4	<0.1	<0.005	<0.005
232139	<4	0.1	<0.005	<0.005
232140	<4	0.1	<0.005	<0.005
232198	<4	0.1	0.035	<0.005

Method: X1 A7/1 ----- A7/3 -----



METALS EXPLORATION LIMITED

NORTH WEST TASMANIA
HEAZLEWOOD PROSPECT
EXPLORATION LICENCE 21/85

**STREAM SEDIMENT
SAMPLE LOCATIONS**

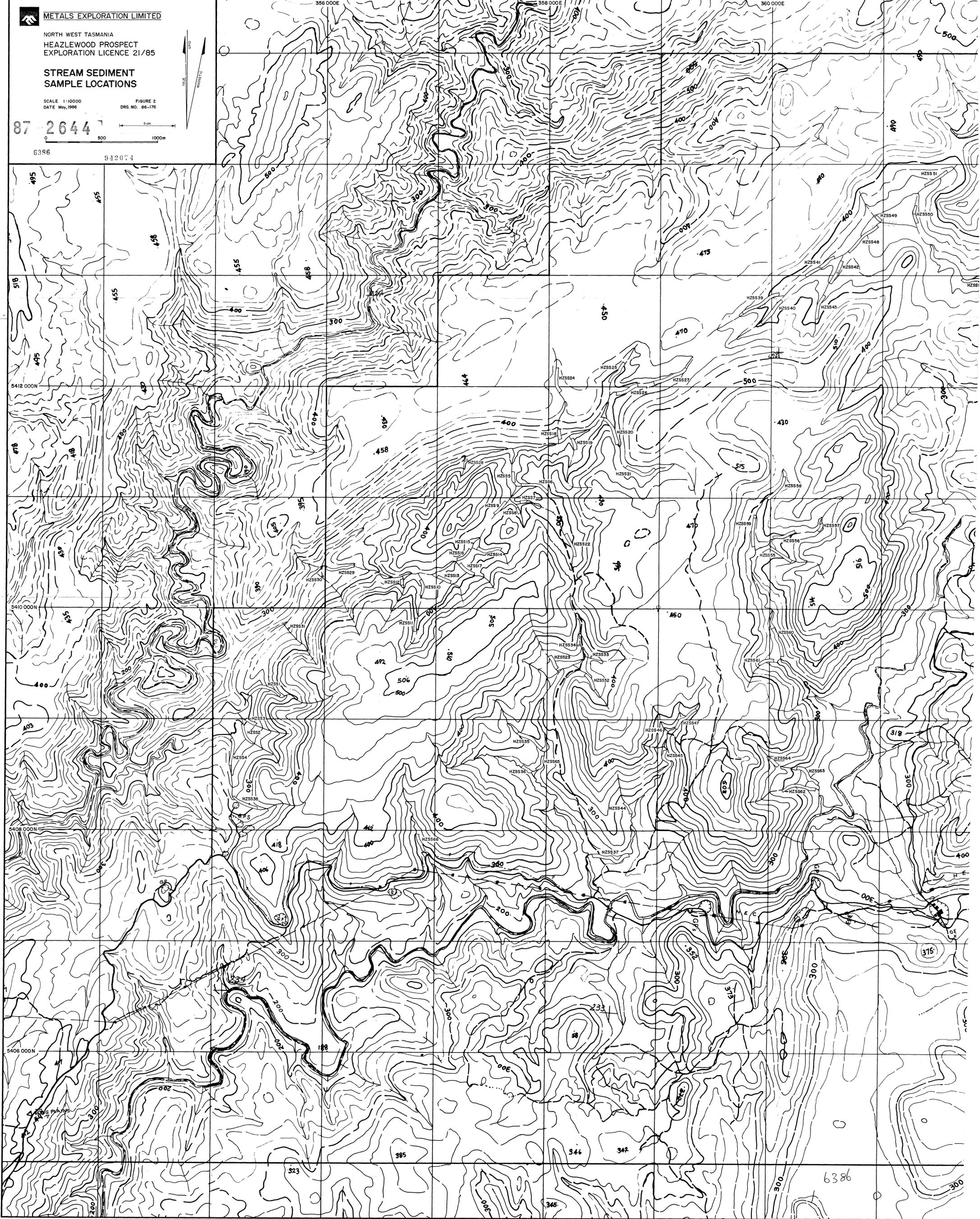
SCALE 1:10000
DATE May, 1986

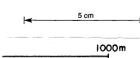
FIGURE 2
DRG. NO. 86-176

87 2644

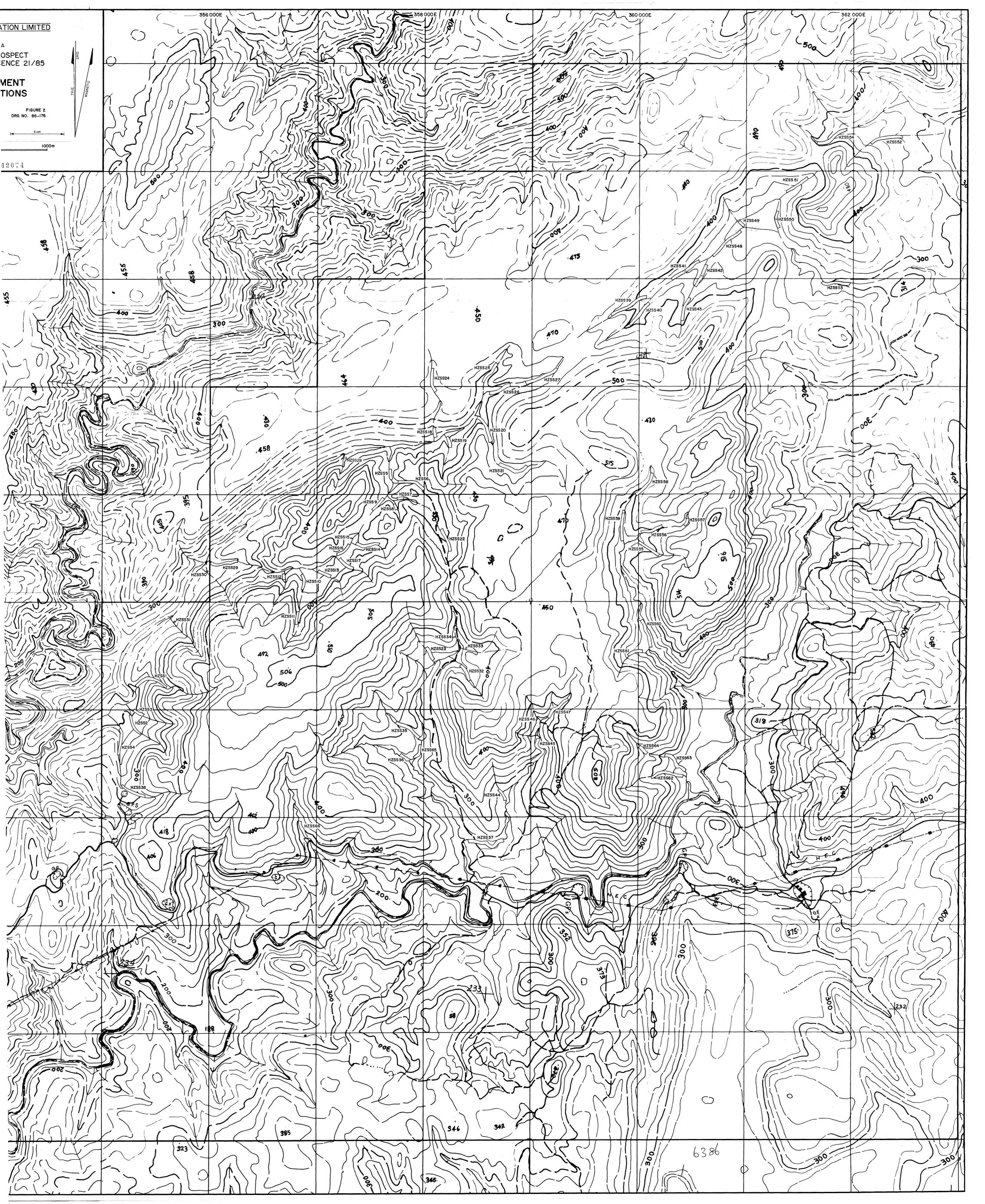
500m
1000m

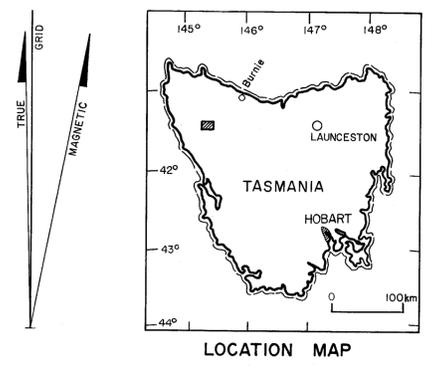
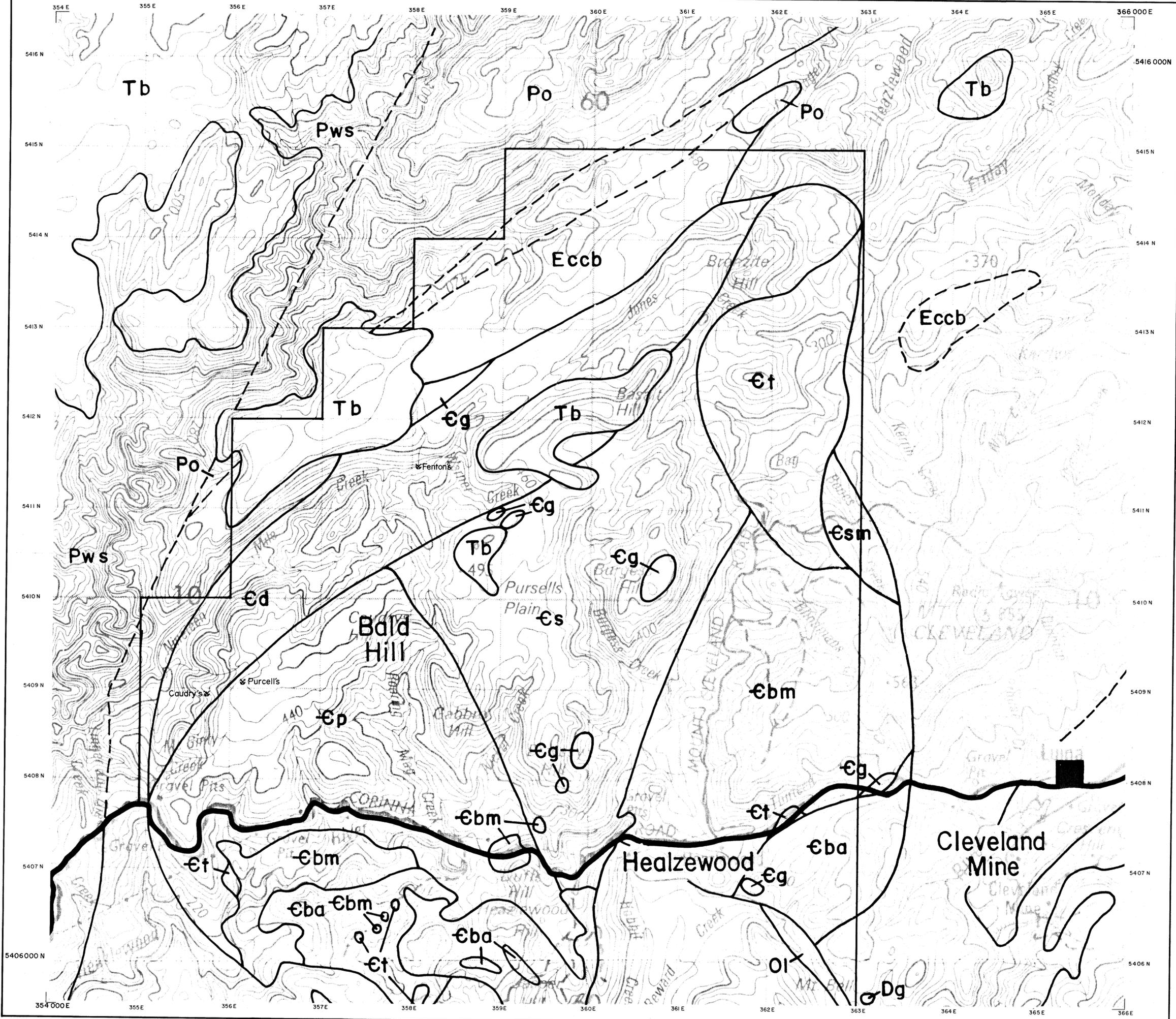
8386 942074





42074

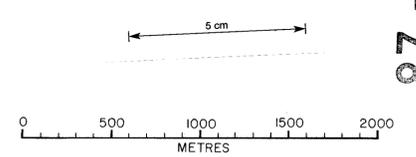




LEGEND

SILURO-DEVONIAN	S-Du	Eidon Group and correlatives
ORDOVICIAN	O1	Gordon Limestone Sub-Group and correlatives
	Oa	Dawn Formation and correlatives, including Molle Sandstone
EOCAMBRIAN	Ecc	Crimson Creek Formation and correlatives, areas of dominantly low flows Eccb [Ecc] indicated
	Eec	Success Creek Group and correlatives
PRECAMBRIAN	Pws	Wynne Schist and correlatives, including Concert Schist
	Po	Oonah Formation and correlatives
TERTIARY	Tb	Alkali Olivine and Tholeiitic Basalt, with associated sediment
DEVONIAN	Dg	Granitoids
CAMBRIAN	Eg	Gasbro
	Ebm	Low-Titanium Tholeiite
EOCAMBRIAN	Eba	High-Magnesian Andesite, and associated coarse-grained pyroxenite
	Et	Tonalite and associated rocks
	Ep	Pyroxenite
	Ed	Dunite
	Ea	Serpentinized ultramafic, mafic rocks, tectonic mélange (Ea [Ea] indicated)

⊗ 1930's Prospect



Map covered with 1000 metre Australian Map Grid, Zone 55. Contours interval 40 metres.

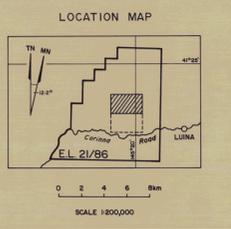
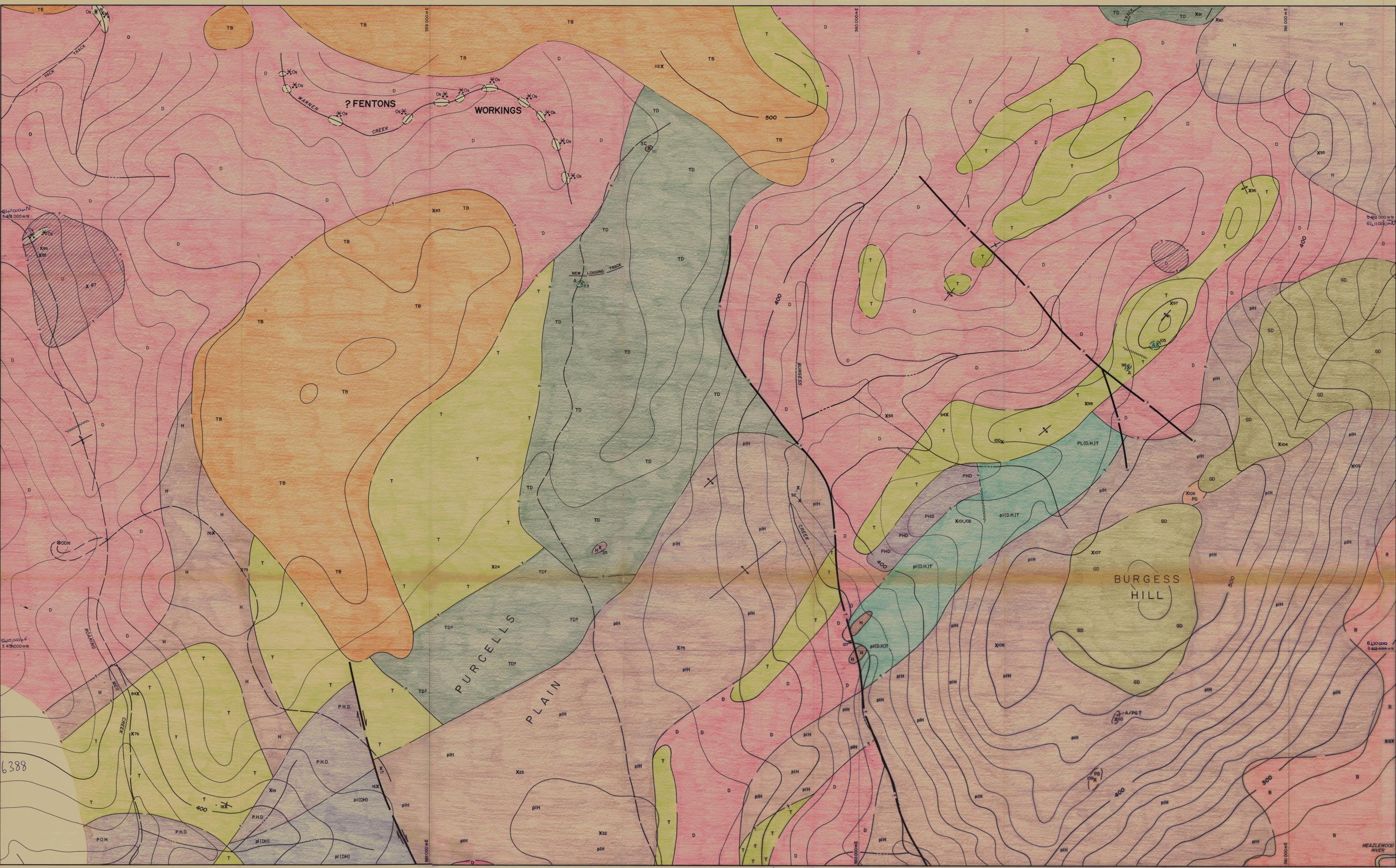
942075
METALS EXPLORATION LIMITED

HEAZLEWOOD PROSPECT, TASMANIA
 E.L.21/85
Geology and Location Map

Grey base map photo enlarged by M.E.L. from Cleveland 7915-II 1:50,000 topographic sheet (provisional) by Lands Department.

Prepared by: Date: SCALE 1:20,000
 Traced by: Date:
 Revised: Date: DRG No. 86-080

87-2044



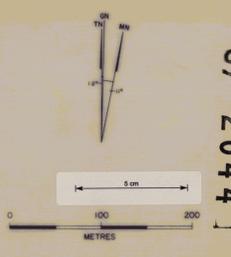
- LEGEND**
- TRACK
 - CREEK
 - CONTOURS (20m intervals)
 - GEOLOGICAL BOUNDARY - POSITION APPROXIMATE
 - GEOLOGICAL BOUNDARY - POSITION INFERRED
 - FAULT POSITION APPROXIMATE
 - FAULT POSITION INFERRED
 - ANTICLINE, FOLD AXIS
 - STRIKE OF BEDS
 - SHEAR ZONE
 - SILICIFICATION
 - X21 SAMPLE LOCALITY (PREFIX 231....)
 - DDH PRE M.E.L. DIAMOND DRILL HOLE SITE
 - CHROMITE MINOR MINERAL OCCURRENCE
 - ABANDONED ALLUVIAL WORKINGS
 - ABANDONED HARD ROCK WORKINGS
 - MINE NOT BEING WORKED
 - QUARRY
 - SHALLOW SHAFT, TRENCH

TERTIARY

TB	BASALT
B	BASALT
PG	PLAGIO GRANITE
SC	SILICA CARBONATE ROCK
A	ANORTHOSITE
T	TROCTOLITE
GD	GABBRO/DOLERITE
GN	GABBRO/NORITE
P	PYROXENITE
H	HARZBURGITE (PHI) PLAGIOCLASE HARZBURGITE
D	DUNITE

MULTI LITHOLOGY ROCK GROUPS

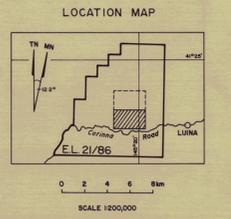
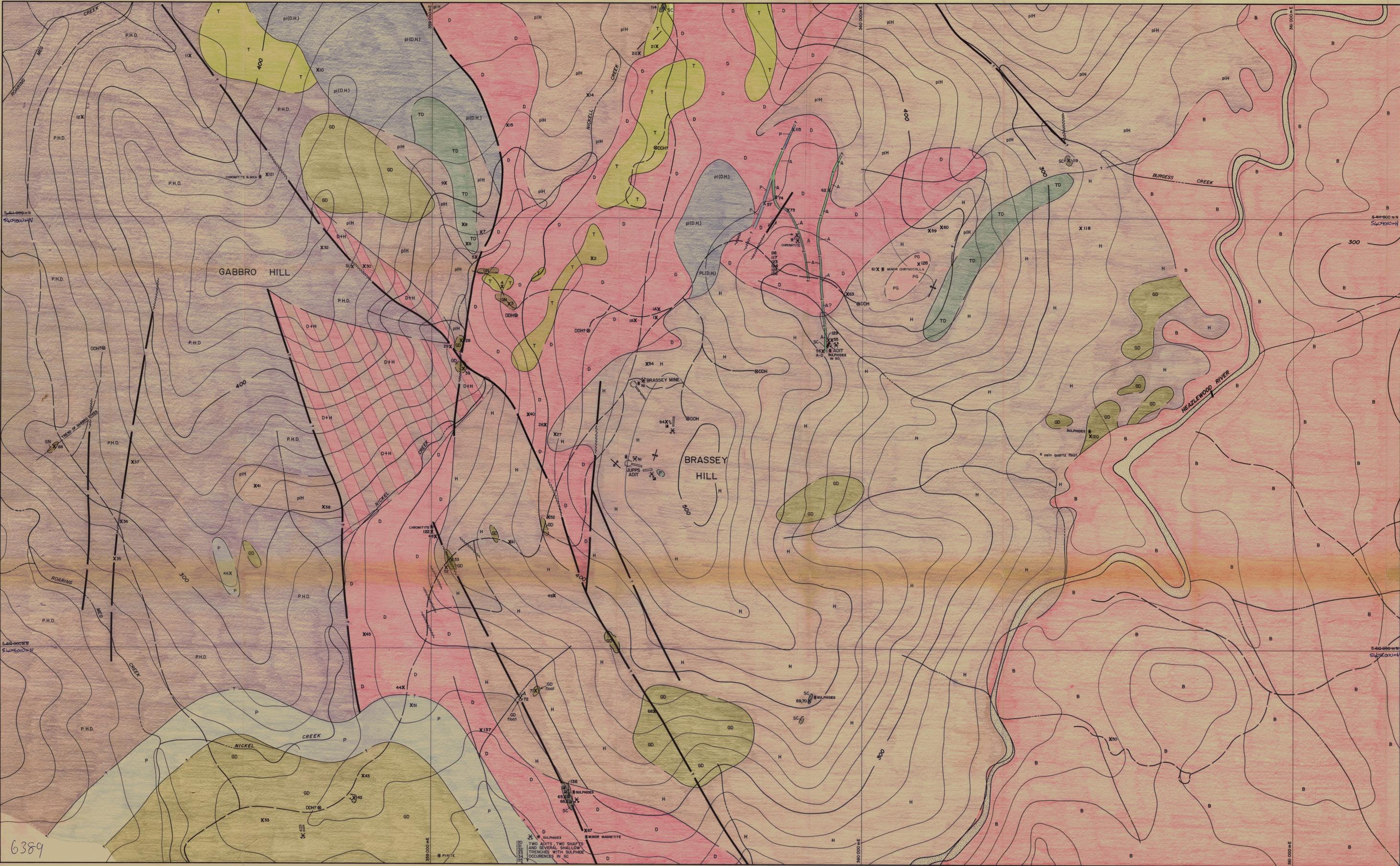
P.H.D.	INTERLAYERED PYROXENITE - HARZBURGITE - DUNITE
pl(D,H)	INTERLAYERED PLAGIOCLASE DUNITE - PLAGIOCLASE HARZBURGITE
pl(D,H,T)	INTERLAYERED PLAGIOCLASE DUNITE - PLAGIOCLASE HARZBURGITE - TROCTOLITE
TD	INTERLAYERED TROCTOLITE - DUNITE



942076
METALS EXPLORATION LIMITED
 HEAZLEWOOD PROSPECT, N.W. TASMANIA
 EXPLORATION LICENCE 21/85
 Interpretation of Fact Geology
BURGESS HILL SHEET
 PREPARED: T. SUMMONS, K. MORRISON, G. ANDERSON
 DATE: OCTOBER 1988
 SCALE: 1:2500
 FIGURE 4
 DRG. NO. 86-346
 BASE MAP DRG. NO. 86-335

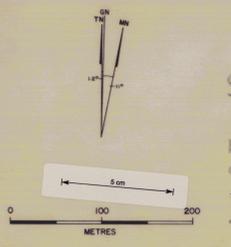
6388

87-2644



- LEGEND**
- TRACK
 - CREEK
 - CONTOURS (20m intervals)
 - GEOLOGICAL BOUNDARY - POSITION APPROXIMATE
 - GEOLOGICAL BOUNDARY - POSITION INFERRED
 - FAULT POSITION APPROXIMATE
 - FAULT POSITION INFERRED
 - ANTICLINE, FOLD AXIS
 - STRIKE OF BEDS
 - SHEAR ZONE
 - SILICIFICATION
 - X21 SAMPLE LOCALITY (PREFIX 231...)
 - DDH1 PRE M.E.L. DIAMOND DRILL HOLE SITE
 - CHROMITE MINOR MINERAL OCCURRENCE
 - OS MIRIDIUM
 - ABANDONED ALLUVIAL WORKINGS
 - ABANDONED HARD ROCK WORKINGS
 - MINE NOT BEING WORKED
 - QUARRY
 - SHALLOW SHAFT, TRENCH

- TERTIARY**
- BASALT
- CAMBRIAN AGE HEAZLEWOOD MAFIC-ULTRAMAFIC COMPLEX**
- BASALT
 - PLAGIO GRANITE
 - SILICA CARBONATE ROCK
 - ANORTHOSITE
 - TROCTOLITE
 - GABBRO/DOLERITE
 - GABBRO/NORITE
 - PYROXENITE
 - HARZBURGITE (with H in plagioclase Harzburgite)
 - DUNITE
- MULTI LITHOLOGY ROCK GROUPS**
- INTERLAYERED PYROXENITE - HARZBURGITE - DUNITE
 - INTERLAYERED PLAGIOCLASE DUNITE - PLAGIOCLASE HARZBURGITE
 - INTERLAYERED PLAGIOCLASE DUNITE - PLAGIOCLASE HARZBURGITE - TROCTOLITE
 - INTERLAYERED TROCTOLITE - DUNITE



METALS EXPLORATION LIMITED

HEAZLEWOOD PROSPECT, N.W. TASMANIA
EXPLORATION LICENCE 21/85

Interpretation of Fact Geology

912077
BRASSEY HILL SHEET

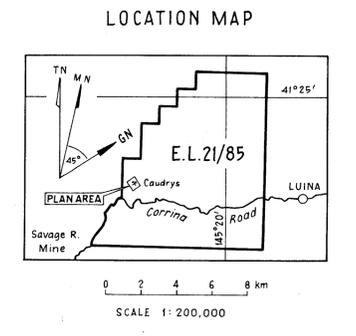
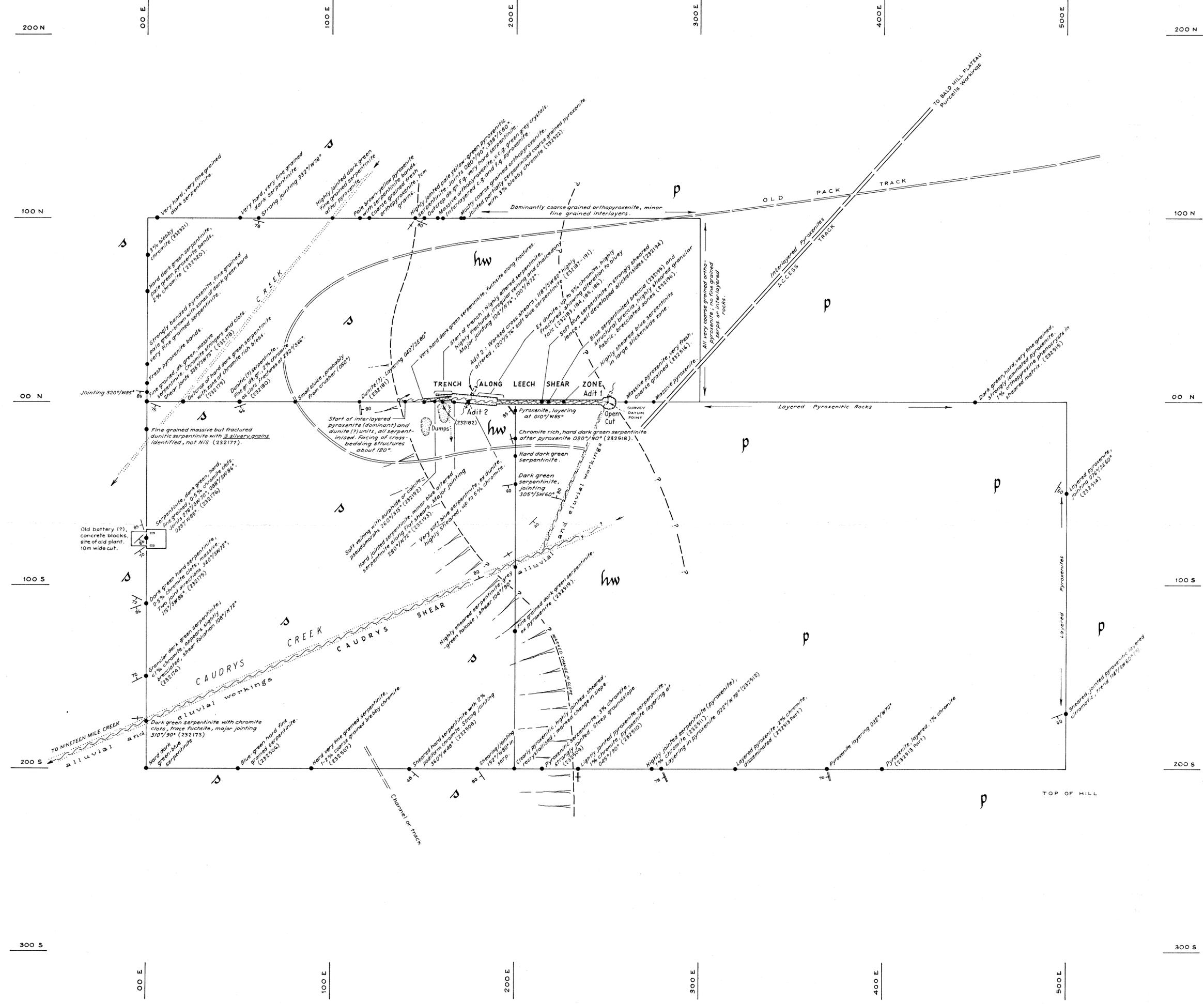
PREPARED BY T. SUMMONS, K. MORRISON, G. ANDERSON
DATE OCTOBER 1988
SCALE 1:2500

6389
PLATE 5
DNG NO. 86-345

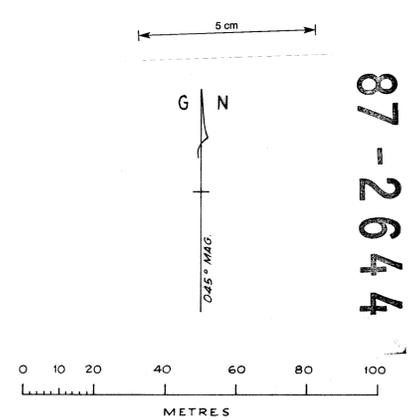
BASE MAP DNG NO. 86-336

6389

35 SULPHIDES
TWO ADITS, TWO SHAFTS
AND SEVERAL SHALLOW
TRENCHES WITH SULPHIDE
OCCURRENCES IN SC



- LEGEND**
- p PYROXENITE: Mostly massive and interlayered pyroxenite, mostly coarse grained.
 - hw HARZBURGITE AND OLIVINE WEBSTERITE: Variably serpentinised.
 - s SERPENTINITE: Very hard, fine grained dark green serpentinite (after dunite-pyroxenite-harzburgite).
 - (232154) Sample locality and number, and strike/dip location in some cases.
 - Geological boundary, approx. position
 - ~~~~~ Shear zone
 - ↗ 57° Strike and dip, as described.
 - ↘ 65° Strike and dip of layering.
 - |— Cut line for geological mapping.
 - ⋯⋯⋯ Creek, approximate position.



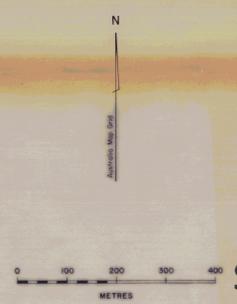
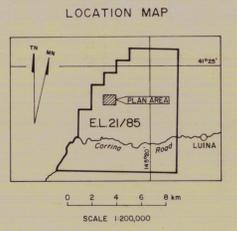
87-2644

942078
METALS EXPLORATION LIMITED
 HEAZLEWOOD PROSPECT
 E.L. 21/85, N.W. TASMANIA
 GEOLOGY IN VICINITY OF
 CAUDRYS WORKINGS

SCALE 1:1000
 6390
 Prepared by Simon Dodd, May 1986
 Drawn by C.R.M. Revised: 17-6-86
 FIGURE 6
 Drg. No. 86-175 A

LEGEND

51	INTERLAYERED GABBRO/DOLERITE	S	SERPENTINIZATION
50	MASSIVE PYROXENITE	• 232105	SAMPLE NUMBER AND LOCATION
49	OLIVINE BEARING INTERLAYERED PYROXENITE	• cr	CHROMITE LOCATION
48	LHERZOLITE	GRAD	GRADATIONAL CONTACT
47	HARZBURGITE		Contour intervals 20m
46	DUNITE		
—	ROCK BOUNDARY		
—	APPROXIMATE BOUNDARY		
—?	INFERRED BOUNDARY		
—F—	FAULT		
—F—?	INFERRED FAULT		
—	SHEAR ZONE		
— ¹⁰	DIP AND STRIKE (LAYERED)		
—	DIP AND STRIKE (JOINTING)		
—	TREND LINE		



87-2644

METALS EXPLORATION LIMITED

HEAZLEWOOD PROSPECT, TASMANIA
EXPLORATION LICENCE 21/85

942079

**GEOLOGY IN THE VICINITY
OF FENTONS WORKINGS**

DATE MAY 1986
SCALE 1:2500

6391

FIGURE 7
ORIG. NO. 86-174