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METALS EXPLORATION LIMITED

METALS EXPLORATION LIMITED

**WELD RIVER
SOUTH WEST TASMANIA
EL 11/84**

**ANNUAL REPORT FOR THE PERIOD ENDING
27TH SEPTEMBER, 1987**

REPORT NO. 212003

OPEN FILE

Copies: Department of Mines, Tasmania
M.C. Forster
Exploration - Perth
Exploration - Melbourne
Library

T.G. SUMMONS

February, 1988

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1. INTRODUCTION

1.1 Location and Access

The Weld River commences in the area between Mt. Bowes and Mt. Mueller in south central Tasmania, and drains in a south east direction for about 30km to its confluence with the Huon River, 24km west southwest of Huonville, and 50km south west of Hobart.

The area covered by EL 11/84 is centred on Glovers Bluff, and the eastern boundary of the property is situated 2.5km north west of the Weld-Huon river junction.

The principal access to the Licence area is via the Arve Road from Geeveston to the Huon River, and thence along the South Weld Road to the southern half of EL 11/84. Access to the northern half of the property is via the Weld Road from Judbury, the last 5km of which is only navigable by 4WD vehicles in dry weather.

1.2 Topography and Drainage

The Licence area is one of rugged relief, ranging from 50m ASL on Glovers Plain to 700m ASL near Mt. Frederick in the south west, and to 440m ASL on Bernard Spur in the north west portion of the property.

The Weld River bisects the licence from north west to south east, and all minor drainage is directed northward and southward in to this major tract.

Close to the valley of the Weld River, local topography is dominated by the NW-SE trending Bernard Spur - Camels Back ridge which culminates in the 180m high cliff face of Glovers Bluff.

002.3 Vegetation

The vegetation present in the Licence area is of the low altitude - high rainfall type, ranging from button grass moor (over the Precambrian age metasediments) to the Eucalyptus obliqua tall and wet forest over both the other rocks of the Weld River inlier and the enclosing Parmeener Super Group rocks. Localised patches of dense rain forest and scrub understories occur, particularly south of the Weld River at the eastern end of Glovers Plain.

1.4 Tenure

Exploration Licence 11/84, covering an area of 25 sq.km, was granted to M.C. Forster on the 28th September 1984 for a period of up to ten years.

Although the Licence area is entirely enclosed by the South West Conservation Area (SWCA, proclaimed in 1978), the State Government (through the Department of Mines) has consistently encouraged mineral exploration activities in the area.

Since 1980 the SWCA has been included on the register of the National Estate (under the Heritage Commission Act of 1974), and much of this area is currently being proposed for World Heritage listing.

The Weld River part of the SWCA is currently administered by the State Forestry Commission, (logging operations in the general area are accessed by the South Weld Road).

Since the 5th January 1987, the rights to explore for metallic minerals in EL 11/84 have been the subject of an option agreement between M.C. Forster and Metals Exploration Limited.

1.5 Previous Exploration and Mining

Reward Leases for both nickel (north bank) and osmiridium (south bank) were granted during the osmiridium boom of the 1930's. The nickel was extracted from a shaft, while the PGE may have either an eluvial or alluvial source within the reward lease area.

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In addition, an adit was driven into the southern end of Hogsback Hill, reputedly for gold.

There is no recorded production of nickel, gold or platinoids (osmiridium) from the area. Pioneer Concrete Services conducted an open hole drilling program across and along the Hogsback Hill in 1985, (Mac Forster pers. comm).

1.6 Exploration Philosophy

The exploration model adopted to investigate the platinoid potential of the area is one of PGE concentrations in the cumulative layers of a stratiform complex, typified by the Bushveld and Stillwater Complexes.

While this model may be deficient in specific details, the gross features are considered relevant at this stage, although considerable tectonic remobilisation and consequent dismembering of the ultramafic rocks is believed to have occurred (similarly to the Adamsfield Complex).

1.7 Regional Geology

The 1:250 000 scale Hobart sheet shows the Weld River inlier to consist of undifferentiated Precambrian age rocks, fault bounded by dolerite of Jurassic age.

1.8 Tenement Geology and Mineralization

The geology of the area is poorly known, and not well published. In recent years the author has recognised the presence of ultramafic rocks beneath the Hogsback, and this ultramafic suite has suffered extensive alteration including serpentinization, steatization, carbonation and silicification.

Mineralization observed to date includes chromite, PGE, and gold (values up to 0.36 g Au/t in talc schist).

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2. CURRENT EXPLORATION ACTIVITIES

2.1 Lithologies

A review of the Pioneer Concrete Services work done in 1985 shows the presence of ultramafic lithologies in the vicinity of both the Hogsback Hill and the western edge of Fletchers Plain; these rock types ranged from pyroxenite to serpentinitised dunite, and several percent of chromite was logged in a few of the holes.

Outcrop in the bed of the Weld River upstream from the adit (at the southern end of Hogsback Hill), consists of strongly sheared, pyritised, chloritised and sericitised porphyritic rhyolite, volcanic wacke, and volcano-sedimentary conglomerate.

These rocks show strong similarities with either the Dundas Group or the Mt. Read Volcanics of western Tasmania.

Also seen in this area were several mafic dykes, which are assumed to be of post Cambrian age.

Full petrographic details are included as Appendix II. In the vicinity of the adit, but on the opposite (south) bank of the Weld River, a blue/grey chert was sampled, and found to contain framboidal pyrite in fractures; this rock also contains traces of galena, and may be a siliceous sinter (Appendix I).

2.2 Grab and Chip Sampling

Reconnaissance traverses in both the north and south bank areas have shown the general area to have a thick cover of soil and alluvium. A total of 21 grab and chip samples were collected, the analyses for which are shown in Tables 1, 3 and 4.

The most notable results obtained were grades of <0.36 g Au/t, (Sample 235272, Table 1), from a talcose schist exposed on the south bank of the Weld River. Repeat samples of similar material (Samples 255761-763, Tables 3 and 4) were not anomalous in gold, but were slightly elevated in Cu, Co and Ni values.

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The blue/grey chert samples, collected opposite the adit at the southern end of Hogsback Hill, returned anomalous Pb grades, and possibly anomalous Zn and Sb values.

2.3 Drill Hole Sampling

The Pioneer Concrete Services drill holes HB-8, and HB-10 (in which several percent chromite was seen), were assayed for Ir, Ni and Au, as shown in Table 2.

Whilst the Au grades are anomalous, the Ni and Ir values are not elevated, although the highly siliceous (? replaced) state of the rocks may preclude the preservation of original (pre alteration) PGE concentrations.

3. CONCLUSIONS AND RECOMMENDATIONS

The preliminary nature of the exploration to date does not allow wide ranging and definite conclusions about the mineral potential of the property to be made at present.

Significant observations include the following:-

- 3.1 Probable lithocorrelates of the Mt. Read volcanics occur in the area;
- 3.2 The nickel and PGE mineralization recorded in the area is related to an altered ultramafic body.
- 3.3 Possible epithermal style gold mineralization may occur in the vicinity of the old adit, at the southern end of Hogsback Hill.

It is recommended that a full program of gridding, mapping, auger and percussion drilling be undertaken to further assess the PGE, Au (and? base metal) potential of the property.

EXPENDITURE

Expenditure Statement

I, .IAN.DONALD.FINCH.....
.PRINCIPAL.GEOLOGIST.....
.619.MURRAY.STREET..WEST.PERTH..WA..6005.....

in the STATE OF WESTERN AUSTRALIA, do solemnly and
sincerely declare:-

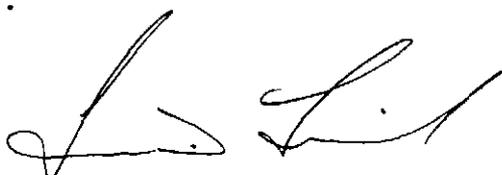
THAT an amount of \$8,700 has been expended on Exploration
Licence No. 11/84 - Weld River during the twelve month
period to 27 September 1987 and is made up as follows:

Assays	\$1,260
Field Expenses	\$ 440
Technical Services	\$2,700
Hire of Vehicles	\$ 370
Petrology	\$2,400
Travel and Accommodation	\$1,530

	\$8,700

and I make this solemn declaration by virtue of section
106 of the Evidence Act, 1906.

Declared before me at Perth
this 26th April 1988....



Rev Jones
Authorized person

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TABLE 1

SAMPLE	Cu	Pb	Zn	Ag	Au	Pt	Pd	Ni	Co	Cr	Mn	As	Sb
235270	16	28	18	0.7	0.32	<5	<1	70	8	28	80	12	8
235271	16	28	20	0.6	0.29	<5	<1	70	8	42	80	10	<4
235272	18	30	20	0.7	0.36	<5	<1	34	6	8	40	14	18
235273	7	20	40	1.4	0.03	<5	<1	65	24	36	330	<2	6
235274	46	14	36	0.8	0.08	<5	<1	28	14	16	185	3	4
235275	16	18	80	1.4	0.01	<5	<1	80	28	28	960	5	<4
235276	2	8	22	0.6	0.09	<5	<1	990	60	710	1200	26	12
235277	3	70	90	1.1	0.02	<5	<1	125	6	690	75	30	46
UNITS	ppm	ppm	ppm	ppm	ppm	ppb	ppb	ppm	ppm	ppm	ppm	ppm	ppm
SCHEME	AAS1	AAS1	AAS1	AAS3A	FAS1	FAS2	FAS2	AAS1	AAS1	AAS2	AAS2	XRF1	XRF1

APPENDIX 1

ANALYSES BY COMLABS PTY. LTD.

- 235270 : "Talc schist" (478060E, 5234 500N)
- 235271 : Ferruginous "chlorite schist" (477940E, 5234 420N)
- 235272 : "Talc schist" with goethite pseudomorphs of pyrite (location as for 235270)
- 235273 : "Chlorite-talc" schist (477960E, 5234 430N)
- 235274 : Mafic dyke (478000E, 5234 440N)
- 235275 : Schistose metasediment-manganiferous (478020E, 5234 450N)
- 235276 : Gossanous silicified ultramafic (478020E, 5234 460N)
- 235277 : Kaolinised ultramafic (location as for 235276)

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TABLE 2

SAMPLE	DRILL HOLE	INTERVAL	Au	Ir	Ni
232200	HB-08	1 - 2m	0.090	<0.01	86
232201	HB-08	2 - 3	0.110	<0.01	58
232202	HB-08	3 - 4	0.085	<0.01	48
232203	HB-08	4 - 5	0.105	<0.01	20
232204	HB-08	5 - 6	0.100	<0.01	22
232205	HB-08	6 - 7	0.115	<0.01	20
232206	HB-08	7 - 8	0.120	<0.01	14
232207	HB-08	8 - 9	0.055	<0.01	10
232208	HB-08	9 - 10	0.130	<0.01	20
232209	HB-08	10 - 11	0.080	<0.01	26
232210	HB-08	11 - 12	0.115	<0.01	16
232211	HB-10	1 - 2	0.180	<0.01	18
232212	HB-10	2 - 3	0.210	<0.01	20
232213	HB-10	3 - 4	0.125	<0.01	16
232214	HB-10	4 - 5	0.035	<0.01	12
232215	HB-10	5 - 6	0.055	<0.01	30
232216	HB-10	6 - 7	0.055	<0.01	34
232217	HB-10	7 - 8	0.135	<0.01	38
232218	HB-10	8 - 9	0.050	<0.01	26
232219	HB-10	9 - 10	0.065	<0.01	32
232220	HB-10	10 - 11	0.165	<0.01	46
232221	HB-10	11 - 12	0.080	<0.01	38
UNITS			ppm	ppb	ppm
METHOD			A7/2 (50g)	A7/2 Spec.	A1/1

Analyses by AMDEL

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TABLE 3

SAMPLE NUMBER	Pt	Pd	Ru	Rh	Ir	Os	Au F
255753	0.5	1.5	6.0	1.0	12	2	200
255753 DUP	<0.5	0.5	5.5	1.0	6.0	6	
255754	1.0	2.0	4.0	1.0	1.5	<2	30
255755	1.0	1.5	3.0	1.0	2.5	<2	30
255756	0.5	1.0	4.0	1.0	1.0	<2	40
255757	<0.5	1.5	3.0	1.0	1.0	<2	40
255758	<0.5	2.5	2.5	1.0	2.0	2	40
255759	0.5	1.0	3.0	1.0	1.0	<2	17
255760	0.5	1.0	3.0	1.0	0.5	<2	28
255761	7.0	5.0	5.5	1.5	1.0	32	3
255762	1.5	5.0	7.0	1.0	1.0	<2	3
255763	12	8.0	5.5	1.5	1.0	<2	8
255763 DUP	7.5	8.5	4.5	1.5	0.5	<2	
255764	4.5	6.0	4.0	1.0	<0.5	<2	12
255765	<0.5	1.5	4.5	1.0	1.5	<2	15
UNITS	ppb						
METHOD	ICPms	ICPms	ICPms	ICPms	ICPms	ICPms	FA (50g)

ANALYSES BY ANALYTICAL SERVICES (W.A.) PTY. LTD.

255753 : Brecciated blue/grey chert, black opaline silica in matrix, 2% pyrite (478200E, 5234 300N)
 255754 : Brecciated blue/grey chert, trace pyrite, galena (478200E, 5234 301N)
 255755 : As for 255753, with approximately 5% pyrite (478200E, 5234 301N)
 255756 : Blue/grey chert, weakly brecciated, trace pyrite, galena (Refer Appendix I)
 255757 : As for 255756 (478200E, 5234 297N) - (Refer Appendix I)
 255758 : Pale to medium brown chert, white/grey opaline silica veinlets (478200E, 5234 303N)
 255759 : White, granular secondary silica (478250E, 5234 050N)
 255760 : Grey, felt textured silica (?replaced amphibole), (478150E, 5233 650N)
 255761 : Altered rhyolite, pyritic and propylitised (477950E, 5234 425N) - (Appendix II)
 255762 : Altered volcano-sedimentary conglomerate (477955E, 5234 430N) - (Appendix II)
 255763 : Altered volcanic wacke (477952E, 5234 425N) - (Appendix II)
 255764 : Mafic dyke (478000E, 5234 440N) - (Appendix II)
 255765 : Altered volcanic (478300E, 5234 300N)

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NOTE : 255761 is equivalent to 255777 in Appendix II
255762 is equivalent to 255778 in Appendix II
255763 is equivalent to 255779 in Appendix II
255764 is equivalent to 255780 in Appendix II

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TABLE 4

SAMPLE	Cu	Pb	Zn	Co	Ni	Bi	Sb	Au	Pt	Pd
255753	16	40	55	4	18	14	14	0.08	< 5	< 1
255754	6	360	12	4	6	8	10	< 0.01	< 5	< 1
255755	5	30	9	4	14	6	4	< 0.01	< 5	< 1
255756	18	360	14	4	10	4	6	< 0.01	< 5	< 1
255757	8	165	16	4	10	4	10	< 0.01	< 5	< 1
255758	14	36	10	4	20	4	10	< 0.01	< 5	< 1
255759	4	8	12	4	18	6	12	< 0.01	< 5	< 1
255760	6	4	8	4	12	4	20	< 0.01	< 5	< 1
255761	32	42	70	50	610	6	4	< 0.01	< 5	< 1
255762	46	8	85	32	95	4	4	< 0.01	< 5	< 1
255763	50	36	70	50	340	8	4	< 0.01	< 5	< 1
255764	75	14	80	40	85	8	4	< 0.01	< 5	< 1
255765	95	44	105	24	170	4	4	< 0.01	< 5	< 1
UNITS	ppm	ppb	ppb							
SCHEME	AAS1B	AAS1B	AAS1B	AAS1B	AAS1B	AAS1B	XRF 1	FAS1	FAS2	FAS2

ANALYSES BY COMLABS PTY. LTD.

(Sample descriptions given on Table 3)

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APPENDIX 1

REPORT CMS 87/9/38

Sample No.	Rock Type - Composition	Fabric	Minor Minerals	Comments
309756 (T.S. 58894)	Chert. Featureless finely crystalline chert, medium-crystalline mosaic quartz cut by coarser quartz veins (diagenetic).	No bedding or other sedimentary features. Faintly brecciated. Later weak fracturing.	Fine pyrite (and jarosite pseudomorphs) in microfractures.	Origin unknown because the rock is featureless, but it may be a siliceous sinter, brecciated and contemporaneously re-cemented.
309756 (P.S. 58894)	<u>POLISHED SECTION.</u> The only sulphide detected was pyrite, as $< 20\mu$ framboids and crystals, and larger spongy patches, in quartz-filled microfractures; the presence of framboids suggests low-temperature, possibly late-diagenetic formation. The random arrangement of the microfractures supports this interpretation. Post-lithification fractures would tend to be straight and parallel.			
309757 (P.S. 58895)	<u>POLISHED SECTION.</u> (Insufficient sample for T.S.; rock type resembles 309756). The only sulphide present is pyrite, in meandering veinlets randomly traversing the rock; the haphazard directions suggest diagenetic formation, in fractures ("crackling"), probably related to dehydration of the silica host. The pyrite is mainly framboidal, and as euhedral overgrowths on spongy framboidal cores. No Au was detected.			

Summary

309756 and 309757 have been termed cherts because of the microcrystalline quartz which is the dominant component; they may well be siliceous sinters. They are randomly traversed by narrow, dark-coloured veinlets containing framboidal pyrite; the cause of the dark colour is not known, but is thought to be due to organic matter (?Kerogens/pyrobitumen). The veinlets are regarded as fillings in diagenetic microfractures due to shrinkage/dehydration rather than tectonism. Despite a careful search, no gold was detected.

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APPENDIX II

MINPET SERVICES

659 Botany Road
ROSEBERY, N.S.W.

FOUR TASMANIAN ROCKS NUMBERED

255777 TO 255780 FOR

PETROGRAPHIC DESCRIPTION

(Prepared for Mr. T.G. Summons
of Metals Exploration Ltd., Melbourne)

13th March, 1987

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3.	PETROGRAPHIC DESCRIPTIONS	3

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1. INTRODUCTION

A suite of four rocks from Tasmania were submitted by Mr. T. Summons of Metals Exploration Limited, Melbourne for petrographic identification and description.

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2. SUMMARY

Rocks may be grouped as follows-

1. Rhyolite - 255777.
 2. Coarse polymict wacke type sediment of pebbles and finer clasts - 255778.
 3. Fine volcanic wacke - 255779.
 4. Porphyritic, holocrystalline basalt - 255780.
- .. 255777/MPS 4461
Porphyritic rhyolite, sheared. Phenocrysts of K feldspar and quartz are small. A possible adularia vein is present as fragments - sheared with host. Contains also pyrite. Weakly propylitised.
- .. 255778/MPS 4462
Volcanic and sedimentary conglomerate. Contains worn fragments of basalt, feldspathic sandstone, mudstone, volcanic wacke and quartz wacke in a matrix of fine banded mudstone and quartz wacke. Contains sheared vein fragments of K feldspar thought to be adularia. Propylitised.
- .. 255779/MPS 4463
Volcanic wacke of mainly median fine sand size. Strongly sericitised and chloritised. Strongly sheared and pyritised along fractures.
- .. 255780/MPS 4464
Porphyritic olivine basalt of holocrystalline texture, with phenocrysts of plagioclase, diopside and olivine. Groundmass consists of plagioclase and pigeonite partly replaced by deuteric K feldspar. Plagioclase is sericitised and olivine is serpentinitised, clinopyroxene remains fresh.

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3. PETROGRAPHIC DESCRIPTIONS

Specimen No. 255777/MPS 4461

Petrographic Summary: An altered finely porphyritic rhyolite, a sheared rock. Strongly sericitised and moderately altered to fine rubbly clinozoisite along some (ex calcic plagioclase feldspar rich) flow bands. Abundant fine potash feldspar remains in the groundmass but there are few phenocryst fragments present. There was an early introduction of adularia in veins which were then sheared.

<u>Mineralogy (vol.%)</u>	<u>Phenocryst</u>	<u>Groundmass</u>
	<u>Fragments</u>	
<u>Recognisable Primary</u>		
Quartz	3	5
K feldspar	2	32
<u>Secondary</u>		
Sericite		35
Prochlorite		5
Clinozoisite		15
Actinolite		2
Limonite		3
Adularia		2
Leucoxene		20
Pyrite		4

Veins: Sericite and limonite.

Subrounded and lobate vesicles; adularia; also traces of actinolite and clinozoisite.

Texture: A finely sheared acid volcanic rock that contains scattered crystal fragments, including fragmented and euhedral forms of K feldspar and quartz as brecciated phenocrysts (size variation 0.001 to 0.02 mm).

The groundmass consists of fine sericite and intercalated laminae (~ 0.3 mm wide) of cherty K feldspar with equally fine rubbly clinozoisite in varying proportions, that describe thin flow

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bands which are crossed by shear planes. Lenticles of altered spherulitic material of tridymite and K feldspar arranged discontinuously along flow bands are somewhat darker under crossed nicols than the more general sericite:KF groundmass. The subrounded lenticles 0.3 x 0.8 mm now contain anhedral K feldspar grains (0.03 mm), quartz and clinozoisite as fine granules - includes fine prisms and scattered tufts of sericite.

A thin (0.01 to 0.12 mm wide) irregular vein systems contain only limonite or sericite as large (to 0.8 x 0.16 mm) flakes filling the broader sections of vein. One vein section that cuts across shear plane contains K feldspar.

Subrounded and lobate aggregates of adularia as rhombic intergrowths (0.5 x 0.3 mm, 0.12 x 0.07 mm, etc) have enclosed fine clinozoisite and are in places intergrown with pale green prochlorite flakes (0.4 mm).

Small (0.04 to 0.16 mm) groups and scattered limonitised pyrite crystals are most dense between the veins, but trend as an echelon groups within flow bands.

Alteration:

- i) Elongate vesicles (sheared vein sections?), contain adularia, clinozoisite and prochlorite. Possible - propylitic followed by adularia + chlorite.
- ii) Sericitic and clinozoisite, (weak propylitic) + pyrite. Silicification, weak. Continuous veins remain.

Metamorphism: Brecciation and strong shear post dates most veins.

Specimen No. 255778/MPS 4462

Petrographic Summary: Volcanic and sedimentary conglomerate. Contains ovoid fragments of basalt, feldspathic sandstone, mudstone, volcanic wacke and quartz wacke in a matrix of fine bedded mudstone. Host contains a crystal mosaic of adularia; also chlorite in vesicles. Alteration of volcanic fragments is propylitic.

<u>Mineralogy</u> (vol.%)	Basalt		Feldspathic Breccia	Mudstone	Quartz Wacke	
	Coarse	Fine			Fine	Coarse
Quartz	-	-	15	45	50	40
K feldspar	-	-	55	-	-	10
Plagioclase	68	68	-	-	-	-
Sericite	-	-	-	48	15	5
Clinozoisite	5	7	5	7	2	-
Chlorite	25	15	15	-	33	40
Chalcedony	-	-	-	-	-	-
Iron oxides	2	10	-	-	-	5
Leucoxene	-	-	10	-	-	-

Chalcedony and adularia in vesicles.

Texture: Overall texture is that of stretched ovoid fragments of sediment and volcanic rocks varying from 2 x 1 mm to 10 x 6 mm which sit in lenticles of fine mudstone intermixed marginally with quartz wacke. In places both lithologies appear as distinct fragments.

Basalt fragments vary from even, fine grained basalt of fine random plagioclase intergrowths, in a matrix of fine clustered chlorite, irregular granular aggregates of clinozoisite and limonitised magnetite and leucoxenised rhomb shapes of ilmenite. Fragments are ovoid and vary to 7 x 4 mm. One ovoid fragment (4 x 2.5 mm) contains an abundance of fine plagioclase clusters with a trachytoid flow structure and abundant irregularly distributed chlorite and leucoxene. Basalt occupies about 10 vol.% of the section.

Feldspathic breccia consists of sheafs of K feldspar (1.0 x 0.5 mm) with interstitial subhedral quartz, fine chlorite and specks

of clinozoisite in aggregates. Total size of fragments varies from 2 to 7 x 3 mm. Some appear to be uneven quartz:feldspar breccia with a fine chlorite and sericite matrix which contain vesicles (0.3 x 0.1 to 0.6 x 0.4 mm) filled with clear K feldspar of rhombic adularia appearance (2V - 70°) in vesicles, rimmed by limonite. K feldspar growths occupy about 8 vol.% of the section surface.

Mudstone as elongate or subrounded lenticles, vary up to 10 x 5 mm, some are fragmented and contain vugs of chlorite (to maximum 3 x 2 mm). The volcanic host is a fine uniform mixture of cherty quartz particles, fine platy interstitial sericite (~ 0.005 x 0.002 mm) and greenish clinozoisite as fine granular intergrowths (~ 0.02 mm). Veined rarely by even 0.05 mm wide quartz:chlorite:sericite as fracture fill or appear as fine irregular fractures filled by limonite that cross clast boundaries into neighbouring clasts.

Between lenticles of fine sediment are equally large clasts of tuffaceous wacke, occasionally intermixed with 'fingers' of mudstone. The quartz wacke (to 3.2 x 2.0 mm and larger) occur as 'pillows' of subrounded clasts that alternate with similar size mudstone. Median grain size of quartz varies 0.16 down to 0.04 mm, i.e. fine sand to silt size with interstitial fine platy sericite that gives a banded appearance to the silt and an abundance of pale green interstitial chlorite. Coarser wacke occupies broad spaces between mudstone and silt rich wacke (9 x 4 mm).

The coarser wacke occurs as ovoid fragments and as interstitial matrix to other clasts. The abundant chlorite occurs as parallel fibrous growths, irregularly distributed as are quartz grains and clear twinned feldspars. Quartz and feldspars vary 0.08 to 0.6, median 0.16 mm, grains are commonly breccia fragments and are sharply angular. Some grains were in situ brecciated.

Sericitised plagioclase fragments (1.2 x 0.1 mm) occur with dense chlorite, intermixed with flanking mudstone in one area of section.

Leached vesicles (3.2 x 1.6, 1.2 x 0.4 mm) show limonitised margins and contain adularia (see also above), fine chalcedony growths, and chlorite with chalcedony growths.

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Alteration: Strongly propylitic for clasts of basalt and feldspathic breccia; fine sediment is mainly of sericitised clay minerals.

Metamorphism: Load shear.

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Specimen No. 255779/MPS 4463

Petrographic Summary: A volcanic wacke that contains clasts of median fine sand size, also few scattered subangular and angular quartz and K feldspars; otherwise consists of sericitised and chloritised volcanic clastics that show no relict textures. Matrix is of sericite and chlorite. Rock is strongly sheared and pyritised along fractures.

<u>Mineralogy:</u>	<u>Vol.%</u>
Quartz	10
K feldspar	15
Chert	1
Sericite	23
Chlorite	40
Iron oxides	3
Leucoxene	3
Pyrite	5

Texture: Resembles large fragments of wacke in Specimen 255778. The only distinctive clasts are those of irregularly distributed quartz (0.03 to 0.3 x 0.08 mm). Grains vary in shape from mainly subangular to fewer sharply angular and splintery, also few sub-rounded 'pebble' shapes. The approximate median grain size is 0.11 mm, which classifies the rock as very fine to fine sand size.

Similar size subrounded cherts of very fine sutured quartz are around 0.1 mm. Potash feldspar so obvious in the stained slab are less clear in section and are in fact fine aggregates of fine KF, sericite (\pm quartz), probably altered acid volcanics. Other feldspars are subangular. Clasts show partial alteration to sericite. Sericite is in great abundance, mainly low birefringent illite as scaly aggregates (0.2 x 0.05, 0.08 x 0.04 mm). Many of the clustered sericite clasts show some parallelism and a weak cleavage pattern, though many schist like fragments are oriented oblique to main rock cleavage demonstrated by quartz, feldspar and altered volcanic clasts. Disordered sericite also constitutes much of the matrix.

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Chlorite with sericite, forms altered lamellar shaped clasts of fine sand size. The chlorite is pale green and fibrous and shows anomalous birefringence. Chlorite is also present as fine seams within the section and forms much of the matrix. Clasts of chlorite form stellate clusters associated with fine rubbly leucoxene, as schist-like bundles and irregularly stubby shaped aggregates; also occurring as lenticular networks throughout the section, intergrown with similar textured sericite.

Leucoxene as very fine single and clusters of rubbly grains occur patchily throughout, most often with chlorite.

Pyrite appears as fine grains and clusters (to 4 x 2 mm) with abundant interstitial host minerals. Shows replacement of host minerals, including quartz. Where weathered, pyrite is altered to limonite. Cross cutting, branching veinlets (0.03 to 0.01 mm wide) contain only patchy limonite and are mostly vacant. Locally, veins are pinched out by shear.

Observation by Incident Light: Pyrite is very fine with minimum size 0.01 mm, scattered throughout much of the section. Otherwise occurs as aggregates of coarser pyrite to 0.6 x 0.2 mm and lenticles 1 x 0.2 mm that show pyrite growth and cementation of grains. Many grains have nucleated around quartz or have crystallised within quartz having entered narrow breccia fractures. Atoll type textures of euhedral pyrite grains around quartz clasts are fairly common.

Pyrite shows growth along fractures and very irregular dispersion, also replacement of clastic material.

No other sulphides are identifiable.

Alteration: Almost totally sericitised and chloritised.

Metamorphism: Sheared, post alteration.

Specimen No. 255780/MPS 4464

Petrographic Summary: Porphyritic olivine basalt, holocrystalline but fine grained. Contains phenocrysts of plagioclase, diopside and olivine and a groundmass of pigeonite and altered plagioclase. Alteration is mainly strong sericitisation of plagioclase and serpentinisation of olivine.

<u>Mineralogy (vol.%)</u>	<u>Phenocrysts</u>	<u>Groundmass</u>
Primary		
K feldspar	-	5
Plagioclase	4	58
Diopside	3	-
Pigeonite	-	25
Olivine	5	-
Alteration		
Sericite		30
Serpophite		5
Iron oxides		7

Texture: Matrix consists of a plexus of fine sericitised plagioclase laths, which are commonly bent and of variable size, 0.05 x 0.004 mm to 0.3 x 0.03 mm, in aggregates which show a random distribution. Interstitial to the plagioclase are similar size subhedral pigeonite laths ($\sim 0.08 \times 0.04$ mm), colourless with a variable extinction angle (to 40°), more stubby in shape than the plagioclase, better preserved, containing only fine skeletal iron oxide laths that were exsolved within the pyroxene. The pyroxene and plagioclase crystals are fairly evenly distributed. Studding the matrix minerals are rare, somewhat larger and more euhedral diopside prisms (up to 0.3 x 0.14 mm), and squat sericitised plagioclase phenocrysts (0.6 x 0.4 mm) often occurring as glomeroporphyratic aggregates. Olivine phenocrysts are totally serpentinised by fine veinlets of green serpophite and/or by very fine antigorite.

Generally the texture is even and holocrystalline. Localised alteration of plagioclase to fine K feldspar is probably deuteric.

Alteration: Patchy deuteritic K feldspar; strongly sericitised plagioclase; and olivine is totally serpentinised.

Metamorphism: -