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1. SUMMARY

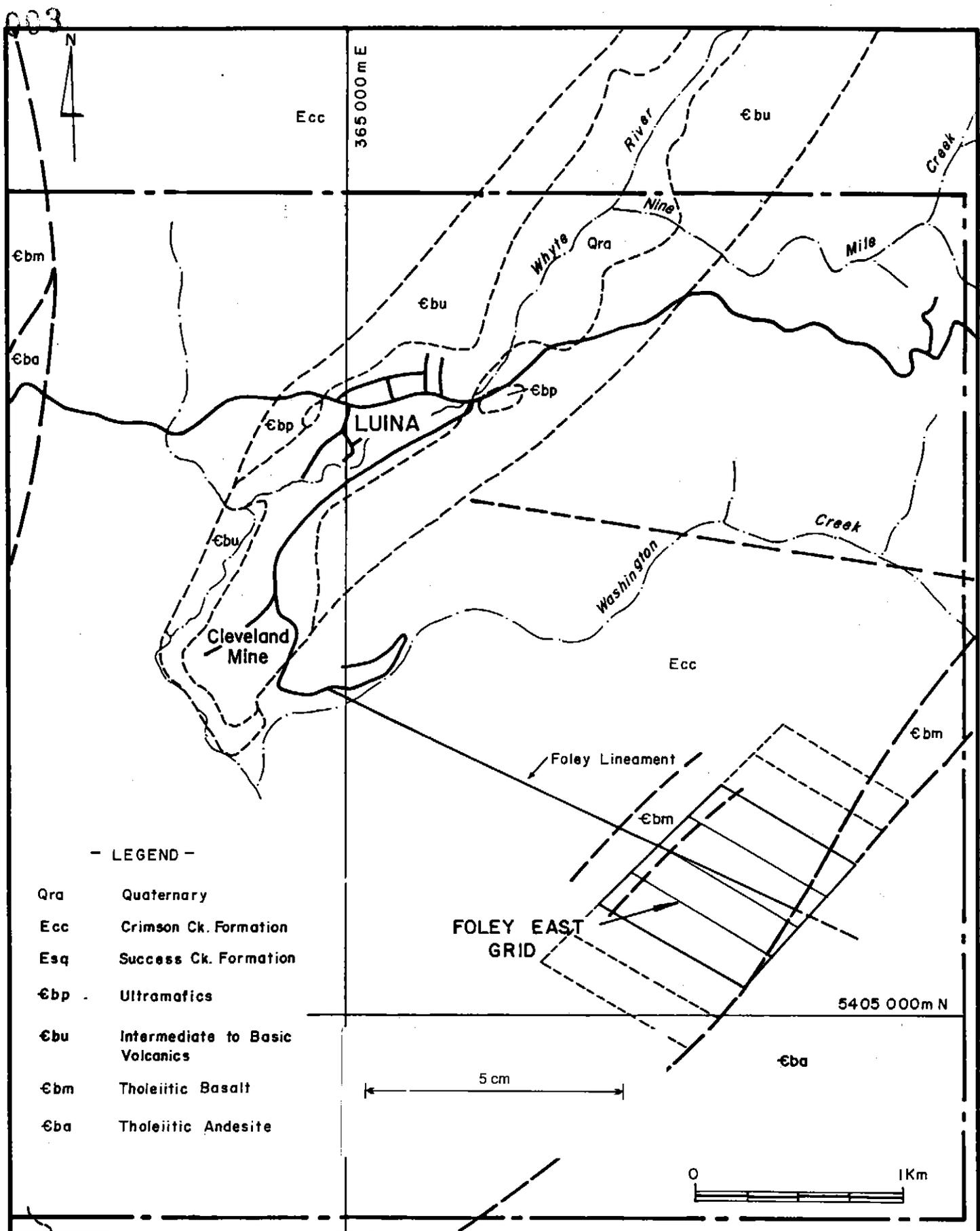
A programme of gridding, geological mapping and rock sampling, over the postulated eastern extension of the Foley Lineament, has located calcareous mildly-sulphidic sandstone units within a sequence of mafic volcanics and sediments which appear similar to the Halls Formation* at Cleveland. Mapped east-west trending faults in the area are considered to represent the eastern extension of the Foley structure.

These geological findings are encouraging as the Cleveland tin deposit, located 1.6 km west of the gridded area, is hosted by calcareous units of the Halls formation at their intersection with the Foley Lineament.

The lack of significant geochemical results from carefully-selected rock samples on the Foley East grid, along with a paucity of veining and alteration, indicates that if there is any Cleveland-style mineralisation within the area it probably lies at depth.

As the mineralisation sought is highly conductive, the principal recommendation for further work is a deep-seeking UTEM survey over the whole gridded area.

* Correlated with the Crimson Creek Formation by Brown (1984), and Cleveland geologists.



- LEGEND -

- Qra Quaternary
- Ecc Crimson Ck. Formation
- Esq Success Ck. Formation
- Ebp Ultramafics
- Ebu Intermediate to Basic Volcanics
- Ebm Tholeiitic Basalt
- Eba Tholeiitic Andesite

Aberfoyle Resources Limited
EXPLORATION DIVISION

725004

REVISIONS			
Init.	Date	Init.	Date
JGP/rje	10-9-88		

NORTH WEST TASMANIA
CLEVELAND E.L. 34/82
SUMMARY PLAN

Location Code : Scale : 1:25,000 Date : June, 1988

Compiled : DBW
Drawn :
Traced : JLR
Checked :
Plate No. : CL 2

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2. INTRODUCTION

Exploration Licence 34/82 covers 25 sq. km around the Cleveland tin deposit at Luina, Western Tasmania. The licence was granted to Cleveland Tin Limited, a division of Aberfoyle Resources Limited, in 1982 and subject to renewal each year on the October 30th anniversary date, has a life to 1992 with no reduction requirements. The licence carries an annual expenditure commitment of \$50,000.

This report details the results of exploration carried out on EL 34/82 during the year to 30th October, 1988. The report also contains recommendations for further work to be undertaken on the EL in the coming year.

At the beginning of the year under review, Aberfoyle resumed management of the EL with the termination of the Joint Venture with Billiton Australia. Billiton had been responsible for all exploration on the EL from 1st October, 1986 to 6th November, 1987.

Previous exploration on the licence had concentrated on the strike extensions of the Cleveland stratigraphy (Halls Formation). However, recognition of the Foley Lineament and its contribution to the metasomatising event that produced the Cleveland mineralisation, encourages exploration in those areas where the

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structural conduit intersects favourable lithologies (Wallace 1987).

In the 1970's reconnaissance mapping in the upper catchment of Falls Creek along the eastern extension of the Foley Lineament, had revealed lithologies similar to the Halls Formation - siltstones, sandstones, cherts and mafic volcanics. Regional mapping by Brown (1984) also suggested the presence of correlates of the Success Creek Formation likely to contain suitable carbonate hosts.

However, initial geochemical exploration in this area in the 1970's, involving stream sediment sampling and limited reconnaissance soil sampling, returned disappointing results. The area was covered by an airborne DIGHEM survey in 1981 without finding any EM anomalies, although three magnetic responses were delineated - two stronger anomalies over mafic volcanics on the western margin of the catchment, and a weaker anomaly centered in Falls Creek itself.

On resuming control of exploration on the EL in late 1987, Aberfoyle decided to more closely examine the lithological character of the rocks along the eastern extension of the Foley Lineament in the upper Falls Creek catchment.

3. WORK COMPLETED NOVEMBER 1987 - OCTOBER 1988

The area targetted by this years programme was the eastern extension of the Foley Lineament, east of a prominent high ridge 1.6 km east of the Cleveland Mine.

The programme involved the establishment of a 4.8 line km, 200m x 25m grid in the upper catchment of Falls Creek. A 1 km long access walking track was cut from the grid baseline to a nearby forestry road.

The gridlines were oriented parallel to the likely trend of the Foley Lineament and at right angles to the prevailing rock strike, so as to detect any conformable replacement tin mineralisation extending from the lineament.

Much of the area was covered by a 100m x 20m grid cut by Cleveland Tin Limited in 1983, and part of this grid was incorporated into the new grid (see Figure 2). Reportedly (Hespe 1983 a-d), two (unnamed) gridlines on the old grid were soil sampled (for Sn, WO_3 , MoS_2 , Bi, Zn, Cu, As and CaF_2), and a 'weak' Sn, As, CaF_2 anomaly was detected. However, no actual details or results of this work are recorded, and in one report (Hespe 1983c), it is stated that no anomalous values for Sn were obtained. Field evidence suggests that at least the old baseline (FE00N), was soil sampled.

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The new Aberfoyle grid was geologically mapped in some detail, including a traverse down Falls Creek. During this exercise 54 rocks samples were selected for geochemical analysis (see Appendix A), and 7 of these were also submitted for petrological examination (see Appendix B). Care was taken during the rock sampling to select those displaying any veining, fracturing or alteration.

4. GEOLOGY

4.1 Introduction

The gridded area comprises a sequence of mafic volcanic lavas and associated sediments (see Figure 2). The latter include mafic detrital sandstone, mafic pebble conglomerate, red or purple-brown hematitic mudstone, khaki-grey siltstone and mudstone, micaceous sandstone (some calcareous), and minor chert.

Importantly, the various rock units display features and subtle variations which link them together and indicate they are all part of the same overall rock suite. For example, in places the mafic sandstones are very slightly micaceous and conversely, the highly-micaceous quartzo-feldspathic sandstones occasionally contain mafic lithic detritus. The hematitic mudstone was noted typically amongst and adjacent to the mafic volcanic units, but also occurred as bands within the non-hematitic grey siltstone-mudstone sequence which underlies most of the area.

Overall, the rocks are similar to the Halls Formation sediments which host the Cleveland deposit, and essentially identical to sediments of the Cambrian Crimson Creek Formation and Rosebery Group which the author mapped in an area along

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the Pieman Road south of the Meredith Granite (Aberfoyle's Marionoak EL 22/74 - Purvis 1986). Brown (1984) correlates the Halls Formation with the Crimson Creek Formation, but correlates the rocks at Foley East with the Success Creek Group. The author disagrees with the latter interpretation.

4.2 Mafic Volcanics

There are three separate units of mafic volcanics within the gridded area : a large unit on the ridge along the western side of the property; a unit on the ridge on the eastern margin of the property; and a central unit immediately west of Falls Creek.

All units appear similar, comprising dark green basalt lava flows and rare lava breccia. The basalt is non-vesicular and often porphyritic with laths to 2mm of plagioclase and, less commonly, augite. The mafics are frequently doleritic with sub-ophitic texture, probably representing the central parts of individual lava flows.

Floaters of massive or banded chert frequently occur on or near mafic volcanic outcrops, but the chert was only seen in outcrop at one locality within the western unit. Here, the chert was present as irregular masses up to 0.5m long within

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the basalt. The chert is clearly interflow or interpillow material, although no definitive evidence of pillow lavas was noted anywhere. The chert, along with the bands of mafic detrital sandstone within the mafic volcanics (see section 4.3), indicates the volcanics were deposited subaqueously.

The basalts are weakly affected by chlorite \pm epidote \pm albite alteration. Local patches of stronger alteration accompany restricted zones of fracturing and veining associated with faulting. This veining comprises thin (average <2mm), parallel veinlets and fracture-fillings of quartz-epidote \pm carbonate \pm chlorite, and occurs extremely sparsely in both the western and central mafic units. In the western unit the veinlets and fracture sets are oriented E-W or NW-SE, parallel to the trend of adjacent faults considered to be part of the eastern extension of the Foley Lineament. In the central unit, the veining is associated with a strike-slip fault along the eastern margin of the unit. Here, the veining is strongest on line 5000N.

Although all the mafic volcanics are very similar in appearance, the three units display markedly different magnetic characteristics. Generally, the western unit is moderately to strongly magnetic, the central unit weakly magnetic and the eastern unit is non-magnetic.

Local zones of disseminated pyrite, rarely to 2-3% maximum, were noted in the mafic volcanics.

4.3 Mafic Sandstone and Mafic Pebble Conglomerate

Extensive lenses and bands of massive, hard, green mafic detrital sandstone and mafic pebble conglomerate occur within and marginal to the mafic lavas, from which they appear to be largely derived.

However, apart from mafic volcanic detrital grains and feldspars, the mafic sandstones can also contain minor quartz grains, sedimentary rock clasts (including cherts and carbonates), intermediate - acid felsic volcanic detritus, and mica flakes. Clearly, the mafic sandstones are not entirely of local derivation, and a similar feature is seen in the mafic conglomerate (see below).

There appears to be a more-or-less continuous progression from mafic sandstone, through feldspar-rich micaceous sandstone with minor mafic detritus, to the micaceous quartzo-feldspathic sandstones mentioned in Section 4.4. In this respect, the author disagrees with the petrologist's suggestion that the mafic sandstones and micaceous (calcareous) sandstones form two distinct lithological groupings (see Appendix B). This suggestion is not supported by the field

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evidence. Sample 482823 in Appendix B is an excellent example of a transitional phase between the mafic and micaceous sandstones. It should be noted that this sample was submitted as a typical example of the calcareous sandstones (see Section 4.4).

The mafic sandstones are chloritic (especially the matrix which can also be siliceous), commonly magnetic (due to detrital magnetite), and contain ubiquitous minor disseminated pyrite and pyrrhotite.

The mafic pebble conglomerate is typically composed of densely-packed well-rounded mafic volcanic clasts averaging around 5mm in size. The matrix is characteristically highly chloritic, softer than the clasts, and composed of sandy mafic detritus with abundant fine feldspar crystals. However, many of the basalt clasts are finely amygdaloidal—a feature not seen in the basalts outcropping on the property. Occasional clasts are strongly silicified and pyritised, and clearly this took place before they were incorporated in the conglomerate, which is generally otherwise devoid of sulphides.

4.4 Mudstone-Siltstone Sequence

The most common rock types at Foley East are a poorly-exposed sequence of soft khaki-grey mudstones and siltstones, some of which appear to have a slight vitric (tuffaceous) component. Intercalated within this sequence are khaki-grey massive micaceous quartzo-feldspathic lithic sandstones, some of which are calcareous and contain disseminated pyrite and pyrrhotite. Minor thin beds of chert are also present and these are commonly fractured and weakly pyritic.

Within this sequence there are extensive units of red or purple - brown hematite-pigmented mudstone, generally soft and poorly exposed, often greasy (chocolate mudstone), but occasionally cherty and hard. These hematitic mudstone units tend to be most common in the vicinity of the mafic volcanics.

In all these sediments bedding is often obscured, either by extensive soft-sediment deformation (including flowage of mudstones and boudinaging of the harder sandstone beds), and/or by a very weak bedding-parallel schistosity.

All the sediments are almost totally devoid of any veining or sweat-outs of any type, except for extremely thin (<2mm) quartz-epidote veinlets and fracture-fillings noted in the chert beds. These are probably the result of brittle

fracturing as they don't appear to extend from the cherts into the surrounding mudstones. Very little evidence of sulphides was noted in the mudstone-siltstone sequence although limonite and manganese oxide stains are fairly common.

The most important rock types noted, from the point of view of tin mineralisation potential, were the massive calcareous micaceous sandstones. These occur within the mudstone-siltstone sequence (including the hematitic mudstone), in and east of Falls Creek. These were the only calcareous rocks noted on the property. The calcareous sandstones are basically similar to the non-calcareous sandstones, with three minor noticeable differences :

- a slight bluish or green tinge
- extreme hardness
- ubiquitous fine grained disseminated pyrite and pyrrhotite, averaging 1-3%.

In some places, e.g. line 4800N, the sandstone is extremely calcareous and could be termed an impure sandy limestone. The petrological data confirms the carbonate content of the sandstones is largely primary, but it is interesting to note the marked variations in provenance of rocks that appear

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essentially similar in the field - the provenance ranges from mafic volcanic detritus with some sediments (including cherts, limestones and dolomites), through to granitic, metasedimentary and acid volcanic detritus. The calcareous sandstones are represented by samples 482823, 834 and 851 in Appendix B.

Outcrop was insufficient to get an accurate picture of the extent and thickness of these calcareous units, but at least one unit of 15-20m thickness and 600m strike extent appears to be present, with several thinner units. The units are intersected by broadly east-west trending faults which are considered to be part of the Foley Lineament.

4.5 Structure

(See Figure 2)

The rocks at Foley East strike NNE and dip westward at angles varying from 30° to almost vertical, with an average dip around 60° . No evidence of folding was noted and deviations in strike are apparently due to faulting.

The principal faults mapped are a major ESE trending structure that passes close to the grid origin at 5000N/5000E, and a strike-slip fault just west of and parallel to Falls Creek.

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The faults are largely interpreted from the pattern of mapped units and the topography. Of the faults actually seen in the field, the strike slip faults in and near Falls Creek were the most evident.

The major ESE trending fault is considered to be the Foley Lineament. At its eastern end there is an apparent SE trending branch of the lineament which is offset by a third fault. In this complex area occur the most calcareous and sulphidic sandstone units noted on the property.

5. GEOCHEMICAL SAMPLES RESULTS

A total of 54 rock samples were collected during mapping of the Foley East grid (see Appendix A). The samples were analysed by Analabs for Cu, Pb, Zn, Ag, Bi, As, Sn, W, Mo and F.

Results were uniformly poor with no values of significance.

Maximum values (in ppm) were : 240 Cu, 105 Pb, 200 Zn, 0.5 Ag, 10 Bi, 36 As, 15 Sn, <20 W, 20 Mo and 1700 F. Considering the samples included the best examples of veined, altered and sulphidic rocks seen on the grid, the results are extremely disappointing.

6. DISCUSSION

In making a judgement on the potential of the Foley East area, three geological observations are of over-riding significance:

1. The Foley Lineament extension

The Foley Lineament apparently extends through the area, complicated by branching and cross faulting.

2. The presence of carbonate-rich units

The overall similarity of the sequence at Foley East to that around the Cleveland Mine, more particularly the presence of strongly-calcareous units within it, indicates the sequence does have the potential to host replacement-style tin mineralisation. The fact that these calcareous units are also the most sulphidic rocks in the area, and that they are intersected by the faults considered to be part of the Foley Lineament, are further encouraging factors. It is likely that additional carbonate units occur within the non-outcropping parts of the sequence.

3. The paucity of veining

As already stated, only sparse veinlets (generally of quartz-epidote) were noted in outcrop and rock floaters. More importantly, there is an almost total absence of quartz or

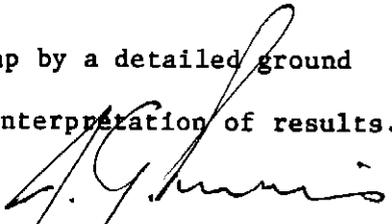
other vein fragments in the gravels in Falls Creek, in the smaller watercourses draining the soil-covered areas over the mudstone-siltstone sequence, or in flat-lying areas of residual soils. This suggests there is a lack of veining in the non-outcropping parts of the sequence as well as the outcropping parts.

The inference is that there is no intrusive porphyry at shallow depth along the Foley Lineament in this area, and hence unlikely to be any near-surface mineralisation either.

The uniformly poor results from the rock sampling tend to support this conclusion. However, much of the sequence is poorly exposed and systematic soil sampling could perhaps detect something unexpected. But the low results from Cleveland Tin Limited's very detailed stream sediment sampling in upper Falls Creek, and their later reconnaissance soil sampling programmes, reinforce the impression that there is no near-surface mineralisation.

7. CONCLUSION AND RECOMMENDATIONS

1. The sequence of mafic volcanics and sediments at Foley East is similar to the Halls Formation at Cleveland, and can be correlated with the Crimson Creek Formation.
2. The presence of mildly-sulphidic, carbonate-rich lithologies cut by faults considered part of the Foley Lineament, indicates the sequence at Foley East has the potential to host Cleveland-style tin mineralisation.
3. The lack of veining and alteration, along with poor results from geochemical sampling, is taken to indicate that there is no intrusive porphyry at shallow depth along the Foley Lineament in this area, and unlikely to be any near-surface mineralisation.
4. The potential for tin mineralisation therefore lies at depth.
5. As Cleveland-style mineralisation is highly conductive, it is recommended that the Foley East grid be covered by a deep-seeking UTEM survey to examine the prospective stratigraphy at depth.
6. The UTEM survey should be backed up by a detailed ground magnetic survey to assist in the interpretation of results.


J.G. PURVIS
October 1988.

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APPENDIX A

GEOCHEMICAL SAMPLE RESULTS

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GEOCHEMICAL ROCK SAMPLING LEDGER

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Page No. 1

TENEMENT EL 34/82

AREA/PROSPECT FOLEY EAST

SAMPLE No's. 482801-854

GEOLOGIST J.G. PURVIS

DATE SEPT 1988

PLAN REFERENCE CLEVELAND, WESTERN TASMANIA

ANALYSED BY ANALABS

Sample No.	LOCAL GRID CO-ORDS	Metal Content in ppm.							Geological observations
		Pb	Zn	Cu	Ag	Sn	As / Mo	F	
482801	4855N/5000E	<5	105	190	<0.5	4	4 / 4	300	etc. Basalt ± carb-epidote vein and fractures.
802	4880N/5000E	<5	45	25	<0.5	<3	<1 / 7	140	Float. Chert ± qtz-epidote-chlorite filled fractures
803	4887N/5000E	<5	140	35	<0.5	3	4 / <3	800	Sub etc. Chloritised basalt ± 1-2% py.
804	4925N/4997E	<5	165	130	<0.5	<3	2 / 8	370	etc. Basalt ± abrad veinlets of epidote.
482805	4970N/5000E	<5	30	5	<0.5	<3	<1 / 6	55	Sub etc. Basalt ± 60mm qtz-epidote vein.
806	4678N/5000E	<5	125	240	<0.5	<3	<1 / 6	360	etc. Chloritised basalt ± 2-3% py, trace cp.
807	4635N/5000E	<5	125	200	<0.5	<3	<1 / 4	300	Float. Strongly alt basalt ± abrad fractures
808	4615N/5000E	<5	155	50	<0.5	4	<1 / 6	800	Sub etc. Basalt ± 3% py, ± some in veinlets.
809	5000N/4995E	<5	140	185	<0.5	<3	<1 / 3	380	etc. Chloritised basalt ± fractures + 1% py.
482810	5008N/4995E	<5	100	110	<0.5	3	<1 / <3	350	etc. Highly epidotised basalt ± qtz-carb veinlets.
811	5200N/4995E	<5	90	145	<0.5	<3	<1 / 5	340	etc. Highly epidotised basalt ± lenses of qtz-carb.
812	5342N/5000E	<5	120	185	<0.5	4	<1 / 4	340	etc. Chloritised basalt ± 1% py.
813	4600N/5002E	<5	40	5	<0.5	3	<1 / 7	150	Float. Green chert ± minor py-epidote veinlets.
814	4600N/5371E	<5	155	195	<0.5	<3	<1 / 5	290	etc. Basalt lava breccia ± epidote-rich matrix.
482815	4600N/5375E	<5	20	25	0.5	5	36 / 20	95	Float. Bedded cherty siltstone ± 1% py.
816	4600N/5432E	<5	175	50	<0.5	8	23 / 5	660	Float. Calcareous micaceous sst ± 2% py.
817	4600N/5503E	<5	150	35	<0.5	<3	11 / 3	640	Float. Calcareous siltst ± 2-3% po.
818	4600N/5137E	<5	75	35	<0.5	8	<1 / 6	800	Float. Grey siltst/mudst ± Fe ox stains.
819	4800N/5232E	<5	145	40	<0.5	6	<1 / <3	740	Float. Purple-brown hematitic mudst ± limonite stain
482820	4800N/5242E	<5	145	45	<0.5	15	<1 / <3	760	etc. Khaki mudst with limonite + Mn ox stains.
821	4800N/5275E	<5	50	20	<0.5	3	14 / 10	150	Float. Greenish chert ± prominent limonite stains
822	4800N/5390E	25	165	5	<0.5	4	13 / 5	1700	etc. Bright red impure hematitic chert.
823	4810N/5495E	<5	180	85	<0.5	8	4 / 6	660	Float. Calcareous mica sst ± 2-3% py + po.
824	4800N/5525E	<5	170	50	<0.5	9	<1 / <3	730	Float. Highly calcareous sst ± 2% py + po.
482825	4800N/5580E	<5	135	65	<0.5	7	4 / 7	730	Sub etc. Khaki siltst ± limonite stains + brnks.
826	4800N/5610E	<5	150	55	<0.5	7	11 / 5	400	Sub etc. Qtz-fold sst ± limonite stains + brnks.
827	4800N/5623E	25	55	35	<0.5	7	<1 / 20	760	etc. Soft black shale ± minor limonite stains.
828	4800N/5625E	<5	165	35	<0.5	7	19 / 5	640	Float. Highly calcareous mica sst ± 3% py + po.
829	4800N/5725E	105	200	80	<0.5	8	15 / 7	660	Float. Khaki + purple mudst ± limonite + Mn ox stain
482830	4800N/5768E	<5	95	65	<0.5	3	<1 / 9	340	Float. Mafic conglomerate ± some pyritic clasts
831	5000N/5437E	<5	120	125	<0.5	6	<1 / 7	530	Sub etc. Chloritic mafic sst ± minor py.
832	5000N/5490E	<5	120	215	<0.5	<3	3 / 8	510	etc. Mafic sst ± minor py + limonitic fractures.
833	5000N/5512E	<5	160	160	<0.5	6	<1 / 8	420	etc. Basalt ± rare qtz veins to 5mm, ± rare py.
834	5000N/5536E	20	110	35	<0.5	<3	<1 / 6	800	Float. Altered calcareous mica sst. Minor py + po.
482835	5000N/5545E	25	105	20	<0.5	<3	21 / 8	620	etc. Mica sst ± rare limonite-stained qtz veins 1mm.
836	5000N/5548E	<5	80	45	<0.5	<3	10 / 7	480	etc. Blue-grey chert ± 1-2% w. Highly fractured

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GEOCHEMICAL ROCK SAMPLING LEDGER

Page No. 2

TENEMENT EL 34/82

AREA/PROSPECT FOLEY EAST SAMPLE No's. 482801-854

GEOLOGIST J.G. PURVIS DATE SEPT 1988

PLAN REFERENCE CLEVELAND, WESTERN TASMANIA

ANALYSED BY ANALABS

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Sample No.	LOCAL GRID CO-ORDS	Metal Content in ppm.							Geological observations
		Pb	Zn	Cu	Ag	Sr	As Mo	F	
482837	5000N/5625E	<5	200	85	<0.5	5	4/7	590	Float. Mudst/silt, sst ± minor chlor veinlets + fractures
838	5000N/5687E	<5	105	70	<0.5	<3	3/15	400	Float. Mafic sst ± 2% dissem py + po
839	5000N/5660E	<5	130	35	<0.5	15	12/3	460	Float. Calcareous mica sst - slightly chloritic
482840	5200N/5026E	<5	55	35	<0.5	<3	3/8	115	Float. Highly fractured chert ± qtz-carb-epi veins
841	5200N/5068E	<5	130	40	<0.5	<3	2/7	680	dk. Diabritic basalt ± qtz-carb veinlets ± 1% py
842	5200N/5195E	<5	45	35	<0.5	4	3/5	140	Float. 200mm qtz-chlor-carb vein in basalt
843	5200N/5545E	<5	50	<5	<0.5	<3	2/8	290	Float. Bedded red, green + grey chert.
844	5200N/5638E	5	140	40	<0.5	10	6/5	600	Float. Calcareous mica sst ± minor py
482845	5200N/5730E	<5	120	105	<0.5	<3	2/3	390	dk. Sl calcareous mafic sst ± minor dissem py
846	5400N/5024E	<5	145	190	<0.5	3	2/<3	330	dk. Basalt ± thin (<1mm) qtz-chlor-carb veinlets
847	5400N/5165E	<5	30	70	<0.5	<3	3/9	140	Float. Highly fractured chert ± epidote veinlets ± minor py
848	5400N/5721E	5	110	105	<0.5	<3	9/4	270	Float. Mafic pebble conglomerate ± carb veinlets ± py
849	5400N/5754E	<5	120	105	<0.5	<3	5/<3	320	dk. Silicified mafic sst ± 1% py
482850	5135N/5585E	80	80	90	<0.5	4	12/3	470	dk. Cherty mudst ± thin (to 2mm) qtz veins ± minor py
851	5070N/5588E	5	120	30	<0.5	<3	5/7	660	dk. Calcareous mica sst - sl sericitic, minor py
852	5000N/5512E	<5	100	125	<0.5	6	5/5	550	Float. Qtz-veined basalt - weak chlor-epidote alt.
853	4723N/5455E	<5	95	10	0.5	<3	4/5	320	Float. 0.5m boulder of banded red, green, grey, chert
482854	5200N/5020E	<5	130	225	<0.5	<3	5/3	370	dk. Basalt ± several qtz-chlor-carb veins to 2mm

027

725028

APPENDIX B

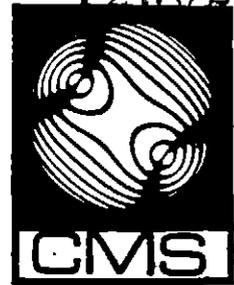
PETROLOGICAL SAMPLE DESCRIPTIONS

028

725029

Central Mineralogical Services

39 Beulah Road, Norwood, South Australia 5067
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International: Telephone + 618 425659 Fax + 618 363 1820



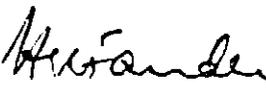
Mr. D.B. Wallace
Regional Manager
Aberfoyle Resources Ltd.
Exploration Division
P.O. Box 952
BURNIE / TAS. 7320

3rd October, 1988

REPORT CMS 88/9/44

YOUR REFERENCE: Letter dated 26.9.1988
DATE RECEIVED: 27th September, 1988
SAMPLE NOS.: 7 Samples
SUBMITTED BY: D.B. Wallace
WORK REQUESTED: Petrology

Copy to:
Mr. H. Skey
Exploration Manager
Aberfoyle Resources Ltd.
Exploration Division
123, Camberwell Road
HAWTHORN EAST / VIC. 3123


H.W. Fander, M. Sc.

REPORT CMS 88/9/44

A suite of seven rock chip samples, from a suite of basic volcanics and sediments near Cleveland, was received for routine petrological examination.

Representative thin sections were prepared, examined in transmitted light and, together with respective offcuts, in oblique incident light, with (carbonate, K-feldspar) stain tests performed as warranted. Attached descriptions summarise the microscopic data and include interpretative comments.

Summary

This suite may be divided into two groups on lithological grounds:

Group 1 comprises basaltic lava and tuffs together with basic volcanic-derived greywacke and conglomerate. Compositional affinities indicate the sandstones are largely derived from the lava/tuff suite (as represented by samples 482845 and 482854), but the turbiditic sandstones also include felsic intermediate-acid volcanic-derived and non-volcanic components including clasts of limestone and dolomite.

The suite exhibits essentially spilitic alteration trends, interpreted as burial-/low-grade regional metamorphic in origin. Characteristic are assemblages of albite, chlorite, epidote and carbonate + prehnite and traces of Fe-sulphide. There are no tangible specific contact- or hydrothermal alteration effects, although the local presence of pyrrhotite may reflect marginal contact-alteration of pyrite.

This group includes samples 482823, 482830, 482831, 482845 and 482854.

Group 2 comprises two samples (482834 and 482851) of polymict quartzo-feldspathic and micaceous sandstone. These rocks are compositionally distinctive, derived from a variety of source rocks, and in contrast to the Group 1 sediments, are devoid of basic volcanic-derived components.

In common with the Group 1 rocks there are no specific contact or hydrothermal alteration effects. Relatively marked chlorite-carbonate alteration in sample 482851 appears to reflect heterogeneous shearing effects.

D. Cowan, B.Sc.

SAMPLE NO.:

482823

(T.S. 60762)

725031^{1.}CLASSIFICATION:Altered GreywackeCOMPOSITION:

Framework of extensively chloritised/variably calcite-stained poorly determinate basic-intermediate lava clasts, subordinate felsic intermediate-acid lava, sericitic pelite, chert and impure chert clasts, quartz grains and albitised/carbonate-stained plagioclase grains, limestone and dolomite clasts and minor muscovite flakes. Carbonate-stained chloritic matrix/cement with minor clots of sericite.

FABRIC:

Poorly sorted, weakly bedded silty and slightly medium sandy turbiditic fine sandstone. Unstressed.

ACCESSORIES:

Conspicuous lithoclast-hosted and clastic leucoxenitic semi-opaques. Clasts of carbonaceous pelite. Traces of clastic magnetite. Thinly disseminated clots (mean 100 um) of pyrrhotite, impregnating the matrix and chloritic lithoclasts.

INTERPRETATION/
COMMENTS:

An extensively chlorite-carbonate-altered volcanomict fine-grained turbiditic sandstone. Carbonate is dominantly dolomite-ankerite, but with some relics of clastic and matrix calcite. Chlorite is interpreted as a low-grade metamorphic product. Pyrrhotite is possibly marginal after pyrite. Carbonate is partly primary (calcite) and partly diagenetic (dolomite-ankerite).

SAMPLE NO.:

482830

(T.S. 60763)

CLASSIFICATION:Volcanomict ConglomerateCOMPOSITION:

Framework of extensively clay ("montmorillonite")-chlorite-prehnite-altered and cloudy microcrystalline epidote-stained basaltic lava clasts, minor felsic intermediate ("trachytic") lava clasts. Chlorite-clay-cemented sandy matrix of similarly altered lava clasts, subordinate albitised plagioclase and variable epidote-prehnite-altered pyroxene grains, minor clasts of chlorite-clay-altered basic glass.

FABRIC:

Poorly sorted fine to medium sandstone-supported conglomeratic. Pebbles are subangular to subrounded, typically basaltic-textured, variably (chlorite + albite, epidote) amygdaloidal.

ACCESSORIES:

Relics of colourless augite in clasts and matrix. Partly degraded lithoclast-hosted and minor clastic opaques. Very minor traces of ultrafine Fe-sulphide in lava clasts.

INTERPRETATION/
COMMENTS:

An almost entirely basic lava-derived, sandstone-matrixed conglomerate. The alteration assemblage is essentially spilitic, with some relics (notably augite) of the primary basaltic assemblage. No tangible contact- or hydrothermal effects.

081

SAMPLE NO.:

482831

(T.S. 60764)

2.

CLASSIFICATION:Volcanomict Greywacke

725032

COMPOSITION:

Framework of extensively microcrystalline-albitised/variably chlorite-stained basic-intermediate lava clasts, subordinate felsitic intermediate-acid lava clasts, albitised plagioclase grains, relatively minor extensively epidotised pyroxene and minor quartz grains. Cloudy cryptocrystalline epidote-stained chloritic matrix/cement.

FABRIC:

Similar to 482823; relatively bedded with sandy turbiditic siltstone interunits. Sporadic irregular chloritic fractures.

ACCESSORIES:

Conspicuous lithoclast-hosted and clastic opaques/leucoxenic semi-opaques. Rare very fine to ultrafine pyrite. Minor relics of colourless augite. Minor traces of prehnite.

INTERPRETATION/
COMMENTS:

Close affinities with 482823. In comparison, this rock is relatively strongly volcanomict, with no obvious non-volcanically derived components. A certain proportion of clastic feldspar is splintery, representing devitrified shard fragments, and the rock is thus reworked-tuffaceous in part. Alteration essentially similar to that in 482830.

SAMPLE NO.:

482834

(T.S. 60765)

CLASSIFICATION:Polymict SandstoneCOMPOSITION:

Framework of angular to subangular/minor relatively rounded quartz grains, feldspar grains (oligoclase-albite, subordinate orthoclase, sanidine-anorthoclase) and minor quartz- and quartz-feldspar composites, conspicuous mica (muscovite, variably chloritic biotite and phlogopite) flakes, subordinate sericitic pelite and low-grade regional metapelite clasts, chert-meta-quartzite clasts, limestone clasts and calcite grains. Weakly chloritic and calcitic matrix/cement of semi-sericitic white mica and microcrystalline quartz.

FABRIC:

A poorly sorted, weakly bedded, slightly medium sandy silty, fine-grained sandstone. Incipiently sheared. Exhibits "fluvial" characteristics in contrast to the turbiditic 482823 and 482831.

ACCESSORIES:

Minor clasts of carbonaceous pelite and carbonaceous chert. Disseminated detrital graphite flakes. Conspicuous and diverse detrital heavy mineral assemblage (colourless garnet, epidote, zircon, sphene, rutile, leucoxene, apatite, rare tourmaline, magnetite and chromite?).

INTERPRETATION/
COMMENTS:

An unusually polymict quartzofeldspathic micaceous sandstone with granitic, sediment, metasediment and acid volcanic-derived components. Bulk of calcite is clastic and rock lacks definite hydrothermal alteration features. This rock appears "out of context" with samples 482823, 830 and 831 and doubtfully represents the same formation.

SAMPLE NO.:

482845

(T.S. 60766)

3.

032

CLASSIFICATION:

Altered Basaltic "Tuff"

725033

COMPOSITION:

Framework of variably chloritic and epidote-montmorillonite-stained, subvitic to microcrystalline basaltic lava clasts, subordinate albitised plagioclase and chlorite-epidote-altered ferromagnesian silicate grains. Fine-grained chlorite cement with interspersed clots of epidote, minor very fine subacicular tremolite-actinolite and a little calcite.

FABRIC:

Poorly sorted gritty fine to coarse sandy clastic. Irregular to angular-subangular/minor subround clasts. Incipiently bedded.

ACCESSORIES:

Minor clasts of dolomitic limestone, minor quartz grains, clastic magnetite and leucoxenic semi-opaques. Thinly disseminated blebs of pyrrhotite. Relics of augite in lava clasts. Minor clots of prehnite.

INTERPRETATION/
COMMENTS:

This rock is interpreted as a basaltic lithic tuff, but is possibly mildly reworked, i.e. strictly a "tuffaceous" sandstone. Alteration is similar to that in, for example, 482830, but is slightly prograde with traces of tremolite-actinolite.

SAMPLE NO.:

482851

(T.S. 60767)

CLASSIFICATION:

Polymict Sandstone

COMPOSITION:

Framework of angular to subangular/minor relatively rounded quartz grains, variably sericitic feldspar (albite-oligoclase, orthoclase, sanidine-anorthoclase) grains, subordinate chloritic/carbonate-impregnated poorly determinate lithic clasts, muscovite and variably chloritised phlogopite and biotite flakes, limestone clasts. Variably chloritic and dolomite carbonate impregnated semi-sericitic white mica/microcrystalline quartz matrix/cement.

FABRIC:

Similar to 482834, but reflecting heterogeneous (fault- or fracture-related) shearing effects.

ACCESSORIES:

Minor clasts of carbonaceous pelite and impure chert. Detrital graphite flakes. Semi-conspicuous detrital heavy minerals (variably chloritised colourless garnet, chloritic carbonate-stained epidote, sphene, zircons, rare tourmaline and apatite, relatively conspicuous leucoxene).

INTERPRETATION/
COMMENTS:

Altered lithoclasts include pelitic and low-grade regional metapelitic types, with subordinate sericitic felsitic-devitrified acid volcanic types. This rock exhibits close affinities with 482834. It is relatively (chlorite-carbonate) altered in comparison, more or less contemporaneously with the heterogeneous shearing effects. No detectable sulphides.

SAMPLE NO.:

482854

(T.S. 60768)

4.

003

CLASSIFICATION:

Altered Basalt

720034

COMPOSITION:

Thinly disseminated phenocrysts of fresh augite and albitised/chlorite-stained to chlorite-pseudomorphed plagioclase in a groundmass of albitised and variably chlorite-saussurite (cryptocrystalline cloudy epidote-) stained plagioclase laths with interstitial augite granules and an impersistent chlorite-epidote-altered "glassy" mesostasis with conspicuous very fine sub skeletal opaques (?ilmenite).

FABRIC:

Weakly flow-structured and -brecciated, weakly porphyritic "basaltic"/trend doleritic-subophitic.

ACCESSORIES:

Minor thoroughly chloritised phenocrystal ferromags. (olivine and/or orthopyroxene). Sparse discontinuous microscale chlorite veinlets. Traces of leucoxene. Minor traces of extremely fine-grained Fe-sulphide.

INTERPRETATION/
COMMENTS:

A partly chlorite-epidote-albite-altered or "spilitised" porphyritic basalt. Exhibits compositional affinities with typically finer-grained basalt-derived material appearing as clasts in the basic-volcanomict sandstones and conglomerates; essentially similarly altered.

SAMPLE NO.:

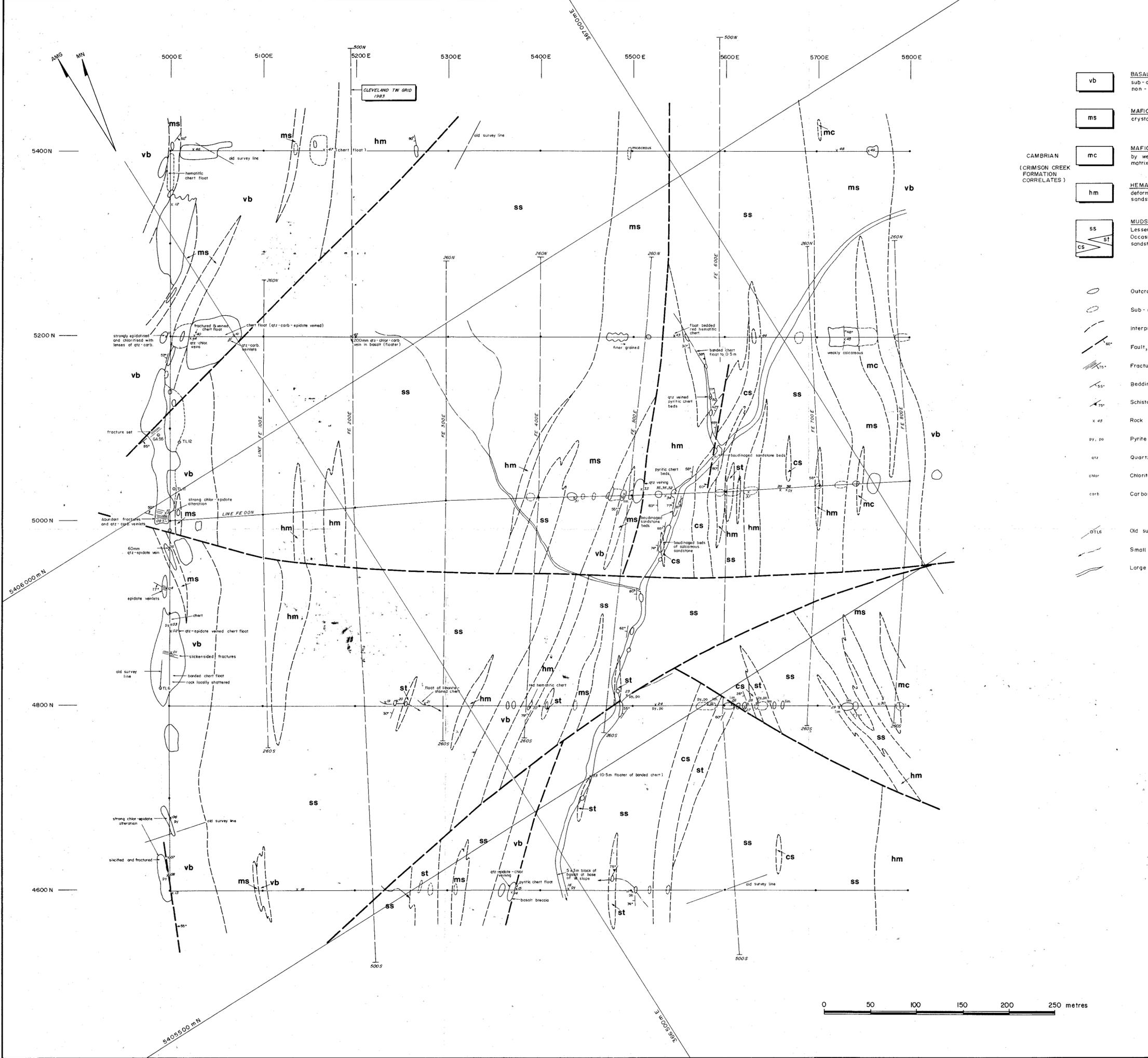
CLASSIFICATION:

COMPOSITION:

FABRIC:

ACCESSORIES:

INTERPRETATION/
COMMENTS:

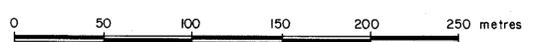
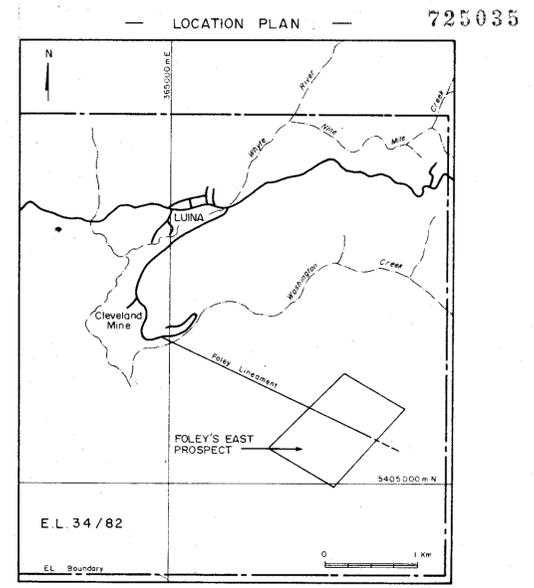


— LEGEND —
(Not in Stratigraphic order)

- vb** **BASALT LAVA** Dark green, sometimes porphyritic. Non vesicular. In places doleritic with sub-ophitic texture. Some inter-flow chert. Western mafic unit strongly magnetic. Eastern unit non-magnetic.
- ms** **MAFIC SANDSTONE** Green, hard and massive. Composed of mafic volcanic detritus and feldspar crystals, in siliceous and chloritic matrix. Often magnetic and slightly hematitic. Ubiquitous minor pyrite.
- mc** **MAFIC PEBBLE CONGLOMERATE** Some breccia-conglomerate. Green, hard, massive. Characterised by well-rounded clasts, average 5mm, of finely-amygdaloidal pale green basalt, in felsic and chloritic matrix. Some clasts silicified and pyritised.
- hm** **HEMATITIC MUDSTONE** Red or purple-brown chocolate mudstone, cherty in places. Much soft-sediment deformation of bedding, and a weak bedding-parallel schistosity. Minor intercalated beds of soft hematitic sandstone, or harder bounding quartz-mica sandstone.
- ss** **MUDSTONE, SILTSTONE AND SANDSTONE** Mostly grey, khaki or creamy, mudstone. Slightly vitric in places. Lesser intercalated similar siltstone, and quartz feldspathic micaceous lithic sandstone (st). Rare chert beds. Occasional units of bluish or greenish-grey, hard, massive, calcareous quartz feldspathic micaceous sandstone (cs), with disseminated pyrite and pyrrhotite.

CAMBRIAN
(CRIMSON CREEK
FORMATION
CORRELATES)

- Outcrop
- Sub-outcrop
- Interpreted geological boundary
- Fault, attitude if known
- Fractures, joints and veins, attitude if known
- Bedding
- Schistosity
- Rock sample (di numbers prefixed 4828--)
- Pyrite, pyrrhotite
- Quartz
- Chlorite
- Carbonate
- Old survey peg and survey line
- Small creek
- Large creek



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EXPLORATION DIVISION																											
NORTH WEST TASMANIA																											
CLEVELAND E.L. 34/82																											
FOLEY'S EAST PROSPECT																											
GEOLOGY																											
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88-2871

Fig 2