888001

PLUTONIC OPERATIONS LIMITED

(A.C.N. 004 680 997)

GOWRIE PARK

OPEN FILE

EL 10/88

ANNUAL REPORT

AUGUST 1993 TO JULY 1994

94-3600

Distribution

1. Plutonic Operations - Sydney
2. Tasmanian Department of Resources & Energy

P Rea
Senior Geologist
August 1994

888002

TABLE OF CONTENTS

1.0 Summary and Recommendations

Limited field work was conducted during the year and a review of previous geochemical and geophysical data was undertaken. The review of this data resulted in a drill programme to test targets at Cethana East Prospect.

Two diamond drill holes are proposed to target the "horizon" which hosts the semi-massive sulphides in hole CC5 (1m @ 1.18% Cu,0.80% Pb, 3.88% Zn and 0.7 g/t Au) and which is interpreted to be the same horizon intersected in hole CC6 with 4.5m @ 1.19% Zn and 0.38% Pb in fine bands. Four existing holes will be cleaned and down hole EM surveys conducted. Significant new targets will be followed up with drilling.

2.0 Introduction

Cethana East lies at the centre of 10 km long alteration zone within the Mt Read Volcanics of the Fossey Mountain Trough. The alteration is characteristic of the massive sulphide deposits elsewhere in the Mt Reads. EL 10/88 was previously a joint venture between Plutonic Operations Ltd and Noranda Pty Ltd. On 2 June 1992 Plutonic became the sole licensee. The EL has two parts, lake Barrington in the west which includes Cethana, and Gog Range in the east (Figure 1 and 2).

2.1 Regional Geology

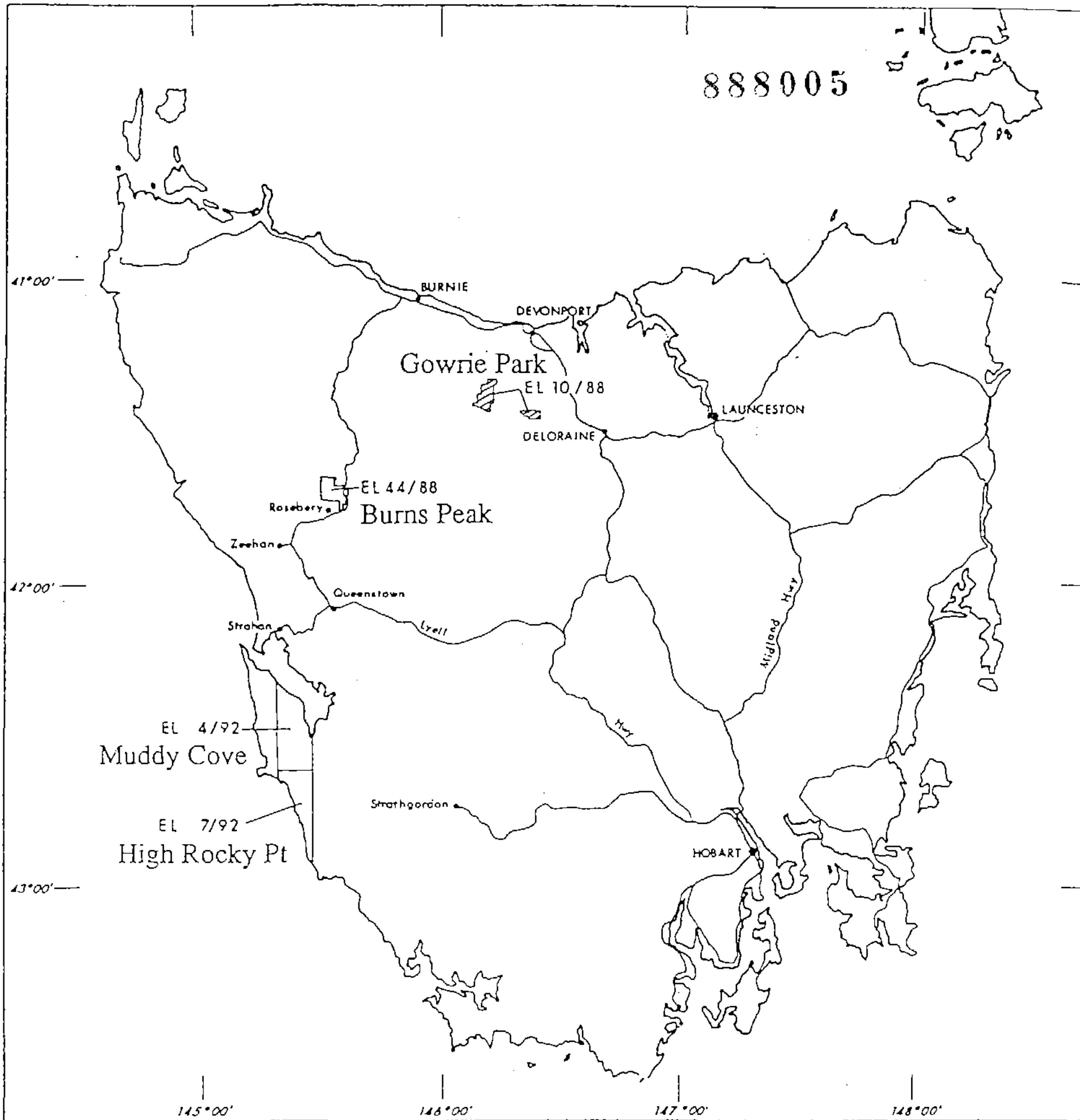
The prospective rocks within the EL are part of the Cambrian Mt Read volcanics which host five gold rich polymetallic Volcanogenic Massive Sulphide (VMS) deposits. These include Mt Lyell, Hercules, Rosebery, Que River and Hellyer. In addition, there are several of sub-economic deposits and occurrences of VMS style alteration throughout the belt.

All of the above deposits lie within the major north-south trending part of the belt which runs from Elliott Bay to north of Hellyer, occupying the Dundas Trough. The Mt Read Volcanics that outcrop in EL 10/88 occupy a smaller trough, the Fossey Mountain Trough, which trends roughly east-south-easterly from north of Hellyer to beyond Deloraine. The Fossey Mountain Trough is considered to be a branch of the Dundas Trough.

Mines Department Mt Read Volcanics 1:50,000 mapping stops just within the western most boundary of the EL with 1 km² included in the "Geology of the Winterbrook-Moina" area. Other than this the most recent Mines Department regional mapping is the Sheffield (1959) and Middlesex (1958) 1 mile to 1 inch mapping. Recent regional updating of the "Sheffield" sheet has been shelved indefinitely.

Early volcanism in the main Mt Read belt was rhyolitic to dacitic in composition. This was followed by a period of andesitic-basaltic volcanism before a return to felsic volcanism. The VMS orebodies of Rosebery and Hercules are believed to have formed later in this initial felsic volcanic phase with the Que and Hellyer orebodies during the mafic-intermediate phase. The disseminated copper orebodies at Mt Lyell are hosted in the first felsic phase but are probably time correlates of the mafic intermediate phase having been deposited sub-surface, possibly due to fluid boiling.

Even within the main belt this relative aging of mineralising events is subject to considerable debate due to the overprinting of alteration and deformation over initially complex facies relationships. Placing the volcanics and associated sediments of the Fossey Mountain Trough within this stratigraphy is even less certain, however, the andesites of the Beulah Formation were very probably deposited during the mafic-intermediate phase. However, regional mapping has revealed significant differences between the volcanic sequences in the Dundas Trough and the Fossey Mountain Trough. In particular the mafic-intermediate phase of volcanism appears more significant in the Fossey Mountain Trough.



SCALE 1:2000000

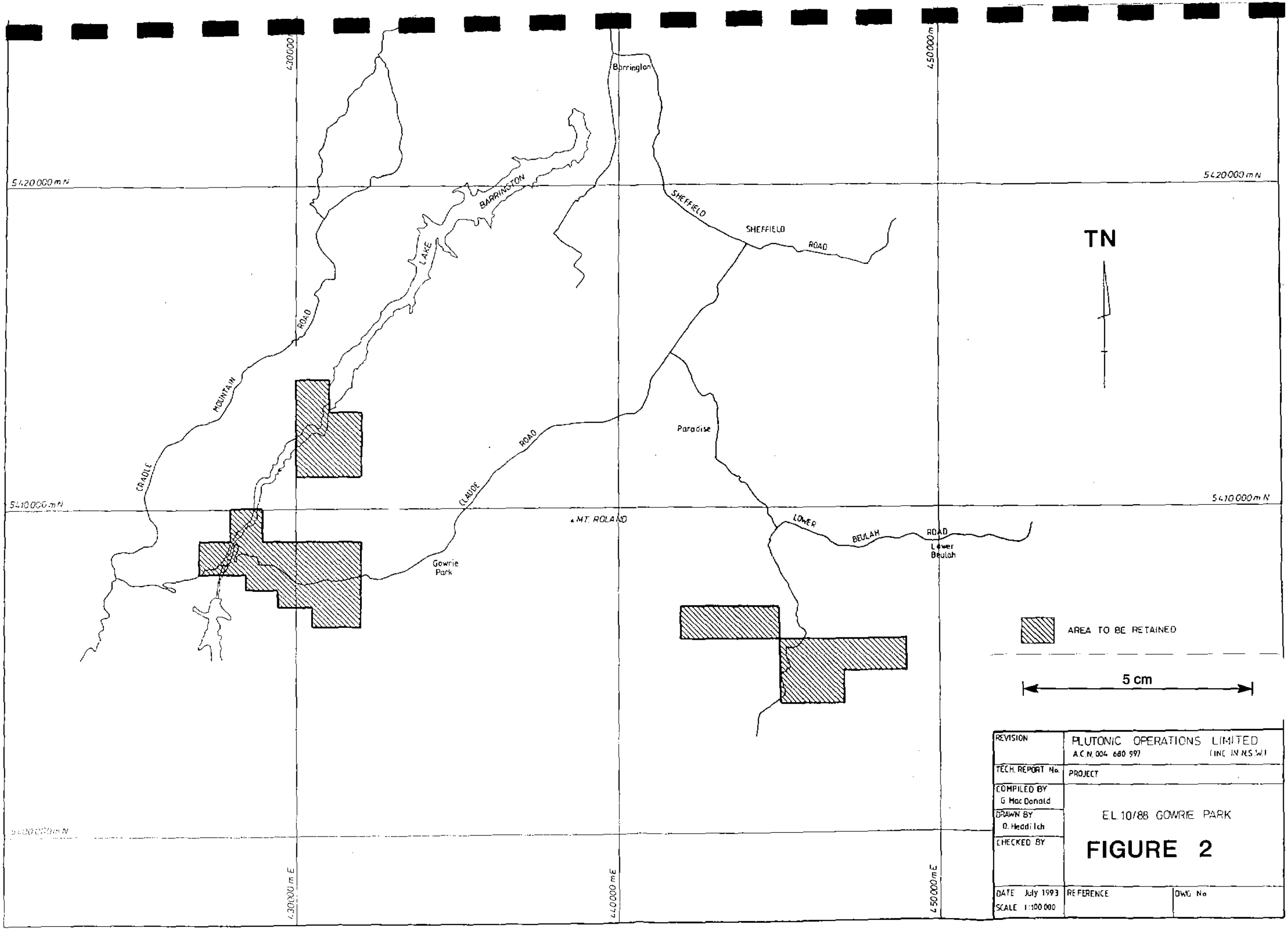
10 0 10 20 30 40 50 60 70 80 90 100 km

T.N.

5 cm

FIGURE 1

REVISION	PLUTONIC OPERATIONS LIMITED A.C.N. 004 680 997		
Technical Report No:	PROJECT: TASMANIA GENERAL		
DWG. OFFICE	PROJECT LOCATIONS		
CHECKED BY.			
DATE: APR. 1992	DRAWN BY. K.G.F. / L.H.B.	DWG. No.	
SCALE 1:2000000	GEOLOGIST: K.M.T.	PROJECT No.	701


430000
450000 mE
Barrington
5420000 mN
BARRINGTON
LAKE
SHEFFIELD
SHEFFIELD
ROAD
TN
ROAD
MOUNTAIN
CRADLE
ROAD
CLAUDE
Paradise
5410000 mN
MT. ROLAND
LOWER
BEULAH
ROAD
Lower Beulah
Gowrie Park
AREA TO BE RETAINED
5 cm
5400000 mN
430000 mE
440000 mE
450000 mE
REVISION
PLUTONIC OPERATIONS LIMITED
A.C.N. 004 680 997
(INC IN N.S.W.)
TECH. REPORT No.
PROJECT
COMPILED BY G. MacDonald
DRAWN BY D. Heddi lch
E.L. 10/88 GOWRIE PARK
CHECKED BY
FIGURE 2
DATE July 1993
SCALE 1:100 000
REFERENCE
DWG No

90088006

The siliciclastic Precambrian derived Roland Conglomerate and Moina Sandstone, of Late Cambrian-Ordovician age unconformably overlie the Cambrian volcanics with small outliers of these younger rocks capping the volcanics in many places. That the unconformity is clearly angular in many places strongly suggests that there was a major phase of deformation, (compressional) in the Late Cambrian, prior to the deposition of the siliciclastics.

Some contacts to the south of the trough are faulted and have been mapped as thrusts. It is quite possible that similar thrusts occur in the Cambrian volcanic sequence though none have yet been recognised.

The siliciclastics of the Roland Conglomerate/Moina Sandstone are overlain by the Gordon Limestone. These younger post volcanic rocks were themselves folded, probably twice, during the mid-Devonian Tabberabberan Orogeny during which time thrust faulting is believed to have taken place.

The structural complexity of the region is an impediment to exploration and is not easily resolved.

Williams (1979) refers to two phases of mid-Devonian folding, namely the earlier east-west trending "Loongana/Wilmot trend" folds with a half wavelength of 5 km and the later north-westerly to northerly "Deloraine/Railton trend" folds with a half wavelength of 2.5 km. The visible S1 cleavage is considered to be consistent with the earlier of the two mid-Devonian folding events. The structural complexity of the rocks in EL 10/88 are discussed in further detail later.

Following the mid-Devonian deformation, the north and west of Tasmania was intruded by granitic batholiths with two such bodies outcropping in the region of 10/88, one to the south of Cethana, the Dalcoath Granite, and the other to the north of the Gog Range, the Beulah Granite. The former granitoid was responsible for a number of smaller mineral deposits in the Moina area south-west of Cethana.

In the Tertiary, tholeiitic basalt lavas infilled most topographic lows, these flows now occupying topographic highs and overlying prospective Cambrian volcanics and associated sediments in many parts of the belt.

Glaciation in the Quaternary has produced both the glacial deposits and scree which cover much of the Cethana East prospect.

3.0 Previous Exploration

Cethana East has been explored intermittently since 1973 when the prospect was located by Asarco in a regional stream sediment sampling survey. Since then the Cethana East has been gridded, soil sampled, had ground magnetics, gradient IP, some pole-dipole and dipole-dipole IP, UTEM and CRONE EM geophysical surveys and had five diamond drill holes.

The area has anomalous soil and rock chips corresponding to altered (sericite ± chlorite ± silica ± pyrite) volcanics though the extensive scree cover by Roland Conglomerate from the mountains just to the south give a somewhat distorted picture of the distribution of soil anomalies. Diamond drill holes CC5 and CC6 were targeted (successfully) on anomalous soils.

EM has not revealed any conductors due to massive sulphides, however, this is to be expected as:

(i) Base metal sulphides in soils and drill core are sphalerite ± galena rich with low copper values .

(ii) Petrology has shown the sulphides to consist of discrete fine grains with an interstitial chloritic 'muddy' sediment matrix. This insulation effect was confirmed with a multimeter.

IP has been more effective, defining an along strike zone of strong chargeability with a sharp cut-off to the north. Diamond drill holes CC4 and CC7 were targeted on IP chargeability highs, intersecting a zone with numerous bands of pyrite, now in the S2 cleavage but probably originally syngenetic, as well as a narrow lens of syngenetic massive pyrite.

The final diamond hole, CC8, was targeted to intersect the semi-massive sulphide lens intersected in hole CC5 (37.8 to 38.8m 1m @ 1.02% Cu, 0.80% Pb, 3.88% Zn and 0.6 g/t Au) but did not intersect any significant sulphides.

4.0 Work Conducted 12 Months to July 1994

Limited fieldwork was conducted during the year and a review of previous geochemical geological, and geophysical data was undertaken. The review included reinterpretation of local geology and its affect on the mineralised horizons. The results of recent petrology suggest more importance should be placed on I.P. geophysics which has outlined a zone of disseminated sulphide corresponding with the prospective stratigraphic horizon.

4.1 Local Geology

The rocks at Cethana East consist of strongly altered medium grained to fine grained quartz rich volcaniclastics and fine sediments, with a quartz phyric lava on the western side of the prospect.

The rocks are almost invariably schistose with two cleavages at low angles to each other, both sub-vertical and trending approximately west-north-west to north-west.

There is very little bedding or facing information at Cethana East with the only readings being bedding to core axis readings from unorientated core.

Two kilometres to the west at Cethana West bedding dips around 60° to the north-north-east and faces the same way. It is likely that the sequence at Cethana East, at least the area which has been the focus of drilling, faces the same way.

The dip and strike of the sequence is more problematical for the following reasons:

(i) Correlation between holes CC4 and CC7 appears to be reasonably straight-forward with similar rocks and mineralisation extending through both holes (including correlating the massive pyrite lenses in both holes). This is supported by the dipole-dipole IP profiles. However, if this is the case then the bedding strikes east-west. The alternative is that bedding strikes more west-north-west with a small northerly trending fault lying between the two holes. A similar structure has been interpreted to pass through holes CC5 and CC8.

(ii) Previous interpretations of holes CC5 and CC8 have considered that the semi-massive sulphide horizon intersected in hole CC5 has been faulted off and does not appear in hole CC8. This interpretation is problematical. In particular, comparison of the IP (pole-dipole and dipole-dipole) pseudo sections for lines 21500E to 21800E and even lines 22200E, 22400E and 22600E, trongly suggests that the lateral sense of any movement on a shear passing through hole CC5 must be sinistral and of the order of 600m or so. However, this would require the fine grained creamy cherty sediments, intersected in the top of hole CC8 and outcropping in road-cuttings on the hairpin bend, to be intersected lower down in holeCC5 or in hole CC4. This is not the case. Moreover, on line 21600E, very similar looking rocks lie at the top of hole hole CC6 and to the north of hole CC6 collar. Thus it is possible that holes CC5 and CC8 can be correlated (with perhaps some minor movement on shears) with facies variation/alteration explaining initially perceived differences. However, vertical movement on a shear cutting holes CC5 and CC8 cannot be discounted. Nor can a shear with 100's of metres displacement be discounted if it trends north-westerly, passing to the north of the IP anomaly on 21800E.

Regardless of this, the correlation between the bottom parts of holes CC5 and CC8 indicates that bedding is sub-vertical to slightly overturned. Bedding to core axis readings from sediments towards the base of holes CC5 and CC8 are 60°. These values support a west-north-west strike for bedding.

4.2 Mineralisation

Cethana East has the best mineralisation discovered to date over the whole 10 km long alteration zone - with 1m at 1.18% Cu, 0.80% Pb, 3.88% Zn and 0.7 g /t Au intersected in CC5. Individual 1m assays from Gowrie Park are of a similar tenor, however, mineralisation is clearly in veins, not bands as at Cethana East.

Cethana East can be divided into two east-east trending mineralised zones.

Diamond Drill Holes CC4 and CC7, targeted strong chargeability highs and intersected numerous bands of pyrite in fine to medium grained altered volcaniclastics, including a lens of massive pyrite in both holes (very probably the same lens). Stratigraphically overlying these rocks are the finer sediments which host the fine bands of base-metals in hole CC6 and the semi-massive sulphides in hole CC5. These base-metals correspond to lower chargeability values. Hence in targeting elsewhere it is likely that the main chargeability high corresponds to a pyritic "footwall" with base-metals occurring at the northern, "leading edge" side of the chargeability high. This is the case for lines 21600E and 21700E and is probably the case for lines 22200E, 22400E and 22600E though in the case of line 22200E the presence of two discrete chargeability highs, the southernmost with a corresponding resistivity low, makes this simple interpretation somewhat insufficient.

Geologically, base metals in hole CC6 lie in tuffaceous siltstones stratigraphically above a felsic lava. The semi-massive massive sulphides in hole CC5 lie at a similar position with the felsic lavas position occupied by a mass flow breccia including clasts of felsic lava (?). To the west of line 21600E a similar stratigraphic position in outcrop contains very strongly manganese stained gossanous fine grained volcaniclastics assaying up to 0.55% Pb and 0.40% Zn. This zone is only covered by one line of pole-dipole IP (21500E). This zone should be drill tested in a second round of drilling.

Two Diamond Drill Holes are proposed, targeting the horizon hosting both the semi-massive sulphides in hole CC5 and the bands of base metals in hole CC6. Targeting is based on outcrop geology (generally poor), previous drilling, IP and soil sampling.

Hole A will be collared at 3450N/21680E and drilled at - 50 grid south to 300m depth. The hole should terminate in felsic lavas. Hole B will be collared at 3475N/21800E and drilled at - 50 grid south to 250m depth. The hole should terminate in medium to coarse grained pyritic volcaniclastics

All holes should be drilled HQ until stable ground is reached with NQ for the rest. Orientation readings should be taken where relevant. The holes will be lined with PVC and down hole EM surveys carried out.

Other potential targets include the southerly chargeability high and corresponding resistivity low on line 22200E and gossanous rocks on line 21500E.

The gossanous rocks on line 21500E and to the east should be better defined with dipole-dipole IP.

5.0 Bibliography

MacDonald, G (1993) The prospectivity of EL 10/88 "Gowrie park" Tasmania, Unpublished Plutonic Resources Report December 1993

MacDonald, G (1993) Annual Report on Exploration Activity August 1992 to July 1993 Unpublished Tasmanian Mines Department Report for Plutonic

Zanzavatjian, P (1989) An appraisal of past geophysical surveys in Cethana EL 10/76 Unpublished Plutonic Resources Report, January 1989.