

# **E.L. 20/96 - Elliott Bay, Southwestern Tasmania.**

## **Partial Relinquishment Report**

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## **SUMMARY**

E.L. 20/96 - Elliott Bay lies at the southern end of Tasmania's Mt Read Volcanics and it covered a sequence of Cambrian calc-alkaline felsic to mafic volcanics, granites and other lithologies. The region has potential for V.H.M.S. and/or gold deposits, however, a reasonable amount of exploration has already been conducted and future work will probably require a commitment to extensive drilling of geological and geochemical targets.

Exploration to date on the relinquished area has defined around 20 base metal and / or gold 'prospects'. Exploration & Management Consultants Pty Ltd and the Fimiston Mining N.L. joint venture did not conduct any ground based exploration in the relinquished area and data compilation consisted predominantly of geophysical data reviews (that are attached in digital format) and no project specific review.

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## **1.0     INTRODUCTION**

The E.L. 20/96 license and relinquished area is located on and near Tasmania's southwest coast (Figure 1) and is accessible by the four wheel drive (??) Low Rocky Point track from Birch Inlet on Macquarie Harbour to the low Rocky Point Lighthouse, by boat to Cowrie Beach and by helicopter.

Access within the tenement is relatively easy by foot, 4wd motorcycle or ATV. The prospective rocks in the license are generally poorly outcropping and are often covered by short heath and thin (to 1m) Tertiary gravels.

Certain sectors of the south-west of Tasmania are World Heritage listed. The outcrops of Mt Read Volcanics at Elliott Bay (and some Eo-cambrian tholeiitic volcanics on the Sorell Peninsula) were excluded from the World Heritage areas on the basis of their mineral prospectivity (and lesser wilderness values).

## **2.0     EXPLORATION PHILOSOPHY**

EMC P/Ls exploration philosophy with respect to the general Elliott Bay region emphasises the necessity for a serious commitment to drilling. Targets ideally would have coincident geochemical and geophysical responses, however, these are becoming far less common. The region's remoteness and the extremely high cost of drill rig, equipment and personell mobilisation make this a difficult philosophy to implement and maintain.

The potential sources of gold in the existing and relinquished EL 20/96 area can be summarised as being the following:

- V.H.M.S. deposits
- Quartz-pyrite-chlorite-tourmaline alteration zones related to shears
- Quartz-gossanous zones associated with magnetite-chlorite alteration at granite margins.
- Stratabound replacement of coarse pyroclastics.
- Quartz veins
- Tertiary gravels

A number of conclusions have been reached regarding gold exploration and they are similar to concerns conclusions noted by previous explorers, being:

- Gold is erratically distributed in soil samples and C horizon samples appear to be the best indicator of its presence or absence
- Detailed panning in creeks to locate the entry point of gold may be the best way to initially track it to source
- If C horizon sampling is utilised the sample should be obtained using a purpose built power auger. Post hole diggers are ineffective if the soil cover is > approximately 0.5 m
- Additional exploration in the region, specifically for gold, is still warranted.

## **3.0     EXPLORATION HISTORY**

### **3.1     Introduction**

The Elliott Bay area lies at the extreme southern end of the Mount Read Volcanics. The area saw some prospecting around the turn of the century with T.B. Moore visiting the area. In 1955, the B.M.R. conducted an Airborne Scintillometer Survey over the southwest of Tasmania. The first EL, which included the Elliott Bay area, was that of Mt.Lyell-E.Z (L.E.E. joint venture) in 1957, which covered a vast area of south-western Tasmania.

### **3.2     Old Workings**

Old workings are visible at V1 (hereafter Voyager is abbreviated to V - i.e. Voyager 1 becomes V1), Penders Prospect, V2 (Lewis River) and V3. These workings date back to 1890-1910, however, the area south of Macquarie Harbour did not see the level of prospecting activity which characterised the rest of the west coast. This was largely due to difficulty of access.

### **3.3     L.E.E./B.H.P.**

The L.E.E. joint venture (between the Mt. Lyell and E.Z. companies, operators of the Mt. Lyell and Rosebery mines, respectively) carried out an airborne EM., magnetics and scintillometer survey over the vast "Gordon Concession" covering much of Tasmania's south-west. Ground inspection of old workings was made at V1, V3 and Lewis River with mapping and rock-chip sampling of the latter. Results of this work are poorly reported and have been superseded by later more detailed work. No data from their work is included in this report.

B.H.P explored the south-west from 1965 -1975 as part of the large EL 13/65. Initial work involved an aeromagnetic survey including the northern part of Elliott Bay, followed by an airborne scintillometer survey. Ground work consisted of a stream sediment geochemical survey over most of the volcanics with some limited soil sampling. In 1975, B.H.P contracted Geoex Pty Ltd to fly a McPhar H-400 EM survey over the Elliott Bay area. The McPhar H-400 EM survey has been superseded by later airborne EM surveys in the area.

### **3.4     Geopeko (1976-1985)**

Geopeko extensively summarised all of their work in their 1985 relinquishment report (Herrmann 1985). Their work defined 36 prospects given the prefix Voyager. A brief summary of exploration conducted annually by Geopeko follows.

#### **1976-77**

Exploration (over a 3 week period in March/April) consisted largely of reconnaissance mapping and rock sampling and the collection of -80# stream sediments over a significant of the area of Mt. Read Volcanics. More detailed work was conducted over areas of old workings at V1. EM anomalies defined by the McPhar H-400 survey (V3 and V4) and aeromagnetic anomalies from the same survey (V5 and V6).

#### **1977-78**

Gridding, soil sampling and geophysical surveys (dipole-dipole IP, VLF-EM and SP) were conducted over some of the prospects defined in the previous years work (V 1, 2, 3 and 9). The V 3, 10 zone in the south-eastern part of the area was recognised as having potential for V.H.M.S. style mineralisation with anomalous streams, soils and IP responses. V 1 was also considered to have similar potential.

#### **1978-79**

The regional work commenced in 1976/77 was extended to cover the area north of the Lewis River, with further mapping, rock sampling and -80# stream sediment sampling conducted. Some of this work was directed towards assessing further EM anomalies from the McPhar H-400 survey. In general inconclusive results were obtained from following up the EM anomalies.

Detailed work was conducted over V 1 to 5, and 10. This work involved further gridding, soil sampling and geophysics (including magnetics, IP, SP, TURAM and VLF-EM). The first drilling (All Jacro AQ holes) was conducted in this season with 2 short holes (for 61.2 metres) at V3.

Geochemical and geophysical anomalies at V2 were attributed to minor "erratic" lenses of mineralisation. Those at V3 remained unexplained by drilling, though the occurrence of sulphides (including Cu, Pb and Zn) in fine sediments was considered encouraging.

#### **1979-80**

Work was conducted over a five month field season from December through April. The regional reconnaissance work was extended to cover much of the remainder of the Mt. Read Volcanics in the Elliott Bay area, with -80# stream sediment sampling and geological mapping. By this stage 26 Voyager prospects had been defined. At the end of the season Large (1981) defined six styles of mineralisation with economic potential in the Elliott Bay area. These were:

- (1) Cu (Pb-Zn) mineralisation (analogous to Mt Lyell) in pyritic alteration in the western part of the Elliott Bay area.
- (2) Stratabound gold in volcanics .
- (3) Rosebery type V.H.M.S. deposits in the V2-V3 area in the south
- (4) Epigenetic gold-base metal mineralisation related to the contacts with the Elliott Point Porphyry.

- (5) Copper-tungsten mineralisation associated with thin magnetite-pyrite-chlorite-siderite exhalatites (?) at V1 - V5.
- (6) Syngenetic copper mineralisation in dolomitic horizons in the tholeiitic
- (7) Mainwaring River Volcanics to the west of the Mt. Read Volcanics at Elliott Bay.

Priority (for exploration follow up) was assigned to styles 1 to 3.

Detailed work was conducted over a number of prospects with more significant work at V1 (gridding, magnetics, VLF-EM and TURAM), V6 (gridding, mapping, soils - though not assayed for gold, magnetics and VLF-EM), V9 [gridding, mapping, soils - (inc. Au analysis), magnetics, VLF-EM and a single 60 metre Jacro AQ DDH - V9/1.

The magnetics at V6 defined a magnetite bearing dyke associated with a "tongue" of the Low Rock Point Granite (later shown by Cyprus to be associated with anomalous gold). Work at V9 was encouraging with widespread chlorite-magnetite and pyrite-sericite alteration recognised and anomalous base-metals. The single short diamond drill hole intersected sericitised felsic volcaniclastics with disseminated pyrite and disseminated /veinlet magnetite.

1980-81

Field work concentrated on areas of alteration defined by previous work (V3, V9, V22), and also on a number of other prospects/ reconnaissance work in the Mainwaring River Volcanics.

More significant exploration included the following: at V3 (further mapping, limited IP and drilling of a single 201.1 m DDH - V3/3), V9 (soil sampling, gradient array IP followed-up by dipole-dipole IP and the drilling of a single 232.15 m DDH - V9/2 under a copper soil anomaly), V22 (gridding, mapping, rock and soil sampling).

At V3 DDH V3/3 intersected felsic volcaniclastics with disseminated pyrite and minor local zinc mineralisation (8 metres @ 0.37% Zn). Hole V9/2 intersected chloritic alteration but no significant copper mineralisation.

Results from work on other prospects included the discovery of Ag-Au-As anomalous in pyrite-galena-sphalerite veins along the Copper Creek Fault (V31). Low order gold stream anomalies were defined in reconnaissance work in the Mainwaring River volcanics.

1981-82

At V9 (extensions to grid, infill soil sampling, gravity, magnetics and the drilling of a single 158.55 metre DDH, V9/3 to test a dipole-dipole IP anomaly), V22 (infill gridding, mapping, magnetics and soil sampling) and V34 (gridding, mapping, soil sampling and magnetics).

Further work was conducted over prospects in the north-eastern part of the area of Mt. Read Volcanics. At V16 work included gridding, soil sampling and stream sediment sampling (including panned concentrates), VLF-EM and magnetics with similar work at V20.

V9/3 intersected felsic volcaniclastics with interbedded fine sediments including pyritic black shales interpreted to indicate a favourable ore-forming environment. Magnetics indicated the presence of a large magnetic body at ~ 500 metres depth. Mapping at V31 confirmed that the sulphides are located in quartz veins along a geological contact. Soil sampling at V34 defined a number of moderately anomalous zones with visible galena/sphalerite in auger chips.

Soil sampling at V16 and V20 in the north-east defined a number of anomalous zones. Analysis of alluvial gold indicated that it had a primary origin and was probably associated with sub-volcanic base metal mineralisation.

1982-83

Aquitaine Australia Minerals Ltd joint ventured into the project in 1982, but withdrew in 1983.

Extensive dipole-dipole IP survey was completed over the volcanics on either side of the Mt. Osmund syncline from V33 on the western side to V34 on the eastern. 100 line kilometres (totalling ~ 25 square kilometres) was read using 50 metres dipoles on east-west lines spaced 200 metres apart. As part of this systematic work C-horizon soil sampling was completed over the same area along with detailed

mapping/re-mapping. Magnetism was read over lines in the southern part of the survey area and infill soil sampling and IP conducted in areas where anomalous responses were recorded. Other work in the season was the extension of panned concentrate stream sampling on the eastern side of the Stony Creek Microgranite and a lead isotope study of occurrences of lead mineralisation.

The IP anomalies defined by the survey were only of subtle character, however, after consideration of other geological, geochemical and geophysical data, three were selected as priority targets for drilling in the following season with a further eight recommended for further infill IP or geochemical sampling. The stream sampling defined a zone of anomalous alluvial tin and extended the area of the gold anomalous zone (V24/V30 lie to the west of the Stony Creek Microgranite). The lead isotope study showed that Cambrian mineralisation could be distinguished from Devonian (less prospective) mineralisation.

1983-84

The recommended drilling was not carried out. Instead a smaller programme (apparently designed to obtain encouraging enough results to carry on) was completed. In the V9 area this work consisted of a fixed loop UTEM III survey (four loops for ~ 4 line kilometres).

Geopeko decided to withdraw from exploration in Tasmania in early -1984, however, a J.V. partner could not be found and the ground was dropped in mid -1985.

#### 4.5 Cyprus (Arimco)-Poseidon (1985-1990)

Cyprus were the licence holders of EL 40/85 from 1985 until late-1994 when the ground was compulsorily relinquished in spite of Cyprus's efforts to extend the E.L. It is believed that Cyprus and Poseidon maintained a 50:50 J.V. until Aberfoyle farmed in in 1990, with the split ~ 33% each from then on. Cyprus managed the property until 1989. In 1990 Aberfoyle began farming into and managing the EL, pulling out in 1993.

The following is a summary of exploration conducted by Cyprus from 1985 to 1990.

1985-96

##### *Work Carried Out*

Field work in the six months from January to June, 1986 consisted of the following:

- Helicopter borne Dighem-magnetic survey in early January including 500 line km with 150 metre line spacing
- Ground follow-up of ten anomalous areas involving:
  - 14 lines totalling 19.25 km
  - Max-min EM survey and magnetism surveys over all lines
  - 455 C horizon soil samples on lines 1 to 12 and 14
  - 14 rock chip samples
  - reconnaissance geological mapping
  - 10 thin sections.

##### *Results*

A number of anomalies were recognised in the DIGHEM survey. Bishop (1986) recommended follow-up of 10 of these anomalies. Fourteen reconnaissance lines were completed over these anomalies.

Ground magnetism was generally flat with only five peaks on lines 2, 3, 5 and 8. No geochemical anomalism was associated with these peaks except for line 2.

Line 2: Anomalous zinc in soils (to 550 ppm) from 10550E to 10850E.

Minor lead/zinc (to 100 and 200 ppm respectively) from 11000E to 11150E over spiky magnetism.

Line 5: Anomalous zinc in soils (to 690 ppm) and lead (to 175 ppm) with strong coincident Max-min response.

Line 6: Anomalous gold in soils averaging 0.5 ppm from 850E to 950E (peak of 0.96 ppm).

Line 8: Moderately anomalous zinc (to 190 ppm) and lead (to 100 ppm) in soils with coincident moderate Max-min EM anomaly.. A separate single anomalous gold value of 1.01ppm at 1275E.

(No Au assayed for samples from lines 10 to 14).

Geologically the rocks were considered to become more altered to the south.

1986-87

Regional:

*Work Carried Out*

- Evaluation of all previous geophysical work by Mitre Geophysics (Bishop, 1987)
- Compilation of 1:10000 prospect mapping at 1:25000
- Regional Stream geochemical sampling using -80# and panned concentrates (Cu, Pb, Zn, As and Au).
- Rockchip sampling
- Air photo interpretation of structures.

*Results*

- Bishop (1987) recommended follow-up of a number of DIGHEM anomalies, DHEM on all holes at V19, compilation of all previous work at 1:25000 and regional gradient array IP over areas not covered by previous IP surveys.
- The stream geochemical sampling results along with subsequent years work are compiled at 1:10000.

Prospect evaluation was prioritised according to the following:

- follow-up of Dighem anomalies
- evaluation of old prospects
- follow-up of air magnetic anomalies
- follow-up of geological and geochemical anomalies determined from Cyprus stream and rock-chip sampling program.

Prospects are detailed below:

Wanderer South (Dighem anomaly)

*Work Carried Out*

- 3 lines totalling 3.15 km.
- 13 pan concentrate samples.
- B/C horizon sampling over all lines.
- 12 rock-chip samples.
- Max-min EM and ground magnetics surveys over all lines.

*Results*

The pyritic shales, felsic volcanoclastics, basic volcanics and gabbroic intrusives do not have associated anomalous geochemistry nor geophysics.

Python Pit (Dighem anomaly)

*Work Carried Out*

- 1,000m grid anomaly.
- 4 -80# and 2 pan concentrate samples.
- 41 C horizon samples.
- 1 rock-chip.
- Max-min EM and ground magnetics surveys.

*Results*

Siltstones, shales and basic volcanics underlie soils with up to 200 ppm Cu, 42 ppm As and 0.65 ppm Au with a weak conductor coincident with a black shale.

Mt Osmund West (Dighem anomaly)

*Work Carried Out*

- 2 old Geopeko lines resurveyed and extended 200m + one 500m line cut.
- 4 pan concentrates and 3 -80# stream samples.
- 5 rock-chip samples.
- 41 C horizon samples.
- Max-min EM and ground magnetics over all 3 lines.

*Results*

Felsic porphyries and sediments are drained by creeks with abundant visible gold (to 25 visible grains and 173.3 ppm Au). Rocks are up to 1,600 ppm Cu, 1,875 ppm Pb, 545 ppm Zn, 7,400 ppm As and 0.015 ppm Au in a ferricrete on quartz and 2,800 ppm Cu, 215 ppm Pb, 190 ppm Zn, 86 ppm As and 0.045 ppm Au in a silicified black shale. Soils



were up to 940 and 300 ppm Pb and 370 ppm As. The EM detected very weak anomalies associated with pyritic black shales. Further detailed work was recommended.

#### Mainwaring River (Dighem anomaly)

##### *Work Carried Out*

- Follow-up undertaken along Mainwaring River and tributaries.
- 2 -80# and panned concentrate samples.
- 4 rock-chip samples.

##### *Results*

The basic volcanics and fine sediments have a sheared contact coincident with the EM anomalies. No anomalous geochemistry was revealed.

#### Woolloomooloo Creek (Dighem anomaly)

##### *Work Carried Out*

- 800m grid line.
- 23 pan concentrate and 31 -80# stream sediment samples.
- 32 C horizon soil samples.
- 1 rock-chip sample.
- Ground magnetics and Max-min EM along adjacent line.

##### *Results*

Felsic volcanoclastics and porphyry are drained by creeks with anomalous gold (to 130 ppm in panned concentrates). 9.3 ppm Au was assayed in a -80# sample. All soils were low and the EM responses were weak and attributed to a shale unit.

#### Mt Osmund East (Dighem anomaly and Line 15 from previous years work)

##### *Work Carried Out*

- 2 extra lines + line 15, totalling 2.1 km, were surveyed.
- 78 C horizons soil samples.
- 2 rock-chip samples.
- 4 pan concentrate and 4 -80# stream samples.
- Ground magnetics and Max-min EM surveys over all lines.

##### *Results*

EM anomalies are weak, however, soils are up to 6,000 ppm Pb, 1,700 ppm Zn and one sample gave 1.85 ppm Au though re-sampling gave 0.008 ppm. Anomalous results are associated with zones of chlorite and quartz chlorite alteration.

#### North Waterloo Creek (Dighem anomaly)

##### *Work Carried Out*

- One 600 metre line was cut to cover each of the two anomalies.
- Soils over both lines.
- 2 and 1 rock over lines 18 and respectively.
- Ground magnetics and Max-min EM surveys over both lines.

##### *Results*

- Felsic volcanoclastics.
- Soils to 335 ppm Pb, 245 ppm Zn and 0.16 ppm Au on line 18 though Au results not repeatable. Line 5100 had a peak of 260 ppm Zn.
- All rocks low.
- Weak EM conductors on both lines. Weakly anomalous Zn associated with EM response on southern line.

#### Penders Prospect (V1)

##### *Work Carried Out*

- 12 -80# and 11 panned concentrate stream sediment samples.
- 41 rock-chip samples.

##### *Results*

Up to 1.07 ppm Au in -80# and 365.5 ppm Au in panned concentrates were taken from creeks in the vicinity of Penders Prospect. Best values were obtained just downstream of the volcanics/Low Rocky Point Granite contact.

It was recommended that further mapping, rock-chip and soil sampling be carried out over the granite/volcanics contact with no further work on Penders Prospect itself.

#### Voyager 18-23 (Coastal Section)

##### *Work Carried Out*

- Reconnaissance mapping.
- 22 rock-chips.

##### *Results*

- Rock-chips assayed up to 2.15% Cu, 30 ppm Pb, 375 ppm Zn and 0.055 ppm Au.

No further work was recommended.

#### Voyager 6

##### *Work Carried Out*

- Reconnaissance mapping.
- 16 rock-chip samples.
- 15 pan concentrate and -80# stream samples.

##### *Results*

- Rock-chips up to 7.25 ppm Au.
- Streams up to 0.9 ppm Au in -80# and 22.6 ppm Au in panned concentrates.

#### Porphyry-Dolerite Contact (Air Magnetic Anomaly)

##### *Work Carried Out*

- 800 m grid line.
- 16 B/C horizon soils.
- 4 -80# and panned concentrate steam sediment samples.

##### *Results*

- Soils all low.
- One -80# has 0.88 ppm Au whilst one pan concentrate has 230 ppm Au

No further work was recommended.

#### Magnetic Anomaly 1

##### *Work Carried Out*

- Traverses in vicinity of anomaly with ground magnetics.
- 9 soil samples.

##### *Results*

- Soils all low.
- Magnetic anomaly not located but probably lies south of traverse at volcanics/porphyry contact

No further follow-up recommended.

#### Magnetic Anomaly 2

##### *Work Carried Out*

- 4 traverses totalling 1.1 line km.
- 8 soil samples.

##### *Results*

- Soils all low
- Anomaly located and considered to be deep.

No further work recommended.

#### Magnetic Anomaly 3

##### *Work Carried Out*

- 6 traverse lines totalling 2.1 line km.
- 8 soil samples.

##### *Results*

- Anomaly located at contact of granite and rhyolitic tuffs.
- Soils up to 5,100 ppm Cu and 0.03 ppm Au at eastern end of line

Further detailed work recommended over contact zone.

#### Magnetic Anomaly 4

##### *Work Carried Out*

- 6 traverse lines totalling 1.6 line km.
- 10 soil samples.

##### *Results*

- Anomaly located at eastern margin of chloritised quartz feldspar biotite porphyry.
- Soils up to 2,700 ppm Cu, 1,325 ppm Pb and 48 ppm As but no Au

No further work was recommended.

#### Magnetic Anomaly 5

##### *Work Carried Out*

- 1 400 m traverse
- Soils and rock-chips.

##### *Results*

- Anomaly located over dacitic lavas and ignimbrite.
- Soils and rocks low

No further work was recommended.

#### North Porphyry Contact

##### *Work Carried Out*

- 3.9 km of gridding.
- 13 -80# and panned concentrate stream sediment samples.
- 161 B/C horizon soil samples.
- 9 rock-chips.
- Max-min EM and magnetics surveys on all lines.

##### *Results*

- Rock-chips to 150 As and 0.025 Au.
- Streams to 30.5 ppm Au in pan concentrate and 0.59 ppm Au in -80#
- Soils to 990 ppm Zn
- Magnetic anomalies detected.

It was considered that the pyrite chlorite alteration zone adjacent to the porphyry had been adequately tested as had the magnetic anomalies.

#### Waterloo Creek

##### *Work Carried Out*

- 1.7 line km of grid established.
- 56 C horizon soil samples.
- 5 rock chip samples.
- 2 panned concentrate and -80# stream sediment samples.

##### *Results*

- Soils to 125 ppm Cu, 430 ppm Pb, 515 ppm Zn but gold all low.
- Rocks up to 0.07 ppm Au.
- 1.97 and 22.7 ppm Au in -80# and pan concentrate, respectively.

It was recommended that further work be carried out on line 8800N where Geopeko had obtained anomalous Pb and Zn in soils with the gold also derived from the same area

Further work recommended by Cyprus consisted of the following:

##### Priority One:

- evaluate regional gravity and computer enhanced magnetics.

##### Priority Two:

- stream sediment sampling of granite contacts.
- stream sediment sampling of zones of structural deformation.
- stream sediment sampling of contact between Elliott Point Porphyry and Precambrian rocks.

- geochemically assess western contact of Low Rocky Point granite.
- more detailed work at Magnetic Anomaly 3.

#### Priority Three:

- assay previously collected stream samples from areas of mafic volcanics for platinum group elements.
- extend traverses at Magnetic Anomaly 1.
- trench sample lead-zinc anomalies on line 8800N at Waterloo Creek.

1987-88

- Cyprus carried out an extensive programme in the 1987-1988 season, but virtually nothing was conducted on the 'relinquished' area.

#### Low Rocky Point Granite Contact

##### *Work Carried Out*

- 1.9 km of old grid (western contact) re-established.
- B/C horizon soil sampling over grid lines at 25 m spacings (western contact).
- Drainage samples (eastern contact).
- 9 Rock-chips (eastern contact).

##### *Results*

- Soils generally disappointing, but 0.03 and 0.07 ppm Au at western end of one line and another zone with values up to 0.06 ppm Au.
- Streams revealed no visible Au in panned concentrates, but -80# samples were up to 0.57 ppm Au
- All rock-chips were B.D.L., except for 0.68 and 0.04 ppm Au in quartz-pyrite-specular haematite± sericite veins.

#### Regional

##### *Work carried out*

- Compilation of all previous geophysics (Bishop, 1988).
- Interpretation of air photographs and magnetic lineaments.

##### *Results*

- Bishop's (1988) report focussed on Geopeko's Voyager prospects with further work recommended for 22 of the 36 Voyager prospects.

Further geophysics was recommended in a number of areas:

- further follow-up of aeromagnetic anomalies
- gradient array IP over areas not covered in regional dipole-dipole survey, in particular the V3-V12 zone.
- dipole-dipole IP may provide drill targets in gold prospects eg V30.
- the extension of the resistivity high at V24 should be tested.
- UTEM survey over the V2-V12 area.
- DHEM at V12 prospect.
- completion of regional gravity to confirm two possible anomalies near V19 and further evaluate gravity at V9 and V29 in the light of drilling.
- carry out an integrated interpretation of aeromagnetic and gravity data to help define structure and deformation in the V19 area.

Bishops compilation also included a complete compilation of previous surveys, geology etc for the area at 1:25000 scale.

1988-89

##### *Work Carried Out*

None in the relinquished area

#### 4.5 Aberfoyle-Arimco (Cyprus)-Poseidon (1990-1993)

In 1989-1990 Aberfoyle began farming into the EL and no work was carried out in this season. At the same time Aberfoyle relinquished the outer parts of EL 40/85, much of which lay within EL 5/94 (until September, 1996).

1991-92

Aberfoyle flew a QUESTEM airborne EM survey over the prospective rocks. Nine anomalies were recognised from the survey.

1992-93

Ground follow-up was carried out at all nine anomalies. This involved ground EM and soil surveys over some of the anomalies. A single hole was planned to test the EB-1 anomaly. This hole was abandoned at shallow depth due to difficult drilling. A second hole was also abandoned short of the target depth. DHEM on this latter hole did not locate any conductors below the hole.

#### 4.5 Plutonic (1994-95)

Plutonic were successful in tendering for the Elliott Bay area against three other companies.

Plutonic's work consisted almost entirely of reviews in the V19 area, but included the re-logging of core and outcrop at V3, as well as geophysical surveys in the V3 area, moving loop SIROTEM (9.7 kilometres). Plutonic's work essentially repeated that completed by previous explorers.

### 3.0 PROSPECTS

A large number of prospects have been identified by Geopeko, Cyprus and Aberfoyle's work. Other prospects, particularly gold, are recognised in this report from anomalous results which have not been followed up. Those prospects considered to have good to very good potential for economic base metal and/or gold mineralisation are summarised below.

#### **V22 – V34 Group**

##### **V22**

This prospect lies on the eastern side of the apex of the Mt Osmund Syncline. To the end of the 1981-82 season the prospect had been defined by anomalous Pb and Zn in soils, associated with intense chlorite alteration. Lithologically the rocks appear to occupy the same stratigraphic horizon as V19, with strongly silicified breccias, agglomerates, lithic tuffs and tuffaceous sediments interpreted to represent a vent area (Wilson et al., 1982). A subtle resistivity response occurs at 11500E from 10300N to 10600N, but may correspond to an interpreted fault.

##### **V34**

V34 lies to the north, along strike from V22. By 1981-1982 the prospect consisted of combined Pb-Zn soil anomalies up to 4,450 ppm Pb and 3,550 Zn. V34 also lies on the eastern limb of the Mt Osmund syncline. The prospect was covered by the 1982-1983 IP survey and remapped.

#### **North Waterloo Creek**

This DIGHEM anomaly lies to the south east of V34. As noted previously, the ground follow-up produced only weak EM anomalies. Anomalous Pb, Zn and Au was not able to be repeated.

#### **Mt Osmund East**

These series of DIGHEM anomalies were covered by three traverses. Soils up to 6,000 ppm Pb and 1,700 ppm Zn with one sample of surface gravels returning 1.85 g/t Au, though follow-up augering was below detection limit. Anomalous soils correspond to pervasive chlorite and vein controlled quartz-chlorite alteration of fine to medium grained rhyolitic.

#### **Woolloomooloo Creek**

This section of the prospective host horizon was 'quite adequately' explored with no significantly anomalous results. The DIGHEM anomalies were shown to be very weak.

### **Voyager 3-10 Trend in South-East**

The zone running N-N-E from V3/Drake Creek/Cowrie Beach in the south through Lewis River, V10, V2/Old Lewis River and V12/North Lewis to the Elliott Point Porphyry contact consists of a linear trend of the above prospects. The zone has potential for V.H.M.S. and/or gold mineralisation

The zone contains a large number of anomalous panned concentrate gold and -80# gold and arsenic in stream sediments.

### **V3 (Drake Creek or Cowrie Beach)**

This prospect lies near the coast at Elliott Bay. It was previously defined by the presence of old workings on chalcopyrite-malachite veins. It was drilled by Aberfoyle in order to test an airborne/ground EM anomaly. Recent work by Herrmann and Close (1995) described the prospect as a zone of sericitic alteration on the coast.

Soil sampling by Geopeko produced anomalies up to 0.47% Pb and 1.0% Zn. VLF-EM and dipole-dipole IP surveys were conducted over the grid. A north-east trending zone of anomalous soils and VLF-EM was drill tested by DDH's V3/1 and V3/2 whilst the best IP anomaly, with coincident anomalous soils was tested by V3/3. It is apparent from core to bedding that V3/3 was drilled down-dip. Wilson (1981) states that the hole penetrated the eastern limb of a syncline with its axis to the west. The IP anomaly is 'explained' by 1-3% disseminated pyrite (Wilson, 1980).

Aberfoyle's airborne EM survey located a north-north-west trending anomaly to the west of the V3 grid. Fixed loop EM confirmed this anomaly, which was subsequently drill tested by EB-1. The first attempt was abandoned due to ground conditions with the second attempt terminated short of the target depth. DHEM on this hole did not reveal any anomalies due to conductive sulphides. Prior to drilling, Aberfoyle conducted a C-horizon soil sampling survey on grid lines west of the V3 grid. Where the two grids overlap it is clear that the Aberfoyle results are an order of magnitude lower than Geopeko's. Geopeko's sampling was generally carried out using a JACRO 200 Auger rig on the back of a Muskeg Bombardier. In inaccessible locations hand augering was used. Aberfoyle's sampling would have been done with a hand held power auger. Aberfoyle's ground EM survey covered the southern two-thirds of the V3 grid, with no anomalies detected.

### **V10**

The V10 prospect was originally defined by anomalous base metals in stream sediments. The prospect was gridded and soil sampled (not Au), however, hand augered and power augered samples did not agree. Soil results were up to 460 and 640 ppm Cu, 1600 and 3900 ppm Pb and 1900 ppm Zn, with an 800m long, 50m to 200m wide, north-south trending Pb-Zn anomaly defined over felsic volcanics.

No geophysical anomalies are associated with this anomalous geochemistry. The grid covers ground being drained by creeks yielding 12, 12, 11 and 23 grains of gold in panned concentrates.

### **Gold Prospects in north-eastern Elliott Bay**

The eastern side of the Elliott Bay tenement contains a large number of streams with anomalous gold in panned concentrates. Within this 18 km long, 1 to 4 km wide zone are more discrete areas with coherently gold anomalous creeks. The V3-V12 zone discussed earlier is one of these. Spatially, the large zone parallels and broadly corresponds to the contact between the Elliott Point Porphyry and the volcanics to the east.

A number of these anomalous creeks drain aeromagnetic anomalies and prospects. The anomalies/prospects will be discussed from north to south.

### **Northern Porphyry Contact**

This zone was explored under the above title with 6 lines of soils accompanying panned concentrate and -80# sampling. Panned concentrate values of up to 16.9, 30.5 and 36.3 ppm were returned with -80# Au to 0.180 and 0.075 ppm.

### **Northern Contact**

Less than 1 km to the south-east of Cyprus' "Northern Porphyry Contact" Prospect, two creeks contain 31.7 and 163.3 ppm Au in pan concentrates. The latter appears to drain an interpreted north-west trending structure whilst the former is mapped as draining the porphyry. The anomalous creeks immediately to the north-west have been covered by reconnaissance soil sampling traverses which gave generally uniformly low (below detection limit) gold in C-horizon samples. DIGHEM follow-up soil sampling traverses to the west were generally low with only a single 1.0 ppm Au result.

### **Northern Central**

These four anomalous creeks are particularly prospective, as two drain into the Hudson River from the west, the other two from the east. It also corresponds roughly with aeromagnetic Anomaly 5, though the single soil traverse conducted over aeromagnetic Anomaly 5 lies 200 metres to the north-west of the anomalous creeks. Creeks returned 37.7 and 89.3 ppm Au and 456.1 and 4.24 ppm Au. All soils in the traverse were below detection limit (i.e. <0.01 ppm), however, as noted this line was not correctly positioned.

### **Southern**

The area in the south-eastern corner of former EL 5/94 has quite good coverage by Cyprus' stream geochemical survey. There are scattered discretely anomalous streams (predominantly in -80# Au of As) in the very south-eastern corner, however, the best zone is the four anomalous pan concentrates (51.7, 39.3, 34.8 and 30.3 ppm) and the single 51.5 ppm pan concentrate.

These streams appear to be draining the relatively unexplored aeromagnetic anomaly V14 which lies within the porphyry. The single 51.5 ppm pan concentrate is from a stream mapped as wholly draining the porphyry in the vicinity of V14.

Ground follow-up of the V14 airborne EM consisted of ground magnetics with disseminated magnetite recognised in chlorite altered Elliott Point porphyry. This prospect has seen no geochemical sampling. The ground geophysics located two discrete anomalies (10325N and 9800N).

It is interesting to note that none of the streams draining aeromagnetic Anomaly 3 (V15) contain anomalous gold or arsenic which is not surprising, since soils over the anomaly were generally B.D.L., with only 2 at 0.03 ppm Au.

A stream draining aeromagnetic anomaly 1 returned 1.16 ppm and 0.48 ppm Au in -80# though a single traverse of soil samples over the aeromagnetic anomaly were all B.D.L. One of these stream samples (0.48 ppm) may be also draining aeromagnetic Anomaly 2. A second stream draining this aeromagnetic anomaly returned 0.29 ppm Au in -80#. Soils over aeromagnetic Anomaly 2 were all also B.D.L., except for one at 0.06 ppm Au.

### **Porphyry Dolerite Contact**

A single pan concentrate of 230 ppm was obtained from a creek draining Jurassic dolerite near its contact with the porphyry. A single soil traverse was conducted, but around 400 metres to the south. All results were B.D.L., but the survey results are worthless. It is possible that this gold was shed from Tertiary gravels underlying a hill at the headwaters of the creek.

### **Conclusions**

There are a large number of streams with anomalous gold which have seen little or ineffective (single traverse) follow-up (the single traverses were generally undertaken to follow-up DIGHEM anomalies). The source of the gold is unknown and there is potential to discover a gold deposit in this sector of the Elliott Bay license.

### **Gold Prospects in south-western Elliott Bay**

The south-western part of Elliott Bay is largely underlain by the Low Rocky Point Granite, however, creeks draining the contact between the granite and the volcanics are often anomalous in gold in panned concentrates.

#### **Low Rocky Point Granite Contact**

Cyprus conducted stream sediment sampling around the Low Rocky Point granite with highly anomalous gold in panned concentrates inland on the northern and eastern sides of the granite, with stream sediment samples returning up to 50 grains of gold in panned concentrates inland from V1.

Cyprus soil sampled the drainage basin of the creek with the highest gold anomalism. Results were generally poor with only 0.06g/t Au returned.

#### **V6**

A single rock-chip returned 7.25g/t Au, with the next best 1.81g/t, from very narrow sulphidic quartz veins near the granite contact.

#### **Conclusions**

Future work should involve more detailed soil sampling region in conjunction with systematic stream sampling.

#### **Mainwaring River Group Prospects**

The Mainwaring River Group rocks have potential for Besshi type V.H.M.S. deposits.

#### **V1**

This prospect was defined by old workings on two parallel zones of pyrite/magnetite mineralisation with moderately elevated Cu, Zn and Au, and scheelite (from Geopeko). Detailed mapping and drilling (two Jacro holes totalling 53 metres) suggest that the lenses may be chemical sediments. It is possibly the most enigmatic mineralisation at Elliott Bay, however, it is of a relatively low tenor. The prospect has been covered with dipole-dipole IP, VLF EM and TURAM and Jacro augered soil samples. The geophysics and lack of significantly anomalous geochemistry have downgraded this prospect. Cyprus mapped the prospect as lying within the Western Epiclastics. The presence of a chemical sediment in these rocks may have some bearing on exploration to the north.

#### **V18**

V18 was defined by outcropping disseminated copper mineralisation. Geopeko carried out no soil sampling or geophysics over the prospect.

#### **V23**

V23 was defined by minor copper mineralisation in dolomitic siltstones. Geopeko's rock chip samples were up to 1300 ppm Cu.

#### **V21**

This prospect is defined by an airborne magnetic anomaly to the north, along strike from Penders Prospect. JACRO power augered sampling gave no anomalous geochemical results, though Au was not assayed for. Stream sediment geochemical sampling by Cyprus in the immediate area of the aeromagnetic anomaly revealed generally only moderate gold results with the best result 8.6g/t Au.

Most mapping of Penders puts it into the Lewis River Volcanics, however, early mapping called the host rocks the Penders Tuffs whilst the Mines Department mapping separates the host rocks from the bulk of the Mt. Read volcanics.

The host rocks to the Penders Prospect are shown as the Sassy Creek Argillites by Geopeko and Cyprus and as a spatially separate part of the Lewis River Volcanics by the Mines Department. Early mapping referred to the rocks as the Penders Pyroclastics.

The poorly mapped Pleasant Creek Formation, with its mixture of felsic, intermediate and mafic volcanics plus fine sediments is compatible with the reported descriptions of the host rocks at Penders Prospect with felsic volcanics, reported andesitic rocks and sediments (Strickland, 1978). This interpretation also concurs with the trend of the Sassy Creek Argillites to the southern end of their mapped outcrop.



From an exploration perspective, the belt of rocks from Schist Point (2 kilometres north of Low Rocky Point) are now included as part of the allochthonous package originally consisting of the Mainwaring River Group, but now also including the Pleasant Creek Formation. This belt has potential for exhalative Besshi-type Cu-Zn mineralisation.

#### **Wanderer South**

Follow-up using ground EM, magnetics, soil sampling and mapping downgraded Wanderer South, however, there are lower order Cu (400 ppm) and As (4 ppm) associated with a magnetic peak on Line 7 and Cu (200 ppm with native copper noted in outcrop) associated with a sharp magnetic peak on Line 6. These anomalies may be lithological.

#### **Python Pit**

The contact between the Mainwaring River Group and Pleasant Creek Formation is marked by a single soil sample of 0.065 ppm Au, 40 ppm As and 200 ppm Cu with a sharp rise in the ground magnetics profile to the west. Again results may be lithological.

Geopeko's V28 prospect lies 1.0 to 1.5 kilometres to the south of Python Pit. Anomalous gold in soils obtained from C-horizon augering could not be replicated by Jacro geochemical sampling.

#### **Mainwaring River**

Ground follow-up downgraded this DIGHEM EM anomaly with the ground EM showing the anomalies to correspond to the contact between sheared black shales and basic volcanics. Stream sediment sampling returned moderately anomalous Cu and Zn in -80# and pan concentrates with up to 95 ppm and 120 ppm respectively in the former and 80 ppm and 75 ppm respectively in the latter.

#### **V35 and V36**

Previous work by Geopeko was carried out on a series of airborne EM anomalies. This follow-up was only -80# sampling and mapping. -80# samples returned anomalous Cu (to 185 ppm) and Zn (to 180 ppm).

### **4.0 EXPLORATION COMPLETED**

A data review was undertaken and 'Summary' report was compiled during the first year of the Elliott Bay – 20/96 license. A joint venture was later finalised with Fimiston Mining N.L., who drilled 2 holes at the Wart Hill (sulphide outcrop) prospect. Neither Exploration & Management Consultants Pty Ltd or the Fimiston Mining N.L. joint venture conducted any ground based exploration in the relinquished area.

The beginning of a digital database has been established and consists of geology, topography, creeks, tracks and geophysics. The digitising of geology over a significant proportion of the tenement has been completed with boundaries and rock types similar to that published by the Geol Survey of Tasmania, 1:25,000 Elliott Bay map sheet. Areas of significant vegetation (often associated with dominantly sedimentary lithologies) have been digitised from the 1:25,000 topographic sheets.

The digital data has been captured using a combination of MapInfo and Micromine software and can be exported and imported in a variety of formats into different software packages.

A combination of AMG grid coordinates and local grid coordinates have been used to reference the different data sets with a scaled two same point grid transformation used for grid conversions. Errors of +/- 50 metres are possible. Additional field based work should be completed to check and more accurately define a grid conversion.

Current two points being used to control grid conversions are:

AMG	LOCAL
5248370 N	10000 N
379480 E	10000 E
5251360 N	13000 N
380992 E	11500 E

The different data sets can be combined, displayed and plotted at any scale allowing ready synthesis of the data. Fimiston's digital data base is attached as Appendix 1.

The geophysics has been reprocessed and overlaid with a variety of geochemical and geological data sets (largely collected by previous workers) and review of the various data compilations completed. Integration of these data sets suggests that except for the drilling recently completed by Fimiston Mining N.L no stand up drill targets exist.

## **5.0      CONCLUSIONS**

The Elliott Bay relinquished area covers a prospective and under explored part of the Mt Read Volcanics. The large quantity of exploration that has been completed within E20/96 has included systematic and comprehensive geological mapping, geophysics and geochemistry.

The sulphide occurrences at Wart Hill / Voyager 19 have not been traced to their source, however, this and the other most prospective areas (V2, 3, 12, 17, 24, 29, 29W, 30, 31 and 33) have been retained as part of EL 20/96.

The source of the gold in streams in the relinquished area has not been located or defined. Most of the area has only been subjected to limited ground based exploration. The gold exploration of the tenement can be further assessed by mapping and rock chip sampling, followed up by trenching in areas of no outcrop.

The geophysics suggests that the chances of finding such a deposit within the top 200 metres of surface is small. The discovery of a Hellyer or Rosebery size deposit below 200 metres depth is possible, but will require a commitment of deeper exploratory type diamond drill holes. Additional techniques need to be used and integrated with past work to reduce the area of search. Trace element geochemistry and the application of pathfinder elements and ratios coupled with more detailed geological mapping and geological interpretation may assist.

## **6.0      EXPENDITURE STATEMENT**

It is impossible to accurately determine the amount of money spent specifically on the relinquished area, however, it is minimal and may be on the order of \$ 10,000 to \$15,000 total for the data compilation and geophysical reinterpretation.

**E.L. 20/96 - Elliott Bay,  
Southwestern Tasmania.**

**Partial Relinquishment Report.**

**APPENDIX 1.**

**Digital Database on CD ROM**