

PASMINCO EXPLORATION

PARADISE EL 13/2000

ANNUAL REPORT
FOR THE PERIOD ENDING 8TH NOVEMBER 2001

Author: K Denwer
A.McNeill

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Pasminco Mining Rosebery

Submitted By:

Accepted By:

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CONTENTS

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| | |
|---|----|
| 1. SUMMARY..... | 1 |
| 2. INTRODUCTION | 2 |
| 2.1 Attribution | 2 |
| 3. LAND TENURE | 2 |
| 4. GEOLOGY..... | 3 |
| 5. PREVIOUS EXPLORATION..... | 4 |
| 5.1 Regional Exploration..... | 4 |
| 5.2 Beulah Barite Prospect | 7 |
| 5.3 Anomaly 1 | 9 |
| 5.4 Jedyn Grid..... | 10 |
| 5.5 Mersey River Grid | 10 |
| 5.6 Mt Roland Grid..... | 11 |
| 5.7 Stonebridge Ba Grid | 12 |
| 5.8 Ireland prospect | 12 |
| 5.9 Lake Barrington Prospect | 13 |
| 5.10 Star of the West Mine..... | 13 |
| 6. WORK COMPLETED 2000-2001 REPORTING PERIOD..... | 14 |
| 6.1 Geological Mapping | 14 |
| 6.2 Geological Interpretation | 16 |
| 7. CONCLUSIONS & RECOMMENDATIONS..... | 17 |
| 8. EXPENDITURE..... | 18 |
| 9. KEYWORDS & LOCALITY..... | 19 |
| 10. REFERENCES..... | 20 |

LIST OF TABLES

Table 1 Previous Exploration on the area of EL 13/2000 Paradise

LIST OF FIGURES

| Figure No. | Title | Scale |
|--------------------------------|---------------------------|--------------|
| <i>1300_200111_03_Fig1.pdf</i> | Tenement Location Diagram | 1:500,000 |
| <i>1300_200111_04_Fig2.pdf</i> | Prospect Location Map | 1:100,000 |

LIST OF PLANS

| Plan No. | Title |
|---------------------------------|---------------------------|
| <i>1300_200111_05_Plan1.pdf</i> | Outcrop Geology – Sheet 1 |
| <i>1300_200111_06_Plan2.pdf</i> | Outcrop Geology – Sheet 2 |
| <i>1300_200111_07_Plan3.pdf</i> | Outcrop Geology – Sheet 3 |
| <i>1300_200111_08_Plan4.pdf</i> | Outcrop Geology – Sheet 4 |
| <i>1300_200111_09_Plan5.pdf</i> | Interpreted Geology |

LIST OF APPENDICES

| | |
|--------------------------------|---|
| <i>1300_200111_10_App1.pdf</i> | Geophysical data compilation, Paradise EL 13/00 |
| <i>1300_200111_11_App2.pdf</i> | Pasminco Exploration lithology codes |
| <i>1300_200111_12_App3.txt</i> | Previous exploration data (digital format only) |

1. SUMMARY

This report documents work undertaken within Exploration Licence 13/2000 Paradise in Northern Tasmania, covering the period 8th December 2000 to 8th November 2001, the first year of this licence. Work completed during the current reporting period has comprised:

- A review of all previous exploration and digital capture of assay and drill hole data where possible.
- 1:10,000 scale geological mapping of the majority of the tenement.

The review and mapping have so far failed to resolve the key issue of exploration for classic western Tasmanian VHMS; “where is the top of the CVC?” on the Paradise tenement. Further mapping, geochemistry and the interpretation of regional airborne magnetics and radiometrics have been recommended in an attempt to resolve this problem and define area for detailed exploration on the licence.

2. INTRODUCTION

This report documents work undertaken within Exploration Licence 13/2000 Paradise in Northern Tasmania, covering the period 8th December 2000 to 8th November 2001, the first year of this licence.

The EL covers the northern extension of the Cambrian Mt Read Volcanics (MRV), and is located just to the south of the township of Sheffield (Figure 1). The principal target for exploration on the licence is Rosebery or Hellyer type Zn-Pb-Cu-Au-rich VHMS mineralisation.

Access to the tenement is straightforward with a network of sealed and un-sealed minor roads radiating from Sheffield and an extensive network of forestry tracks in the central and southern part of the tenement.

Exploration on the Paradise EL is managed and operated by Pasminco Exploration, a division of Pasminco Australia Limited (Pasminco).

2.1 Attribution

The following personnel were responsible for the work carried out within the Lake Barrington licence area during this period of tenure:

| | |
|-----------------------|--|
| Contract Geologist: | Kim Denwer - Pasminco Exploration Rosebery |
| Senior Geologist | Andrew McNeill – Pasminco Exploration Rosebery |
| Contract Geophysicist | Nolene Dorn |

3. LAND TENURE

EL 13/2000 Paradise (180 sq km) was granted to Pasminco on 8th December 2000 for a period of 5 years. The location of the tenement is shown on Figure 1. EL 13/2000 covers land that fell vacant on the relinquishment of RGC's EL 15/92 in September 1995 and Plutonic's EL 10/88 in July 1993.

The land covered by EL 13/2000 is predominantly Private land with scattered areas of Crown Land with a range of classifications including; state/multiple use forest, Conservation Area (Mt Roland and Dasher Falls), Regional Reserve (Mt Roland), Forest Reserve (Lizard Hill and Promised Land), Nature Recreation Area (Lake Barrington) and HEC Land. All these tenures are available for mineral exploration under the Mineral Resources Development Act 1995.

Land unavailable for exploration comprises 3 gravel and stone mining leases (ML's 1657P/M, 1202P/M and 24M/2000) and totalling some 38 ha in area.

4. GEOLOGY

The regional geology of EL 13/2000 is described on the Sheffield 1:63,360 Geological map sheet and explanatory report (Jennings et al., 1959; Jennings et al., 1979). Although establishing the overall regional geology, the description and sub-division of the Cambrian – Ordovician sequences is now dated and new geological coverage at 1:25,000 has been initiated by MRT. At the time of writing the Wilmot sheet (McClenaghan and Green, 1999) covering the western portion of the tenement had been published, and work on the Gog sheet, covering the southern and eastern part of the tenement, is well advanced.

The regional geology of the Mt Read Belt (MRB) can be subdivided, from an exploration perspective, into three elements; the central MRB, covering the area of outcrop from south of Queenstown to north of Hellyer, the northern MRB covering the area from Back Bluff eastwards through Gowrie Park and Mole Creek, and the Southern MRB comprising areas west and south of Macquarie Harbour. EL 13/2000 is in the central and eastern part of the northern MRB.

Basement in the Central and Northern MRB is of Precambrian age, comprising predominantly greenschist facies meta-sediments with minor basalts and dolerites. Higher-grade amphibolite and eclogite facies meta-sediments and meta-basalts are also present within the Precambrian. This Precambrian basement, termed the Tyennan Block, lies to the south of the Paradise licence.

Cambrian volcanism and sedimentation developed on the Precambrian continental crust and, in the Central MRB, is subdivided into the Eo-Cambrian Tholeiitic Crimson Creek Formation (CCF), the mid to late Cambrian Dundas Group and the predominantly calc-alkaline, Mt Read Volcanics (MRV).

The CCF was deposited in shallow but rapidly subsiding basins comprising basaltic lavas and volcanoclastics, turbidites, carbonates, chert and minor evaporites. This formation is not exposed in the licence area. Ultramafic cumulates and volcanic equivalents were thrust onto the CCF in the mid Cambrian. They are also absent from the licence area.

The MRV, in the Central MRB, form a 200 km long by 20 km wide north-south trending belt along the eastern side of the Dundas Trough, adjacent to and in some areas overlapping and intruding the Precambrian basement. The northern extension of the MRV swings eastwards around the northern margin of the Precambrian Tyennan block. The volcanics include intermediate to felsic lavas, sub-volcanic porphyries, volcanoclastics and basement-derived sedimentary rocks. The MRV host five economically significant volcanic hosted massive sulphide deposits all of which lie in the Central MRB.

During late MRV time Cambrian granitoids intruded the volcanic pile. The majority of the granitoids occur along the eastern margin of the volcanics and stitch the volcanics to the Tyennan Nucleus.

Cambrian volcanism and sedimentation was followed by predominantly basement derived late Cambrian to Devonian age sedimentation, which includes siliciclastic

conglomerate, sandstone and limestone. These sequences occur within and peripheral to the licence.

At least two phases of regional compression were associated with the mid Devonian Tabberabberan Orogeny. The development of folding, cleavage and regional thrusts in lower Palaeozoic rocks were associated with this event. Fold trends in the licence area are approximately E-W.

Deformation was followed by the extensive intrusion of Devonian to Carboniferous granitoids of batholithic proportions. One such intrusion, the Dalcoath Granite, and associated hornfels aureole, outcrop south west of the licence. Note that the Devonian granitoids in the vicinity of Beulah, shown on Jennings et al (1959), are now considered to be Cambrian (see section 6.1). The Devonian granites are associated with carbonate replacement Sn mineralisation at Renison Bell and Mount Bischoff, and the Pb-Zn-Ag vein deposits of Zeehan and possibly the Tullah Fields. A similar setting may be interpreted for the base metal vein deposits in the Round Hill workings on the adjacent EL 3/1998 Lake Barrington.

The Ordovician and older rocks in the eastern part of the licence are unconformably overlain by marine sediments, including tillite, forming the basal units of the Permian Parmeener Supergroup. Small bodies of Jurassic dolerite intrude the Permian sediments and older rocks.

After substantial erosion of this terrane, extensive Tertiary flood basalts and sub-volcanic sediments were deposited. Basalt flows cover much of the northern and central part of the licence. In the Quaternary, talus deposits have developed on the lower slopes of Mt Roland and alluvial deposits have formed in the valley of the Dasher and Minnow Rivers. These Cainozoic deposits cover a considerable area and conceal much of the lower Palaeozoic geology of the Paradise tenement.

5. PREVIOUS EXPLORATION

This section summarises exploration completed by previous explorers over the area of Pasmenco's Paradise Exploration Licence (EL 13/2000) in Northern Tasmania. A review of Geophysical surveys is included as Appendix 1 and geological and geochemical investigations are summarised below. As a part of this review as much data as possible has been captured in a digital format and the captured data is included as Appendix 3 (digital format only).

Seven companies have held the area in the last 35 years and the majority of their work has concentrated on individual prospects rather than a regional approach. Work has been concentrated on nine prospect areas and is summarised in Table 1.

5.1 Regional Exploration

Asarco completed a regional -80# stream sediment sampling programme, assaying for Cu, Pb, Zn and Ag, over the entire area of the licence in the 1970's (Anon, 1974).

Table 1 Previous exploration on the Area of EL 13/2000 Paradise

| Company | EL Number | Years | Work Completed |
|--|-----------|------------------------------|--|
| BHP | EL 15/65, | 1965-67 | Regional Aeromagnetics |
| McClarm Prospecting Syndicate (MPS) | EL 11/70 | 1970-75 | No work reported, BHP completed mapping, stream and soil sampling at the Barite Prospect on behalf of MPS. |
| Scamander Mining | EL 14/70 | 1970-75 | 32 stream sediment samples, |
| Department of Mines | | 1973 | Gravity survey over the Beulah Barite Prospect. |
| Asarco Asarco/CRA JV | EL 7/73 | 1973- 1976 1976-87 | <p>Regional Stream Sediment sampling Regional Dighem survey (1981) Star of the West Gold Prospect: Minor soil and rock sampling. Beulah Barite Prospect: ground magnetics, grid based soil sampling, UTEM survey, 3 percussion drill holes for 291 metres, 2 diamond drillholes for 425.8m, four grids established at Garden of Eden, Simonds Grids, Beulah Extended, Lower Beulah, soil UTEM, and ground magnetics completed over these grids. Simonds Grid: Two diamond drill holes for 328.3m. Garden of Eden: One diamond drill hole for 182m Mt Roland: Mined by the Mount Roland Silver-Lead Mining Co during the 1880's. Grid based mapping, soil and rock chip sampling, dipole-dipole IP and a UTEM survey were completed. One diamond drillhole for 229.5m and one percussion hole for 100m. Stonebridge Ba Grid: Barite reported in a 1928 Department of mines report. Grid based soil sampling. No geophysical surveys. Ireland Prospect: A discrete bullseye magnetic anomaly. Minor grid based ground magnetics; one line soil sampled. Lake Barrington Prospect: a single point Cu stream sediment anomaly. Followed up by grid based mapping, soils, EM, IP, mise-a-la-masse, magnetics and 4 x DDH.</p> |

Table 1 Previous exploration on the Area of EL 13/2000 Paradise cont.

| Company | EL Number | Years | Work Completed |
|------------------------|------------------|--------------|--|
| Amax | EL 49/82 | 1982-85 | Minor follow-up of Asarco's stream sediment data 360 line kilometre DIGHEM survey-anomalies detected but not followed up. |
| Aberfoyle Resources | EL 43/85 | 1985-91 | Recognised similarities between Beulah andesite and Que-Hellyer volcanics Anomaly 1 (Amax DIGHEM anomaly): Rock chips, petrology, UTEM Lower Beulah Grid: Grid based soil geochemistry, mapping, ground magnetics, UTEM |
| Aberfoyle Resources | EL 11/88 | 1988-91 | The old Asarco/CRA ground EL 7/73 Beulah Barite Prospect: soil, rock geochemistry, mapping, ground magnetics, Pb isotope study and drilling and DHEM of a single diamond drillhole for 400m. Mt Roland New grid, grid based mapping, rock and soil geochemistry and a UTEM survey, Pb isotope study. |
| RGC Exploration: | EL 15/92 | 1992-95 | Geological mapping and rock chip sampling, regional soil samples collected in the Roland area. Anomaly 1: 148 air core samples collected. Jedyn Grid: Soil geochemistry, ground magnetics. Mersey Grid: Soil geochemistry, ground magnetics. |

During 1992/93, 1:5,000 and 1:10,000 scale mapping was completed over the Beulah Andesite in the Beulah area by RGC Exploration (Vicary and Jackson, 1993). Fifty-one rock chips were collected during this mapping and were analysed for a broad range of elements using AAS and NAA techniques. There were some difficulties with reported detection limits in the RGC data (this was from the RGC database, not the original data) and results for Ta and Zr were not captured.

During 1994-1995 RGC Exploration collected 109 C-soil samples from along the major roads in the Roland area. Samples were taken at nominally 100m centres and were analysed for Cu, Pb, Zn, Mn, V and Au; no anomalism was detected (Vicary, 1995).

Crawford (in Rand, 1990a) interprets units originally mapped as Devonian Granites (Jennings et al., 1959) as Cambrian. These rocks are described as aphyric granodioritic to high K dioritic intrusives, which are very similar to the Crown Hill Andesite. Within the central Mt Read Belt these units typically occur at or near the top of the Central Volcanic Sequence. This may help correlate the geology here with the Central Mt Read Volcanic belt.

The geology from Cethana to Beulah is dominated by an approximately E-W stratigraphy. In the Beulah area there are some complications with the mapped Beulah Basalt appearing to crosscut stratigraphy. Rand (1990a) mapped an N-S striking epiclastic unit at 5410000N 483000E for 2km along the western edge of the Beulah Basalt suggesting there are some structural complications in the vicinity of the Beulah Basalt.

Jack (1988) collected a large suite of the intermediate rocks for whole rock analysis and comparison with the central Mt Read Volcanics. The Beulah volcanics are all calc-alkaline Mt Read equivalents.

5.2 Beulah Barite Prospect

Barite was produced, during 1911-1920, from a single vein at the Beulah Barite mine (located at 5408700mN 450710mE) on a property owned by Mr Tom Frankcombe. A production of 635 tons was recorded (Jennings, 1979). A single level was developed on the vein with approximately 70 metres of driving along the vein that was centred on a shaft. Three test adits were also excavated over a 500 x 500m area around the shaft.

Porter (1973) describes the prospect as occurring within schistose andesites and sheared sediments dipping at 60-90 degrees to the north. The mineralisation is confined to cleavage parallel barite vein(s) varying from 0.01-1.3m in width. The vein also contains galena, sphalerite, chalcopyrite and tetrahedrite, with the barite from the adit on Sweetwater Creek having a high sulfide (to 20%) content.

A series of grids were cut around the Beulah Barite Mine and include CRA's Beulah, Garden of Eden, Simonds and Beulah Extended grids and Aberfoyle's Beulah grid.

CRA (EL 7/73)

The first recorded modern exploration at the Beulah Barite prospect was completed by CRA in 1973 for the McClarm Prospecting Syndicate (Porter 1973). CRA completed 1:1,000 scale mapping, drainage sampling and soil sampling on four lines. A gravity

survey was also completed and it was determined that there was potential for 37,000 tonnes of barite (Leaman, 1975).

In 1979 four lines of ground magnetics were completed presumably over the same four lines soil sampled in 1973 (Vicary and Jackson, 1993). An additional two lines of ground magnetics and soil geochemistry were completed in 1982 (Clementson, 1983).

A UTEM survey was completed in 1983 and a number of weak anomalies were detected (Flis, 1983). During 1983 (Weber, 1984) and 1984 (Tembe, 1985) the most promising UTEM anomalies were tested by percussion drilling (PD83BB1, PD84BB2, PD84BB3 for 291 metres) and diamond drilling (DD84BB4 and DD84BB5 for 425.8 metres). The results from this drilling were disappointing and no further work was done.

Carbonate-pyrite-galena veins are common over about 30m in DD84BB5. The mineralisation occurs in post cleavage “sweatout veins” which elsewhere do not contain base metals. This led Temby (1985) to conclude that the base metals in this interval had been sourced locally and as the base-metal mineralisation occurs stratigraphically above the barite it may be a halo effect.

The Garden of Eden grid was established on two DIGHEM anomalies along strike and east of the Barite Prospect. Ground EM, VLFEM, ground magnetics and soil geochemistry (a total of 198 C-horizon soil samples were collected during this programme) were completed over this grid (Clementson, 1983). A UTEM survey was completed during 1985 (von Strokirch 1986) and a single drill hole (DD86GE1; 182m) was targeted on an anomaly from this survey. A sequence of altered andesites and acid volcanics were intersected. The entire hole was sampled by 5m core grinds, but, assay results were discouraging (Caithness and von Strokirch 1987).

On the **Simonds Grid**, UTEM, ground magnetics and soil geochemistry (A total of 144 C-horizon soil samples were collected during this programme) were completed during 1985 (von Strokirch 1986). A significant UTEM anomaly closely associated with a soil anomaly was confirmed by a GENIE survey. It was uncertain what the dip was in the area so two scissor holes were drilled (DD86SM1 and DD86SM2 for 328.3m) to test the anomaly. The holes intersected weakly pyritic interbedded black shale and greywackes. Both holes were sampled with 5m core grinds. Assay results and a downhole Sirotem survey were discouraging (Caithness and von Strokirch 1987).

Aberfoyle (EL 11/88)

Aberfoyle were interested in this area as they recognised geological and petrological similarities between the Beulah Andesite and the Que-Hellyer Volcanics.

Aberfoyle’s exploration concentrated on the Beulah Barite Prospect. They opened up an extensive grid (The Beulah Grid), which incorporated the four CRA grids (Beulah, Garden of Eden, Simonds and Beulah Extended grid). Soil geochemistry (a total of 1446 C-horizon samples), rock chip sampling, ground magnetics and 1:2500 and 1:1000 scale mapping were completed on the grid.

During 1990 Rand (1990a) extensively mapped the surface and the adits in the area. He described strong sericite/silica alteration and weak pyrite/carbonate alteration in the felsic units and strong carbonate-hematite and minor fuchsite alteration in the intermediate units from the main adit.

Rand (1990a) also mapped the 100m long adit located 300m east of the main adit (This adit is easily located by a 10x10m patch of man ferns, well watered by a discharge from the adit within an area of dry eucalypt forest). From 55-83m along the adit the rocks are strongly carbonate-silica-sericite and pyrite altered with veinlets of sphalerite-galena and pyrite to 10mm thick. One rock chip assayed 6.2% Zn, 1.07% Pb, 26 ppm Ag with low Cu and Au.

Calcite fuchsite alteration similar to the hanging wall alteration at Hellyer was recognised in the two diamond drillholes completed by CRA (DD84BB4 and DD84BB5). CRA's holes were targeted at shallow UTEM conductors and only one hole tested the sediment/volcanic contact beneath the barite. A 400m-diamond drillhole (BB6) was drilled to test both a UTEM anomaly, following re-valuation of CRA's UTEM data, and the sediment/volcanic contact. The hole tested the UTEM anomaly however it deviated significantly and failed to intersect the sediment/volcanic contact (Rand and Noonan 1989).

Two lead isotope studies were completed by CSIRO (Jack, 1988 and Rand 1990a). Samples of the Beulah Basalt and barite from the Beulah Barite Mine were analysed. Samples of the basalt have an isotopic composition similar to that of Rosebery and other mineralisation at Cethana and Gowrie Park. This was interpreted to indicate that the lead was derived from Cambrian hydrothermal fluids similar to those responsible for the formation of massive sulfide deposits in the region. Samples of the barite have an isotopic composition similar to samples from Elliott Bay, which are less radiogenic than the basalt samples. The range in composition between the barite and basalt is about 0.8% (as measured on the $^{206}\text{Pb}/^{204}\text{Pb}$ ratio). CSIRO's experience is that within small areas the isotopic composition of Cambrian mineralisation does not vary by more than 0.4%. They concluded that it is very unlikely that both lots of lead formed in response to the same metallogenic event and the barite did not form during a major Cambrian mineralising event.

The Strontium isotopic signature of the Beulah Barite is similar to the composition of barite from the top of the barite blanket at Hellyer (Vicary, 1995).

No further work has been completed at the Beulah Barite Mine.

5.3 Anomaly 1

EL 43/85 was granted to Aberfoyle in 1986. This EL covered Anomaly 1, which is a large DIGHEM anomaly, recognised from the survey commissioned by CRA in 1982 (Clementson, 1983).

Aberfoyle cut a large grid, the Lower Beulah grid, over Anomaly 1 (Figure 2). During 1989 and 1990 soil geochemistry (a total of 1284 C-horizon soil samples), ground magnetics and UTEM were completed on the grid. (Rand and Noonan 1989 and Rand

1990a). A broad 1000 x 2000m Pb Zn anomaly was detected during this survey (Pb to 1050ppm, Zn to 920ppm and zinc commonly 500-600 ppm). There was no follow-up work completed on this geochemical anomaly.

On relinquishment by Aberfoyle in 1992 this area was pegged by RGC Exploration as EL 15/92. RGC followed up the large Aberfoyle Pb-Zn anomaly using rock chip sampling and air core drilling to get a bedrock sample. A total of 50 rock chips and 148 aircore holes for 1908m were drilled. These bedrock samples were analysed for a broad range of elements using AAS and NAA techniques and confirmed the C-horizon anomaly particularly with respect to zinc (Vicary and Jackson, 1993).

RGC plotted K vs. Na for each locality to gauge the degree of alteration. The strongest alteration occurred around the Beulah barite Prospect and 2km north at the Jedyn Zone.

There were some difficulties with reported detection limits in the RGC data (from the RGC database, not in the original data) and results from those elements which have an apparent range of detection limits (e.g., Ag, Au, Br, Ir, Mo, Se, Sn, U and W) were not digitally captured.

5.4 Jedyn Grid

A 44.5 line kilometre grid was established to the north of Aberfoyle's Lower Beulah grid by RGC in 1993 (Vicary 1994) to follow up the large area of Na depletion recognised from the air core drilling (see section 5.3). A total of 787 C-horizon soil samples were collected from the grid at 25 metre centres and analysed for Cu, Pb, Zn, Mn and As. RGC interpreted the results as being insignificant with maximum assays of 1235 ppm Pb, 750 ppm Cu and 466 ppm Zn. There are 6 Pb analysis >500 ppm with associated elevated zinc (>200 ppm), however these are isolated samples.

Plots of Ti vs. Zr and V vs. Sc from the soil results clearly show a linear trend between the Cambrian "granites" and the Beulah Andesite implying that they are co magmatic.

5.5 Mersey River Grid

The Mersey River Grid was established during 1994-95 to cover a large area of Beulah Formation (BF) andesites and andesitic volcanoclastic sediments (Vicary 1995). The grid was mapped, a ground magnetic survey completed and 332 C-horizon soil samples were collected and assayed for Cu, Pb, Zn, Mn, Cd, V and Mn. Seven rock chip samples were collected and analysed.

The andesites on the grid are compositionally and texturally diverse. The phenocryst assemblage varies from feldspar-rich to feldspar-ferro-magnesian mineral-rich (Cpx?) and the lavas include massive, brecciated and vesicular end-members.

The base metal results appear insignificant. RGC also examined at the metal distribution of the soils to assist with the geological mapping. Two main units were mapped on the grid, BF and Gog Range Greywacke (GGW). There are two distinct populations within soil samples from the BF lavas; both with elevated Cu and the populations being distinguished on base metal content. There are two populations within the GGW based on:

1. elevated Cu, low Zn, Mn and V
2. low Cu, low Zn, Mn and V.

Two populations of volcanoclastics within the BF were also distinguished but their characteristics are not detailed in the report.

5.6 Mt Roland Grid

The Mount Roland Silver-Lead Mining Co extracted Pb from the Mt Roland workings during the 1880's. The deposit was first described by Thureau (1881) when mining was occurring from a 21.3m long adit.

CRA worked on the Mt Roland area from 1979-1982 (Weber, 1983a). During 1979 a grid was established then soil and rock chip sampled. Samples were analysed for Cu, Pb, Zn and Mn. A dipole-dipole IP survey located two chargeability zones; the first being a narrow resistivity low commencing near the old adit (target A) and the second a 400m long, broad weak anomaly (target B). Two costeans were excavated to test these IP anomalies. The Mount Roland Adit was mapped and sampled in detail. The host is described as a light green silicified, chloritised and sericitised volcanic and the mineralisation is described as abundant pyrite±sphalerite±galena disseminated throughout the rock. Geochemical results indicate that the system is zinc rich and Cu, Ag poor. The best assay was 5m @ 1.6% Zn, 0.3 % Pb, 0.45 g/t Au.

Diamond drillhole DD 80MR1 (229.5m) was designed to test IP target B. The hole intersected mixed andesite/dacite lavas and volcanoclastics. Various sections of the hole were analysed for Cu, Pb, Zn, Ag and alternate samples were also analysed for Au, Sn and W. Assay results were disappointing (Weber, 1983a).

A bullseye magnetic anomaly coincident with a minor EM anomaly was recognised within the data from the 1981 DIGHEM II survey. The anomaly was located 500 metres north of the 1979 grid. The grid was extended to cover this zone and soil sampling, ground magnetics and a Pulse EM survey were completed (Weber, 1983a). It was interpreted from the ground magnetic survey that the magnetic anomaly is due to disseminated magnetite, however the report does not elaborate as to why the anomaly is a bullseye. This anomaly also has associated Zn anomalism with a large 500 x 300m zone of >350 ppm Zn, this anomaly does not appear to have been recognised or followed up. However the size and shape of the anomaly suggests that it is lithological (KPD pers. comm.2001).

During 1984 an extensive UTEM survey was completed on the Gowrie park and Mt Roland grids (Temby, 1985). A UTEM response was located adjacent to a magnetic feature near the Mt Roland grid ("West Mt Roland") and was tested by a 100m percussion drill hole (RD84MR2) which intersected a sequence of magnetic andesitic lavas and volcanoclastics. Drill chip assays were all low and a DHEM survey (EM37) failed to locate any conductors (Temby, 1985).

Aberfoyle explored the Mt Roland workings during 1989 as part of EL 11/88 (Rand, 1990b). They describe the host as a strongly altered Cambrian Andesite, which contains sphalerite-galena-pyrite veining.

A grid was established over the old workings with five 1.4 kilometre long lines spaced at 200m (600-1400E). The grid was mapped at 1:2500 scale and the dominant lithology is described as a dark brown andesite with minor orange-brown weakly sericite altered feldspar phenocrysts and very rare quartz phenocrysts. It was suggested that the andesite is similar to hornblende-apatite-phyrlic andesites from the Tyndall Group.

Rock chips were collected from the old adit and samples were taken from the CRA drill hole (DD80MR1). Lead and Zinc were highly anomalous with a best value of 1.75%Pb, 4.82% Zn, 9ppm Ag, 0.7ppm Au and low Cu. These values were regarded as being indicative of VMS mineralisation, however the very low Cu values suggest the mineralisation is Beatrice style rather than Rosebery style (KPD pers. comm., 2001). Ti/Zr ratios for the andesites are very consistent with values varying from 18-24. These rocks were also petrographically described. as hornblende + plagioclase + Fe Ti oxide-phyrlic andesite lava. Samples taken from drillhole DD80MR1 are of similar andesites that are strongly calcite-sericite-magnetite altered with abundant disseminated pyrite.

Mineralised samples from the adit were submitted to Sirotope for Lead isotope analysis. The values were similar to values obtained in the Gowrie Park/Cethana area, which are interpreted to represent a Cambrian age.

The above work was regarded favourably and a UTEM survey was completed on the grid. No conductors were identified from this work and subsequently no further work has been completed on the prospect.

5.7 Stonebridge Ba Grid

A 1928 Department of mines report identifies two barite occurrences at Stonebridge at co-ordinates 5411850N 442270E (von Strokirch, 1986). During 1986 CRA cut eight lines in this area and collected 308 C-horizon soil and 30 rock chip samples which were analysed for Cu, Pb, Zn, Ag, Au, Fe, As and Ba. A 150m long and 4m wide gossan was identified adjacent to a soil anomaly that assayed a maximum of 1% Pb, 0.13% Zn, 0.15% Cu, 18ppm Ag, 0.2 ppm Au, 48% Fe and 18% Mn. Despite extensive mapping and sampling the barite occurrences were not re-located.

No geophysical surveys were completed as the prospect is on a dairy farm and there is abundant cultural interference.

5.8 Ireland prospect

A discrete bullseye magnetic anomaly was located in the headwaters of a creek where stream sediment samples assayed 46ppm Pb, 180 ppm Zn and 12 ppm Cu (Weber 1984). Four grid lines were cut and ground magnetics were completed on all the lines, soil sampling was completed on one line but all the base metal results were low. Weber (1984) concluded that the magnetic anomaly is due to andesitic lava with primary magnetite.

5.9 Lake Barrington Prospect

This prospect was initially located by the Asarco regional stream sediment sampling program in 1973 (Anon, 1973). A sample assaying 1300ppm Cu was located in a creek draining approximately 0.5 sq. km on the steep western shore of Lake Barrington.

Asarco followed-up this anomaly by gridding, geological mapping, and soil and rock chip sampling. Soil anomalies with up to 2800ppm Cu were outlined but no outcropping mineralisation was located and Asarco abandoned exploration (Barker, 1975).

In 1979 reconnaissance mapping by CRAE located sulphide mineralisation and Cu-anomalous limonite in the bed of the creek (Purvis, 1981). Systematic exploration commenced with gridding, mapping, rock chip and soil sampling, ground magnetics and IP surveys. The IP survey located a 400m long anomaly that was tested by two diamond drill holes (DD80LB1&2 for 485m). These holes intersected intervals of low-grade Cu mineralisation (0.3-0.8% Cu) and a narrow (0.1m) massive sulphide, interpreted to be syngenetic, assaying 14% Cu, 0.75% Pb, 0.59% Zn, 84 g/t Ag and 1.35 g/t Au (Purvis, 1981).

These results encouraged further drilling (DH LB3 and LB4) which also returned encouraging results, e.g., LB3, 15.85m @ 1.2% Cu, 12 g/t Ag (Weber, 1983b). Other work included EM, mise-a-la-masse and SP surveys and DHEM in DDH LB3, indicating an off-hole conductor (Temby, 1985), all completed before the prospect was abandoned.

Plutonic explored the prospect on their EL 10/88 by re-establishing the CRAE grid, geological mapping, re-logging the old holes, reviewing previous geophysical surveys and extending DDH DD80LB1 by 100.3m to test a coincident IP and mise-a-la-masse target (McDonald, 1993). This drilling returned further low-grade Cu intersections (including 3.2m @ 1.17% Cu) but a DHEM survey failed to provide any further encouragement and all work ceased.

Previous exploration data from this prospect had not been digitally captured at the time of writing and will be included in the next annual report.

5.10 Star of the West Mine

Gold was mined from the Star of the West from numerous shallow pits, trenches and an adit in the early 1900's. Slates dominate the geology with minor quartz porphyry dykes. The dykes are cut by thin quartz veins, which are interpreted to carry the gold (Clementson, 1983). One line of soil sampling was completed and was only analysed for gold. All assay results from this exercise were very low.

6. WORK COMPLETED 2000-2001 REPORTING PERIOD

Work completed during the current reporting period has comprised:

- A review of all previous exploration was completed and data captured where possible. This review is presented as Section 5 and Appendix 1.
- 1:10,000 scale geological mapping of the majority of the tenement.

6.1 Geological Mapping

10,000 scale mapping was completed on roads and tracks on the tenement to enable compilation of an interpretation map and also to allow correlation of the geology of the Paradise EL with the geology on the Lake Barrington EL. Unfortunately, large parts of the EL remain unmapped due to a combination of poor exposure, poor access and a curtailing of exploration on this tenement due to budgetary constraints. Four 1:10,000 scale outcrop geology sheets (Plans 1-4) and a 1:25,000 scale interpretative plan (Plan 5) were produced (see Appendix 2 for lithology codes).

The Cambrian stratigraphy in the Beulah can be divided into three major units: intermediate (andesite) lavas and sediments, sediments and rhyo-dacite lava.

Intermediate (andesite) Lavas and Sediments

A large body of andesite lava is exposed to the east of the township of Beulah and smaller exposures are located near 5409000N, 443000E. In hand specimen the Beulah andesites are magnetic and consist of feldspar (1-3mm, 10-20%) and clinopyroxene (2-4mm, 5-15%) phenocrysts in a blue-green groundmass. These rocks are identical in hand specimen to the andesite lavas at the Hereford Prospect (Denwer and Simpson 2001) but, unlike the Hereford Prospect, more evolved dacite lavas are not found.

MRT mapping has the main Beulah andesite body continuing to the southwest (5408000N, 452000E). Mapping in this area (see Plan 4) has identified two small outcrops of deformed intermediate schist (ie-original fabric not identifiable); it is probable that these are andesites.

The andesite exposures near 5409000N, 443000E have a variable proportion and size of feldspar and clinopyroxene phenocrysts. The feldspars vary from 1-4mm and comprise from 10-60% of the rock whereas the clinopyroxene vary from 2-4mm and comprise 5-15% of the rock. These variations make assignation of the lithology difficult with the unit being mapped in the field as lava, porphyry and an intrusive. Some of the coarser grained rocks look very similar to the Cambrian Granites (see below).

Both exposures of andesite have associated small outcrops of crystal lithic sandstones. The sandstones contain common feldspar crystals, rare quartz crystals, pink aphyric lava (rhyolitic?) clasts, locally large rounded clasts (to 30cm and typically andesite) and variable amounts (to 5%) of detrital? magnetite. This unit is a correlate of the Lynchford Tuff (Tyndall Group) a unit interpreted to have been deposited from a

volumetrically large and probably unique event (J. McPhie pers. comm., 2001). This in turn suggests that the two andesitic bodies are part of the same unit.

Sediments

A package of finely to massively bedded **micaceous** siltstone to sandstone with rare conglomerates is common throughout the mapped area. In the Mt Roland area the unit contains Precambrian quartzite clasts to 50mm. This sediment package is the major lithological association in what has previously been called the Gog Range Greywacke (Jennings et al., 1959; see below).

Associated with the sequence of micaceous clastic sediments are a sequence of mixed volcanoclastics and epiclastics. This unit contains variable amounts of feldspar and quartz crystals, minor lithic clasts and variable amounts (0 to 5%) of detrital magnetite.

These micaceous sediments and mixed epiclastic/volcanoclastic sequence collectively form the Gog Range Greywacke. Poorly located fossil information (Corbett, et.al 1997) suggests that the sediment is at least partly Late Cambrian (post Tyndall Group) in age.

Rhyodacite Lavas

A very common lithology within the tenement is a quartz (1-3mm, 5-20 modal%)-feldspar (1-2mm, 5-15 modal%)-phyric lava. The quartz crystals are often broken. In deeply weathered exposures the feldspars are not evident and the matrix is a deep orange-red. These lavas are remarkably uniform and occur over an extensive area. They were mapped as dacites in the field (VLDA) but whole rock analysis by MRT (M. McClenaghan pers. comm., 2001) has confirmed these lavas are rhyodacitic in composition.

A variation on this lava occurs from approximately 5408000N- 541000N, 444000E. Here the lava typically contains 2-5% clinopyroxene and the proportion of phenocrysts is highly variable. Some samples have no quartz and appear to be andesitic in hand specimen. Whole rock analyses by MRT (M. McClenaghan pers comm, 2001) indicate that, surprisingly, these lavas are compositionally indistinguishable from the rhyodacitic lavas described above.

Roland Conglomerate

The volcanics are overlain both conformably and unconformably by coarse siliclastic conglomerate of the Roland Conglomerate. For the most part the conglomerate occurs in the south of the EL and unconformably overlies the volcanics. At 5415000N 450000E the Roland Conglomerate is directly and conformably underlain by a coarse polymictic conglomerate containing dominantly volcanic clasts and minor siliclastic clasts. This unit is very similar to the Upper Tyndall Group conglomerates (Zig Zag Hill Formation correlates) seen on the Cradle Mountain Link Road east of Hellyer.

Cambrian Intrusives

Intruding the sediment package is a series of micro granitic-dioritic intrusions, varying in size from 0.5 km² to >5 km². The granite is magnetic and is typically a pink-green

fine-grained equigranular type with feldspar, quartz and biotite phenocrysts. These units have a zircon U-Pb radiometric age of 493.5 ± 3.9 Ma (M. McClenaghan pers comm, 2001). This Late Cambrian age is unexpected and suggests that even at its oldest age (497.4 Ma) this intrusive is post Tyndall Group.

6.2 Geological Interpretation

The limited mapping completed during the current reporting period makes an accurate interpretation difficult, however a preliminary interpretation has been completed (Plan 5). The geological interpretation of this tenement will be significantly enhanced by incorporating results from the 200m spaced aeromagnetic data being flown as part of the Western Tasmania Regional Minerals Programme, and the Gog 1:25,000 scale geological sheet. Both are due to be completed in late 2001.

The interpretation for the southern part of the EL was aided by a pre-publication copy of the 1:25,000 geology map for the Gog Sheet kindly provided to Pasminco by Mineral Resources Tasmania. This interpretation could be further enhanced by an analysis of MRT's whole rock geochemical and thin section database.

Significant geological observations and ideas are:

- The Beulah Andesite is the oldest Cambrian lithology. If the Aberfoyle correlation of this unit with the Que-Hellyer Volcanics is correct (Jack 1988) then this unit marks the top of the CVC. This interpretation has significant implications for exploration. However the close association of Lynchford Tuff type lithologies with this unit suggest that it is a Tyndall Group correlate.
- The Beulah Andesite is overlain by the micaceous sediment unit. This sediment unit is at least in part Late Cambrian on fossil evidence and it is intruded by Late Cambrian granite bodies.
- The Late Cambrian age for the Beulah granite bodies is unexpected and suggests a much longer-lived period of granite intrusion during the Cambrian than previously thought.
- The sediment unit contains a thick homogenous quartz-feldspar-phyric rhyodacite lava that is generally stratiform although in places it appears to crosscut the stratigraphy. This suggests some sub-volcanic intrusive component to this unit.
- The quartz-feldspar-phyric rhyodacite lava is interpreted to be absent from the central northern part of the tenement.
- A coarse polymictic conglomerate (which appears to be the upper part of the sediment sequence) at 5415000N 450000E directly underlies the Owen Conglomerate. This unit is very similar to the Upper Tyndall Group conglomerates seen on the Cradle Mountain Link Road. This suggests that the micaceous sedimentary package is an upper Tyndall Group correlate.
- The central portion of the licence is dominated by north-south trending geology, indicated by bedding measurements in the sediment sequence. This in turn

suggests a major E-W monocline. The monocline interpretation supports a correlation of the porphyritic andesitic lava in the vicinity of 5409000N, 443000E with the andesites in the Gowrie Park area (on EL 3/1998).

- The correlation of the andesites at 5409000N, 443000E with the Beulah Andesite (using the Lynchford Tuff correlates) implies that these exposures are on the opposite limb of a synclinal axis. The synclinal axis is presumably within the sediment package. If the above correlations of the andesite exposures are correct it suggests that the interpreted synclinal axis is folded in the monocline.

Significantly more fieldwork is required to check the validity of many of these preliminary conclusions and to provide a robust geological framework for detailed exploration.

7. CONCLUSIONS & RECOMMENDATIONS

The key issue from the point of view of a classic Western Tasmanian VHMS model is “where is the top of the CVC?” on the Paradise tenement. From the current results it seems probable that the top of the CVC is not exposed on this tenement and all of the volcanics are Tyndall Group age. The Beulah Andesite has been correlated with the Que-Hellyer volcanics however the validity of this correlation is under question, due to its close association with possible Lynchford Tuff (Tyndall Group) equivalents. Also, the general lack of strong alteration, the limited areal extent of the Beulah andesite (see Plan 5) and the intense exploration, using conventional soil geochemistry and ground geophysics, with negative results all serve to downgrade the potential.

The geological correlations suggested in this report need to be tested. If the rocks are all Tyndall Group then, at least with current mineralisation models, this significantly downgrades the potential of this tenement (and the adjacent Lake Barrington EL 3/1998 tenement). Potential correlations can be tested using:

1. The database of whole rock geochemical analysis and thin sections collected by MRT as part of the 1:25,000 scale mapping of the Gog Range and the Sheffield Sheets. This data should be assessed in an attempt to correlate the geology here with the main Mount Read Belt to test the above correlations, using geochemical variations such as those outlined in AMIRA project P291A (Corbett et al., 1997).
2. The recently completed aeromagnetics and radiometrics (collected as part of the WTRMP) will be available in late 2001 and this data will be invaluable in helping to unravel the geology.
3. Greg Ebsworth (CODES) is attempting to use the Lynchford Tuff as a marker horizon within the Mount read Volcanics. His interpretation of the geology and correlations on EL 13/2000 may help un-ravel the stratigraphic relationships of potential Tyndall Group correlates.

It is recommended that this work be completed before any decisions are made on the future of this tenement.

8. EXPENDITURE

Expenditure on EL 13/2000 during the 11 month period ending 31 October 2001 was \$35,984. A detailed breakdown of this expenditure is presented below.

| | |
|-----------------------------------|-----------------|
| Personnel | 12,382 |
| Travel & Accommodation | 352 |
| Consultants & Contractors | 990 |
| Geological Consultants | 15,022 |
| Geochemical Consultants & Assays | 0 |
| Geophysical Surveys & Contractors | 0 |
| Drilling | 0 |
| Stores & Supplies | 515 |
| Vehicles Plant & Equipment | 291 |
| Land | 47 |
| Computing | 272 |
| Office | 2,842 |
| Administration Fee | 3,271 |
| Total Tenement Expenditure | \$35,984 |

9. KEYWORDS & LOCALITY

Keywords

COPPER, ZINC, LEAD, GOLD, ANDESITE, RHYOLITE, VOLCANICS, FAULT, SHEAR ZONE, FOLD, PYRITE, CHLORITE, SERICITE, GEOCHEM SOIL, GEOL MAPPING DETAILED, GEOPHYS MAGNETICS, ALTERATION, ORE POTENTIAL, NORTHERN MT READ VOLCANICS, BEULAH BARITE, JEDYN, MT ROLAND, STONEBRIDGE.

Locality

| | |
|-----------|---------------|
| 1:250,000 | BURNIE SK55-3 |
| 1:100,000 | FORTH 8115 |
| | MERSEY 8114 |

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