

**PASMINCO EXPLORATION**

**BULGOBAC HILL EL 37/89**

**ANNUAL AND FINAL RELINQUISHMENT REPORT  
FOR THE PERIOD ENDING 31<sup>st</sup> JULY 2000**

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## 1. SUMMARY

This report details work undertaken on the Bulgobac Hill (EL 37/89) exploration licence for the reporting period ending 31<sup>st</sup> July 2000.

The Bulgobac Hill license covers a portion of the Cambrian Mt Read Volcanics to the south and west of the Hellyer Mining lease in Western Tasmania. The principal exploration targets sought within the license area are Hellyer-type or Rosebery type volcanogenic Pb-Zn-Cu-Ag-Au massive sulphide deposits.

Work undertaken within Bulgobac Hill EL 37/89 in the 1999-2000 reporting period has focused on a partial leach soil sampling program in the High Point area. This survey formed part of a much larger program, on EL's 19/94 and 10/98, designed to cover the buried Que-Hellyer ore position, where it is interpreted to be within 500m of surface, in the area between the Mt Charter Fault MMI survey (Parfrey and McNeill, 2000) to the west, and the Amoeba and Bronco areas to the east (McNeill, 2000). Based on the results to date there are no first order targets worthy of follow-up in the High Point area.

Pasminco's involvement in this area commenced in 1990 and a 10 year exploration program focused on three main areas of the Bulgobac Hill tenement:

1. High Point. This area has been explored using deep search EM, detailed gravity and magnetics, lithochemical studies, partial leach and total digest soils and diamond drilling (approx. 5800m) with DHEM. The drilling has indicated the presence of the Que-Hellyer ore position (or mixed sequence), however, the mineralisation intersected has been of a low tenor (eg., disseminated sphalerite in the Hellyer Basalt equivalent), there are no outstanding DHEM targets and the remaining target areas are at depth (>600m). Given the lack of a coherent multi-element partial leach soil anomaly we have no way of targeting further drilling and no further work can be recommended.
2. Sock Creek. Follow-up of extensive shallow drilling by Comstaff and BHP has failed to upgrade this prospect and further shallow drilling to try and prove up an open cuttable resource has not been successful. The prospect has now been covered by ground EM, detailed gravity and magnetics, geological mapping, costeaning and total digest soil sampling. Although isotopic data (Pb and S) and metal ratios (Zn number) indicate the prospect has affinities with VHMS style mineralisation, the lack of widely dispersed pyrite suggests the system is not typical VHMS. This coupled with the relatively coherent volcanic-rich stratigraphy and restricted depth potential (as demonstrated by BHD4) seriously downgrades the prospectivity of this area. On the basis of the current results no further work can be recommended.
3. Tullabardine – Mackintosh Dam. Work on these prospects in the Farrell Slates has included geological mapping, total and partial digest soil sampling, geological mapping and IP surveys. A number of targets were located. But, none had the size or coherency to warrant follow-up in detail.

## 2. INTRODUCTION

This report details work undertaken on the Bulgobac Hill (EL 37/89) exploration licence for the period ending 31<sup>st</sup> July 2000.

The Bulgobac Hill license covers a portion of the Cambrian Mt Read Volcanics to the south and west of the Hellyer Mining lease in Western Tasmania. The principal exploration targets sought within the license area are Hellyer-type or Rosebery type volcanogenic Pb-Zn-Cu-Ag-Au massive sulphide deposits. The Que-Hellyer Volcanics, which host the Hellyer and Que River mines, extend into the license area. The Hellyer mine lies 5km to the east of the Bulgobac Hill EL boundary. No outcropping mineralisation has been located in the area. The terrain is heavily vegetated, rugged and poorly accessible. Access into the area is provided by a few overgrown 4WD tracks, along foot tracks, cut grid lines or via boat on Lake Mackintosh.

Although the old prospectors found no mineralised showings on the EL, near-continuous exploration over the past 30 years has discovered three zinc occurrences within the volcanics:

- High Point (found by BHP in 1988 during drilling of an EM anomaly. BHP drilled 4 holes 1988-89).
- Sock Creek (detected 1973 by drainage survey by Comstaff, who drilled 14 holes prior to 1978).
- Sock Creek South (found by BHP in 1988 during drilling of an EM anomaly. 4 holes were drilled in 1988-89).

Pasminco's involvement in this area commenced in 1990 and has been concentrated on testing the mineralised Que-Hellyer Volcanics at High Point. Previous exploration (prior to Pasminco's involvement) was largely carried out during the period 1963-1989 by Comstaff. BHP completed 4 diamond holes in the late 1980's to test the Hellyer host position at High Point and Pasminco has completed a total of 6 diamond drill holes (BHD 1, 2,3, 5 & 6) totalling 4,374m in the High Point area to further test this horizon. A deep hole (BHD4, 617m) was also completed at Sock Creek in 1993. A further two diamond holes (SC1 and SC2) for 118.7m, were completed at Sock Creek by J.G. Purvis and Associates (see below). The EL has been covered with detailed aeromagnetics, photogrammetry and regional-scale gravity surveys.

### 2.1 Attribution

The following personnel were responsible for the work carried out within the Bulgobac Hill tenement area during the 1999-2000 reporting period.

Geologist                      Andrew McNeill – Pasminco Exploration Rosebery

Report Compilation      Kirsten Simpson – Pasminco ETS Melbourne

### **3. LAND TENURE**

The Bulgobac Hill Exploration Licence 37/89, covering 32sq km, was granted to Pasminco Mining Rosebery in March 1990 (Figure 1). In August 1990 the licence was transferred to Pasminco Exploration. In May 1992 and October 1993, EL 37/89 was increased to 49sq km by the addition of 7sq km in the Lake Mackintosh area (EL 17/92) and 10sq km in the South Mt Charter area (EL 7/93). On 2nd September 1995, EL 37/89 was reduced to 28sq km (Purvis, 1995b). The reduced EL is composed of two blocks over almost entirely unallocated Crown Land.

### **4. GEOLOGY**

EL 37/89 covers two main groups of the Cambrian Mt Read Volcanics - the Central Volcanic Complex (CVC), and correlates of the Dundas Group. A small sliver of the Farrell Slates, east of the Henty Fault, occurs in the SE part of the EL (Figure 2).

The Central Volcanic Complex covers the southern part of the EL and comprises rhyodacitic lavas, porphyries and volcanoclastics (mostly pyroclastics with minor epiclastics). These rocks are known as the Mt Block Volcanics.

The Dundas Group and correlates cover the northern half of the EL. They comprise the Que-Hellyer Volcanics (a mafic volcanic complex), sediments (including the Animal Creek Greywacke, Que River Shale and Southwell SubGroup), quartz-feldspar porphyry bodies, and rhyodacitic volcanics (mainly lavas).

The boundary between the Central Volcanic Complex and the Dundas Group within the EL area is gradational, facing and dipping to the west, with the Dundas Group apparently conformably overlying the CVC.

Major structures on the EL include the NE-trending Henty Fault and the N-S trending Mt Charter Fault. However, the magnetics and gravity highlight the presence of several major, apparently deep-seated, unmapped or poorly mapped structures trending broadly E-W.

Three zinc-dominated and gold/silver-poor sulphide occurrences are known on the EL. These comprise:

- 1) Disseminated sphalerite-pyrite in altered Que-Hellyer Volcanics adjacent to the Mt Charter Fault at High Point.
- 2) Sphalerite with lesser pyrite-galena-chalcopyrite in net-veins on the contact between quartz-feldspar porphyry and black shale at Sock Creek.
- 3) Weak disseminated sphalerite in black shale at Sock Creek South (best intersection of 1m @ 2.5% Zn).

High Point is by far the most significant occurrence, although the tenor of Zn values intersected to date is not as high as at Sock Creek. Mineralisation occurs at High Point at several stratigraphic levels within the Que-Hellyer Volcanics. At the top of the Hangingwall Volcanics (Hellyer Basalt equivalents), there is an extensive stratiform zone of disseminated sphalerite-pyrite up to 200m thick and averaging 0.2-0.5% Zn. The most recent hole BHD6 at High Point has shown there is also disseminated sphalerite mineralisation in the underlying altered "footwall volcanics". The mineralisation in BHD6 indicates the potential for massive sulphide development in the Mixed Sequence in this area (Purvis, 1995).

At Sock Creek the mineralisation attains grades up to 10% Zn over 1.7m, with a general tenor around 2-5% Zn over 5-10m. There is untested potential at this prospect for an open-cuttable body of mineralisation in the order of 100-200,000t @ 5-10% Zn (Purvis, 1994). An ML application was lodged by JG Purvis in 1996 to investigate the potential of this resource; however, drilling was unsuccessful in increasing the resource base. Subsequently, the ML application was withdrawn and the area returned to the Bulgobac Hill EL.

No other sulphide occurrences of note are known anywhere on the EL.

## **5. PREVIOUS EXPLORATION**

Work conducted within EL 37/89 prior to Pasminco's involvement (1990) was carried out between 1963 and 1989 (Reviewed in: Purvis, 1994; Purvis 1995a; McGunnigle, 1996; Basford & Murphy, 1997). During this period the current tenement area was part of Comstaff's EL 5/63. Exploration activities (EM and stream sediment surveys; Figure 4) undertaken by Comstaff and JV partners Pruessag (post-1977) and BHP (post-1985) resulted in the discovery and subsequent drilling of three zinc-dominated, volcanic-hosted mineralised prospects:

- Sock Creek (14 drillholes)
- Sock Creek South (4 drillholes)
- High Point (4 drillholes)

In addition, BHP drilled 9 shallow diamond drillholes at Tullabardine Gorge without encountering significant mineralisation. Pasminco commenced exploration in the area in 1990. Work undertaken by Pasminco within Bulgobac Hill EL 37/89 between 1990 and 1997 is detailed in Table 1 (Purvis, 1994; Purvis 1995a; McGunnigle, 1996; Purvis, 1996; Basford & Murphy, 1997).

**Table 1: Exploration Undertaken by Pasminco within EL 37/89 - 1990 to 1999**

Reporting Period	Work Completed
1990-91 (Lorrigan, 1991)	- Photogrammetry to produce accurate base maps, high resolution aeromagnetic, collection of physical properties data from existing drill core, Relogging of Sock Creek South drill core and geological mapping in the High Point Area.
1991-92 (Purvis, 1992)	- Geological mapping, lithogeochemical sampling, total digest soil sampling, ground magnetics to complement the aeromagnetic data and drilling of three diamond drill holes (BHD1-3, 1481.5m) at High Point. Additional gravity data were collected in the Sock Creek, Bulgobac Hill, Mt Block and Tullabardine Gorge areas. Geological mapping and lithogeochemical sampling were also completed in these areas. An Honours thesis entitled "Geology and mineralisation of the Sock Creek and High Point Areas, Western Tasmania" (Barwick, 1991) was completed.
1992-93 (Purvis, 1993)	- At Sock Creek Previous drilling, UTEM data and the Geology of the Prospect were reviewed, infill gravity data was collected and a diamond drill hole (BHD4, 617m) completed. All data from the High Point prospect were reviewed and a data exchange completed with Aberfoyle. An Aeromagnetic survey was completed over the Tullabardine area. Geological mapping was completed in the Tullabardine Gorge and Bulgobac Hill areas.
1993-94 (Purvis, 1994)	- drilling of deep hole (BHD5-771.1m) at High Point; DHEM surveys in BHD5 (High Point) & BHD4 (Sock Creek); detailed ground mag survey at High Point; lithogeochem/petrological survey at High Point, based on hole BHD5; re-logging & further sampling of BHP hole HP4/4A at High Point.
1994-95 (Purvis, 1995a; Purvis, 1995b)	- drilling to basement at High Point (BHD6-1060.9m); DHEM survey of BHD6; completion of analysis of stratigraphy & volcanic facies in western part of Que-Hellyer Basin, using lithogeochem & petrological data from 19 drillholes; supporting of Honours Thesis (Sam Watkins-Monash University) on the palaeovolcanic history & stratigraphic correlations of Que-Hellyer Volcanics at High Point. Partial Relinquishment.
1995-96 (McGunnigle, 1996; Purvis, 1996)	- completion of Honours Project (Watkins, 1995); ML application (depth limited to 100m) over Sock Creek prospect by J.G. Purvis resulting in drilling of two holes (SC1 & SC2) with minor Pb -Zn intersections.
1996-97 (Basford and Murphy, 1997)	- geological & geochemical data review, minor grid cutting on northern section of licence.
1997/98 (Parfrey, 1998)	- work was focused on the Tullabardine prospect area, incl. gridding, IP survey, MMI & infill soil sampling, 1:2500 scale mapping & associated rock chip sampling. A number of targets were defined from this work which were to be tested during 1998/99. Partial leach

	soil sampling was completed over the Mt Charter Fault at High Point and geological mapping and total digest soil sampling completed in the Mackintosh Dam Area.
1998/99 (Parfrey and McNeill, 2000)	- work within the Tullabardine prospect area consisted of interpretation of previous infill partial leach soil sampling, minor "C" horizon soil sampling, geological mapping and rock chip sampling. Results were considered insufficient to propose further follow-up. The results of the partial leach soil sampling survey over the Mt Charter Fault were interpreted; no significant anomalies worthy of follow-up were defined.

## 6. WORK COMPLETED 1999-2000 REPORTING PERIOD

- Work undertaken within Bulgobac Hill EL 37/89 in the 1999-2000 reporting period has focused on a partial leach soil sampling program in the High Point area. This survey formed part of a much larger program, on EL's 19/94 and 10/98, designed to cover the buried Que-Hellyer ore position, where it is interpreted to be within 500m of surface, in the area between the Mt Charter Fault MMI survey (Parfrey and McNeill, 2000) to the west, the Amoeba and Bronco areas to the east (McNeill, 2000), and the CSR/Placer Drilling around Que Road, to the north. Griding (6.5 line km ) was completed in April and May 2000, and the grid was then surveyed using real-time differential GPS (DGPS).
- Partial Leach soil sampling of the **High Point** Grid was carried out during April and May 2000, with a total of 270 samples collected, including duplicates. Randomised sample numbers were used to reduce the effect of analytical variations and samples were collected on 25m spacings from nominally the 'B' Horizon (0.1-0.2m depth). These samples were analysed for Cu, Pb, Zn, Ba, As, Au, Ag, Cd, Co, Bi, Mo, Ni, Y, Zr, La, Ce, Sm, Eu and Gd by method Deepleach 42 at Amdel. Results are included as Appendix 1 and sample locations are shown on Figure 3.

### 6.1 Results

As sampling was completed as part of a much larger survey assays were spread over two analytical batches (SDS 3869 and 3870). Quality control data (internal standards and duplicates) for both batches appear to be acceptable, although results for Cu, Pb and Zn are on the low side. In all 17 samples were deleted from the dataset, prior to detailed interpretation, on the basis of:

- low post-digest pH(<8.0); 12 samples deleted.
- abnormally high Zn- contents in samples adjacent to the Murchison Highway, interpreted to result from contamination by wind-blown dust from ore trucks carting ore from Que River to Rosebery (see McNeill, 2000); 6 samples (including one sample with a low post-digest pH) deleted.

Median values for the major elements of interest (Cu, Pb, Zn etc.) are similar for both analytical batches, indicating no significant level shifts, and data from the two batches were therefore compared without levelling. Grided images of raw soil assay data collected over the High point area are presented as Figures 5 – 12. It can be seen that there are several spotty highs none of which are anomalous in all elements; a NE trending Zn anomaly occurs on three lines, but, is supported only by Ba whereas major Cu, Pb and Ag highs occur in the NW part of the grid (note also that Cu appears to be weakly anomalous along the N-S baseline – an analytical effect?). None of these anomalies is currently considered worthy of follow-up, however as the current years survey covered only a small area it was decided to interpret it in conjunction with the more extensive Mt. Charter Fault survey.

As the current survey and the 1998 Mt Charter Fault survey were analysed using different methods (DL42 vs DL40) the data set was divided by analytical method and the individual analytical method data sets levelled to the median of the Soil colour group (a variable derived by combining the logged soil colours into one of six colour groups; black, grey, red-brown, brown, orange and cream). The response ratios (value/median) generated by this process were then plotted as line profiles and grided images (either singly or as multi-element factors) in an attempt to define areas of anomalism (Figs. 13-19). It can be seen that the levelling process may not have been entirely successful in removing level shifts between analytical methods (particularly for Pb, As and Mo; Figs. 14 and 16). For the remaining elements there appear to be no coherent multi-line anomalies worthy of follow-up, the only feature of note being an elongate anomalous zone in Cu which may correspond to the northern poorly mapped extension of the Mt Charter Fault (Fig. 13). When a multi-element response ratio is considered (Fig. 19) it is obvious that there is a major zone of apparent anomalism in the current years data, which may largely result from problems with the levelling of data from different methods (for Pb and As). Based on the results to date there are no first order targets worthy of follow-up in the High Point area.

## **7. CONCLUSIONS & RECOMMENDATIONS**

Pasminco have completed a 10 year exploration program over three main areas of the Bulgobac Hill tenement:

4. High Point. This area has been explored using deep search EM, detailed gravity and magnetics, lithochemical studies, partial leach and total digest soils and diamond drilling (approx. 5800m) with DHEM. The drilling has indicated the presence of the Que-Hellyer ore position (or mixed sequence), however, the mineralisation intersected has been of a low tenor (e.g., disseminated sphalerite in the Hellyer Basalt equivalent), there are no outstanding DHEM targets and the remaining target areas are at depth (>600m). Given the lack of a coherent multi-element partial leach soil anomaly we have no way of targeting further drilling and no further work can be recommended.
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6. Tullabardine – Mackintosh Dam. Work on these prospects in the Farrell Slates has included geological mapping, total and partial digest soil sampling, geological mapping and IP surveys. A number of targets were located. But, none had the size or coherency to warrant follow-up in detail.

## **8. ENVIRONMENTAL DISTURBANCE AND REHABILITATION**

Earthworks completed during the life of EL 37/89 comprise access tracks and drill pads at the High Point and Sock Creek prospects.

At High Point the BHD1, 5 and 6 drill sites were rehabilitated in 1994-1995 and the access track to the BHD5 site was also rehabilitated in that year (Purvis, 1995a). Access to the BHD2 and 3 drill sites has rehabilitated naturally and no work is required in this area. The HP1 (east of the BHD6 collar) and HP4 access tracks (approx. 400m long) constructed by BHP remain to be rehabilitated. This work will be completed in November – December 2000 when weather conditions are more suitable.

In the Sock Creek area all drill access tracks, constructed by Pasminco, have been rehabilitated and no further work is required.

## 9. EXPENDITURE

Total expenditure for all work undertaken by Pasminco Exploration within Bulgobac Hill EL 37/89, for the 12 month period ending 2/8/2000 was \$53,994.46. A detailed expenditure statement is given below.

Personnel	\$17,338.33
Travel & Accommodation	\$995.84
Geochemical Consultants & Assays	\$10,547.74
Geoscience Consultants	\$677.62
Other Contractors	\$13,060.99
Drilling Contractors	\$8.82
Stores & Supplies	\$1,145.60
Vehicles Plant & Equipment	\$265.88
Land	\$1,664.89
Computing	\$84.98
Office	\$3295.18
Administration Fee	\$4908.59
<b>Total</b>	<b>\$53,994.46</b>

## 10. KEYWORDS & LOCALITY

### Keywords

BULGOBAC HILL, BULGOBAC RIVER, QUE RIVER, HELLYER, TULLABARDINE, GEOCHEMISTRY, MAPPING, MMI, IP, ZINC, MAFIC, VOLCANICS, QUE-HELLYER VOLCANICS, MOUNT READ VOLCANICS

### Locality

BURNIE SK55-3

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