PASMINCO EXPLORATION

BULGOBAC HILL EL 37/89 and BULGOBAC RIVER EL 19/94

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1. SUMMARY

During the reporting period work carried out within Bulgobac Hill EL 37/89 was focused on the Tullabardine Prospect area. Work within the prospect consisted of griding, an IP survey, MMI and infill MMI sampling, 1:2500 scale mapping and associated rock chip sampling. A number of targets were defined from this work which will be further tested in the next twelve months.

Minor C-Horizon soil, stream sediment and rock chip sampling programmes were undertaken within Bulgobac River EL 19/94 during the reporting period.

2. INTRODUCTION

This report details work undertaken within both Bulgobac Hill EL 37/89 and Bulgobac River EL 19/94 between August 1997 and August 1998.

The majority of work undertaken within EL 37/89 during the reporting period was within the Tullabardine Prospect area. A grid was established (15km of grid lines) in the NE of the area, along the Henty Fault. An IP survey and MMI soil sampling program were subsequently conducted across this grid, with a later infill MMI sampling program also carried out (no results to date). Mapping at 1:2500 scale and associated rock chip sampling were also undertaken within the Tullabardine Prospect area.

EL 37/89 covers Cambrian Mt Read Volcanics SW of Hellyer Mine in Western Tasmania (Figure 4). A Hellyer-type volcanogenic Pb-Zn-Cu-Ag-Au massive sulphide deposit is the main target of the exploration programme. The terrain is rugged and vehicular access limited.

Although the old prospectors found no mineralised showings on the EL area, near-continuous exploration over the past 30 years has discovered three zinc occurrences in 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. They put in 4 holes 1988-89).

Pasminco's involvement in the area commenced in 1990 and has concentrated on testing the mineralised Que-Hellyer Volcanics at High Point. A further five diamond drill holes (BHD1, 2,3, 5 & 6), totalling 4374m, have been drilled in this area. A deep hole (BHD4, 617m) was also completed at Sock Creek in 1993. The EL has also been covered with detailed aeromagnetics and photogrammetry, and regional-scale gravity surveys extended over the majority of the EL area (Section 5.1).

The palaeovolcanic history and stratigraphy correlations of the Que-Hellyer Volcanics at High Point was studied in detail by Pasminco supported by Honours student Sam Watkins of Monash University.

Work within the Bulgobac River EL 19/94 consisted of conventional soil, stream sediment and rock chip sampling programmes designed to further investigate anomalies identified as part of the Western Tasmanian Prospectivity Review (Murphy 1997a; Murphy 1997b).

EL 19/94 covers an area of Cambrian rocks belonging to the Mt Read Volcanics. The Que-Hellyer Volcanics which host the Hellyer and Que River mines extend into the EL.

The Hellyer mine lies 5km to the east of the EL boundary (Figure 4). No outcropping mineralisation has been located in the area.

Exploration by Pasminco commenced in 1995 and has been carried out in conjunction with exploration on Bulgobac Hill EL 37/89. Previous work undertaken within Bulgobac River EL 19/94 is detailed in Section 5.2

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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 comprised of almost entirely unallocated Crown Land (Figure 2).

Bulgobac River EL 19/94, covering 21km^2, was granted to Pasminco Australia Limited in January 1995 (Figure 1). The licence is renewable annually on the 6th January. The licence is on unallocated Crown Land, designated as multiple use forest (Figure 3).

4. GEOLOGY

4.1 Bulgobac Hill EL 37/89

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 5).

The Central Volcanic Complex covers the southern part of the EL and comprises rhyodacitic lavas, porphyries and volcaniclastics (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 relationship between the various units is shown in Figure 6.

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 (Figure 5). 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 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 was taken out by JG Purvis in 1996 to investigate the potential of this resource, however, drilling appears to have been unsuccessful in increasing the resource base. Subsequently, the ML has been withdrawn and the area again comes under the Bulgobac Hill EL.

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

4.2 Bulgobac River EL 19/94

Two major groups of rocks occur within EL 19/94. One group consists entirely of Tertiary basalt flows which are considered to have low prospectivity to host base metal mineralisation. The second group consists of Cambrian rocks belonging to the Mt Read Volcanics. This group can be divided into distinct packages occurring on either side of the major structure within the EL, the NNW-SSE trending Mt Charter Fault (Figure 7).

Figure 6 shows the rock types occurring within these two packages and their stratigraphic relationship with one another. The Que and Hellyer ore bodies occur within the Mixed Sequence, which is part of the Que Hellyer Volcanics and is found on the eastern side of the Mt Charter Fault. The fault itself is a highly significant structure, characterised by a zone of shearing, fracture, vein and pug development up to 10m wide in places. The difference in thickness and type of Cambrian units either side of the fault may indicate that it was active as a growth fault during Cambrian times.

The dips on either side of the fault are low angle (5-45°) and are mostly towards the north west. Open folds and considerable faulting disrupt the stratigraphy on the eastern side of the fault. The thickness of the Southwell Subgroup and Que River Shale, coupled with the low angle dips on the eastern side of the fault prevent the Que Hellyer Volcanics from outcropping within the EL. They are observed at surface beyond the eastern boundary.

Volcanic units do outcrop on the western side of the Mt Charter Fault. Although these are believed to be time equivalents of the Que-Hellyer volcanics, they are not thought to be geochemical correlates (A Crawford, pers.comm. to Purvis JG, 1995).

No significant alteration or mineralisation has been identified within the EL boundaries (Lorrigan,1995).

5. PREVIOUS EXPLORATION

5.1 Bulgobac Hill EL 37/89

Work conducted within EL 37/89 prior to Pasminco's involvement (1990) was carried out between 1963 and 1989 (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) 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 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 1997

Reporting Period	Work Completed
1990-93	- diamond drilling of mineralised zone in Que-Hellyer Volcanics at High Point (3 holes); drilling of deep diamond hole at Sock Creek; detailed aeromagnetic and photogrammetry across whole of EL; extended regional-scale gravity surveys over the majority of the EL area.
1993-94	- 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	- 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.
1995-96	- completion of Honours Project; 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	- geological & geochemical data review, minor grid cutting on northern section of licence.

5.2 Bulgobac River EL 19/94

Previous work undertaken by other companies on EL 19/94 has included geological mapping, VFL-EM, IP, CSAMT and gravity surveys conducted by CSR and DHEM, UTEM and magnetic surveys conducted by Aberfoyle. Recent work by a Placer-Aberfoyle Joint Venture included the completion of five diamond drill holes, all of which intersected the Que-Hellyer Volcanics at depth (Richardson, 1994). None of these holes contained mineralisation or significant alteration.

Pasminco began exploration within EL 19/94 in 1995. Table 2 details work undertaken by Pasminco between 1995 and 1997 (Lorrigan, 1995; Dibben, 1996; Murphy, 1997)

Table 2:. - Exploration Undertaken By Pasminco within EL 19/94 - 1995 to 1997

Reporting Period	Work Completed
1994-95	-lithogeochemical study (Dr Tony Crawford) to define depth at which the Mixed Sequence occurs in drill holes on eastern side of Mt Charter Fault (>900m)
1995-96	-regional aeromag interpretation to try & locate large alteration zones associated with Rosebery-style mineralisation
1996-97	-refurbishment, mapping, rock chip & soil sampling of Bulgobac River grid; major data compilation as part of Western Tasmania Prospectivity Review; results from both the Bulgobac sampling and data review identified both soil and stream sediment Zn-Pb anomalies within the NW part of the grid (peripheral to and within Tertiary Basalt areas). This area was targeted for further investigation during the current reporting period.

6. WORK COMPLETED 1997-98 REPORTING PERIOD

Work undertaken within Bulgobac Hill EL 37/89 in the 1997-98 reporting period has focused mainly on the Tullabardine Prospect and has included:

- Grid cutting
- IP survey
- MMI soil sampling
- Mapping and rock chip sampling
- Infill MMI soil sampling

Other work within the EL has consisted of minor C-horizon soil sampling and mapping in Mackintosh Dam area and a review of existing IP data north of the Mackintosh Spillway area.

The main work conducted within the Bulgobac River EL 19/94 during the current reporting period has been minor infill C-horizon soil sampling and minor stream sediment and rock chip sampling.

An MMI soil sampling programme was also conducted along the Mt Charter Fault Zone, including the High Point Prospect, which straddles both EL 19/94 and EL 37/89.

6.1 Bulgobac Hill EL 37/89

Griding

A total of 19 line kilometres of track cutting was completed along the Henty Fault, in the NE section of the Tullabardine Prospect area. The cutting comprised an initial 11.6km of grid lines pegged at 25m slope corrected intervals, an additional 3.4 line kilometres of infill grid lines and 4km of access.

IP Survey-Tullabardine

To date very little work has been conducted along the Henty Fault north of the Tullabardine Dam. Due to the Farrell sequence being both moderately conductive compared to the volcanic units, and containing a strong chargeability response, as observed in the Sterling Valley area to the south, an Induced Polarisation (IP) survey was commissioned to cover the area.

Data was collected along eleven lines spaced at 250m, covering a strike length of 2.5km. Of this, 2km covered the interpreted location of the Henty Fault, whilst 0.75km covered the interpreted position of the Mount Charter Fault (see Figure 20).

The IP data indicates the location of the Henty Fault Zone, with the interpreted

Farrell Sequence to the east of the fault having a high chargeability, low resistivity response. This is similar to that observed to the south.

Three anomalous chargeability trends are evident in the IP data, all within the Farrell Sequence. An IP anomaly is also evident coincident with the interpreted position of the Mt Charter Fault.

Five targets have been recommended for further investigation.

The methodology, results and recommendations of the IP survey are discussed in detail in Appendix One.

MMI Soil Sampling-Tullabardine Grid

Four hundred and eighty seven (487) samples were collected during an MMI soil sampling program conducted over the Tullabardine grid. Samples were collected at 25m intervals, with drier samples sieved to -2mm in the field and wet samples dried and sieved prior to submission for analysis. Samples were taken at a nominal 5-20cm depth, directly below the matted root zone. Duplicate samples were taken approximately every 20 samples. These samples along with Pasminco standards were submitted as one batch to Amdel in Adelaide and analysed for Ag, As, Au, Bi, Cd, Ba, Co, Cu, Mo, Ni, Pb, Pt, Pd, Sb, Tl and Zn by partial leach digest (Method IC8M-Deepleach No. 37). Sample locations are shown in Figure 8 and analytical results are detailed in Appendix Two.

An additional one hundred and thirty seven (137) MMI soil samples were collected across the Tullabardine grid. This infill sampling was undertaken to constrain MMI anomalies highlighted during the initial sampling survey. Samples have been submitted to Amdel in Adelaide for analysis by Deepleach digest No. 37. No results for this sampling have been received to date. Sample locations are shown in Figure 8.

Results and Discussion

A prominent partial leach response occurs on line 5387250N at approximately 390600E. This feature is defined by elevated Pb, As, Ag, Cu, Ni, Cd, Tl, and contains the strongest Zn response (>390ppm) reported over the entire grid. The anomaly is defined over approximately 75m strike length and is associated with sub-cropping black shales and siltstones interpreted to be part of the Farrell Slates. A ferruginous seep zone on the SE bank of a small creek draining into Lake Mackintosh is present at the peak of the partial leach anomaly. Ferruginous seep zones similar to this are indicative of oxidising sulphides elsewhere in the distinct and suggest this anomaly may be due to sulphides close to surface. The geochemical anomaly corresponds with a change in trend of the IP chargeability zone marking the Henty Fault. This trend also coincides with a NNW trending structure interpreted from IP data and mapping. Additional work is required to determine the source of the ferruginous seep and geochemical anomalism.

A geochemical linear occurs sub-parallel to the NNW trending structure interpreted from the IP data across lines 5387500N to 5387750N. The feature is defined by elevated responses in Zn, Cd, As, Bi, Ag, Mo, Sb, and Pb. The trend also marks a change in trend of the IP chargeability response marking the Henty Fault position. The ferruginous seep zone mentioned above marks the southern limit of this trend. Elevated geochemical responses along this trend may infer the presence of mineralisation associated with this structure. Similar structures in the Sterling Valley host vein style mineralisation at Farrell and Murchison mines. Additional work is warranted.

Elevated responses in Zn and Cd occur along the contact between the CVC and Dundas group equivalent rocks in the south of the grid. Several elevated responses in Zn, Tl and Ag are present over a weak chargeability anomaly at the interpreted position of the Mt Charter Fault. Facies variations across the Mt Charter Fault in the High Point area suggest it may have acted as a growth fault during deposition of CVC and Dundas Group rocks. The presence of widespread low grade Zn mineralisation in the Mixed Sequence and Que River Shale at High Point suggest this structure may have been important in focusing metal bearing fluids during the Cambrian. Given the presence of elevated geochemistry over the Mt Charter Fault near its junction with the Henty Fault additional work is warranted to fully evaluate the potential of this area.

Rock Chip Sampling-Tullabardine

Fifty five (55) rock chip samples were collected during mapping of the Tullabardine Prospect area. Grab samples of outcrop and float were collected, with individual sample sites being marked with flagging and permatag.

Samples were submitted to Amdel for multi-element analysis. Analytical results are detailed in Appendix Three and sample locations are shown in Figure 9

Geological Mapping-Tullabardine

Very little work has been completed in the area covered by the Tullabardine grid. The only work undertaken in this area has consisted of several geological traverses completed during the Government Mt Read Volcanic's 1:25,000 scale geological mapping project, and some minor stream sediment sampling

Grid based geological mapping was completed over the area at 1:5000 scale during the reporting period. Results of this mapping are presented as Figure 10.

The local geology west of the interpreted Henty Fault Position is dominated by a sequence of epiclastic medium to fine grained, often micaceous, quartz ± feldspar, sandstones, siltstones, greywackes and shales, intercalated with thin horizons of volcaniclastic sediments. These rocks are strongly reminiscent of Dundas Group rocks west of the Rosebery fault and are correlated with the Western Sequence (Dundas Group equivalent rocks) which outcrop to the N and NW of the grid.

The strong micaceous (predominantly detrital muscovite) component of these rocks and their relatively coarse grainsize implies a source region eroding granite or metamorphic rock units. The closest source of metamorphic rocks is the Tynan region to the east, suggesting that this area may have been exposed and actively eroding during deposition of this sequence.

Lithologies east of the interpreted Henty Fault bear some similarity to those observed in the west, however, they appear to be almost devoid of detrital mica. Dominant lithologies consist of grey shales intercalated with thin units of coarse grained quartz-feldspar crystal lithic sandstone particularly along the eastern shore of Lake Mackintosh. These rocks are interpreted as correlates of the Farrell Slates which outcrop in the Mackintosh Dam area 3km to the SW. Rhyodacitic sill-like bodies intrude both sequences either side of the Henty Fault and are particularly abundant through the central portion of the grid.

The Mt Charter Fault separates the CVC from western sequence in the south of the grid. A weak chargeability anomaly is present along the Mt Charter Fault on line 5385500N at the southern end of the grid. This area also corresponds with the approximate intersection of the interpreted Tullabardine Gorge Transform Structure (Purvis 1995).

The Henty Fault has been interpreted from IP data, however little geological indication of this structure can be observed on the ground primarily due to limited outcrop. The approximate fault position is inferred on the ground from a significant break in topography. The second parallel structure depicted in the 1:25,000 scale mapping which lies to the NW of the Henty Fault does not appear in the IP data and is not mappable on the ground.

IP Review - Lake Mackintosh Grid

Induced Polarization data collected over the Lake Mackintosh grid by Billiton has been re-interpreted (Appendix Four). A total of ten lines of dipole-dipole IP were collected along the eastern side of the Lake Mackintosh grid between the Mackintosh and Tullabardine Dams.

As a result of the interpretation of the Billiton IP data, the position of the Henty Fault has been re-interpreted according to the high chargeability signature attributable to the Farrell Slate Formation. There are two areas of structural disruption designated for follow-up investigation, along with a number of anomalous responses within the Farrell Slates. In addition, the Billiton IP data shows the Henty Fault Zone to be offset along line 2400N. Similar areas of cross-faulting on the Henty Fault Zone have been found to have elevated Au mineralisation (Dutton’s in Tullah Flats and Lorrigan’s Luck in the Sterling Valley).

C-Horizon Soil Sampling - Mackintosh Dam

Previous exploration by Billiton along the western shore of Lake Mackintosh located anomalous IP responses in a possible fault jog in the Henty Fault which had been recommended for drilling but never followed up (Appendix Four). Surprisingly, northwards of Mackintosh Dam, the continuation of the Henty Fault has never been drilled. Three grid lines were refurbished (Figure 11) in the postulated fault jog position and mapped. There are significant glacial deposits through this area, though probably less extensive than depicted on the published geology (Figure 11). C-horizon soil sampling was undertaken over sub-cropping areas on the refurbished lines. Mapping and rock chip sampling was also undertaken along tracks and lake margins.

Forty four (44) C-horizon (soil/saprolite interface) soil samples were collected across the Mackintosh Dam grid. Samples weighing approximately 500g were collected at 20m intervals along three refurbished grid lines. As no GPS readings have been done, the UTM co-ordinates for all samples have been calculated from the local co-ordinates, with a location accuracy of +/-150m. Sample depths ranged from 10cm (thin cover) to 30-40cm (thick cover), where samples were collected by hand auger. Samples were placed within calico bags, then within plastic bags and submitted to Analabs in Burnie for multi-element analysis. Samples were analysed for Cu, Pb Zn, Ag, As, Fe, Mn and Bi (A101) and Au (F614).

Sample locations are shown in Figure 11 and analytical results are detailed in Appendix Five.

The multi-element assay results for each of the three lines (3400N, 3600N, 3800N) are plotted in Figure 12. These depict normal probability (nscores) plots of elemental populations and the spatial distribution of selected cut-offs in the data sets. The relatively consistent slopes in the distribution curves suggest there is no distinctly anomalous elemental population. There are some spatial trends that can be gleaned from the data, suggesting some strike continuity of slightly elevated signatures, eg. slightly elevated Zn, Mn and Fe in the western parts of sample lines, and an elevated Au response at the western end of Line 3600N. However, taken as a whole and compared to C-horizon soil assays elsewhere in the district (eg: on the Rosebery Mine Lease), the elemental abundances are at about the level of what is expected from a background non-mineralised population. At this stage no follow up work is planned in this immediate area.

Geological Mapping - Lake Mackintosh Spillway

Detailed (1:1,000 scale) geological mapping of the Mackintosh Spillway, in the southern part of the Bulgobac Hill tenement (Figure 11), was undertaken during the period of this report. A number of DGPS points were taken to accurately locate the map area (Figure 11). Although small in area (250x100m), there is almost complete exposure (itself a rarity in Western Tasmania) of the Farrell Sequence, adjacent to the Henty Fault. This area was mapped by Uren (1994), yet it was evident that more information could be gleaned from these exposures that would aid the exploration program. This area is important in several regards:

- it straddles the Tullah and Bulgobac Hill tenement boundary and thereby provides a template for developing an understanding of the region, linking the Tullbardine Grid to the north and the Farrell area in the south

- it provides a window in understanding the kinematic history of the regionally significant Henty Fault which lies immediately to the west of the outcropping area

- it lies north of an area where massive sulphide “boudins” occur in river bank exposures and therefore holds some exploration interest in establishing their context

- it affords an opportunity to place some geological constraints on the interpretation of IP responses from the Mackintosh IP survey adjoining the Spillway to the south.

Results and Discussion

Mapping in the Mackintosh Spillway area indicates the following relationships and interpretations:

- the Farrell Sequence in the area is a complexly faulted and folded association of three major lithotypes (or facies): greywacke sandstones, siltstones with minor shales, crystal lithic sandstones and tuffaceous siltstones, and often associated feldspar porphyry sills. The sill-like bodies show evidence of intrusion into wet sediment, as well as concomitant extrusion and erosion of the lavas into the sedimentary sequence (producing crystal lithic sandstones). There are complex mixing relationships of the sediments and volcanic flows, particularly in the river outcrops south of the Spillway exposures, where meter scale rafts of shale are incorporated with vesiculated breccia-like flows. This attests to an active Cambrian volcanic environment with tectonic instability proximal to the Henty Fault

- on the Spillway, the Farrell Sequence dips steeply west and is predominantly overturned (younging east). This is consistent with facing evidence in drill core further south (particularly MD3, Purvis 1994). Facing relationships of bedding in the S1 cleavage (ie. the direction of younging along the cleavage plane) indicate the existence of a complexly faulted, overturned anticline through the central part of the Spillway. The axis of the anticline can be mapped in the south of the outcrop but, traced northwards, it merges with and is replaced by a strike parallel fault. This fold axis is one of several associated fold pairs in the outcrop area which mainly plunge steeply northwards but undergo plunge reversals in places. There are complex patterns of upward and downward facing on the S1 cleavage which, in addition to evidence throughout the sequence of soft sediment deformation features, could indicate slumping on a scale sufficient to produce downward facing relationships

- faulting is evident on all scales of observation, and is dominated by a series of anastomosing NE trending strike sub-parallel brittle and brittle-ductile fault zones. These commonly show a significant component of high angle reverse, generally west-side up displacement, with dextral strike slip elements. This set of faults is intersected by a set of brittle north trending faults which show components of dip slip and dextral displacements

- alteration within the area is spatially related to both the NE trending faults and to the feldspar porphyry units. The faulted core of the anticline in the central part of the area is characterised by relatively intense sericite/pyrite/chlorite alteration peripheral to the porphyry. Many of the faults show pronounced Fe alteration staining, with primary pyrite preserved in places

- the fold and fault interpretation, together with the overturned relationships, indicate the stratigraphic sequence is formed of crystal sandstones, tuffaceous flows and dacitic lavas (in the south) overlain by greywacke sediments to the east. The existence of older volcanic associated rocks to the west of the more typical Farrell Slate Sequence raises the possibility that the volcanic-related facies may correlate with the Murchison Sequence (east of the Farrell Fault); whole rock geochemistry will need to be undertaken to test this hypothesis. If this was a valid correlation, this would increase the potential in this area and add to the significance of the boudined massive sulphides.

MMI Soil Sampling-High Point Prospect and Mt Charter Fault

Following grid refurbishment, two hundred and forty six (246) B-horizon MMI soil samples were collected in the High Point Prospect (EL19/94 and EL 37/89). This soil sampling programme, covering the strike length of the Mt Charter Fault from High Point northwards to beneath the Tertiary Basalt cover, was designed to test the ability of the MMI technique to define deeply buried mineralisation associated with the Mt Charter Fault. No assay results have been received to date. Expenditure, details and results of this sampling programme will be reported in full when in next reporting period. The grid and sample locations are shown in Figure 13.

6.2 Bulgobac River EL 19/94

An infill exploration program was undertaken over areas of geochemical anomalism identified in the previous year’s sampling on the Bulgobac River grid. The area of interest centred around a fault intersection between the Mt Charter Fault and a strike parallel fault defined by previous mapping. The area is adjacent to the sub-Tertiary unconformity which it was considered could account for the geochemical anomalism.

Infill Soil Sampling

Fifty eight (58) C-horizon soil samples were collected across the Bulgobac River grid. Bulk samples weighing 500g were collected by hand auger at 50m intervals, from depths of up to 40cm. Samples were dried and submitted to ALS (Queensland) for analysis. Two analytical techniques were employed to determine which was best for extracting the higher percentage of base metals (Appendix Six). Samples were analysed for Au, Cu, Pb, Zn, Ag, As, Mn, Fe, Mo, Ba and Sb using ALS method IC587, while IC580 was used to analyse for Cu, Pb, Zn, Ag, As, Mn, Fe and Mo.

Sample locations are shown in Figure 14 and analytical results are detailed in Appendix Six.

Results and Discussion

Statistical analysis of the multi-element data shows two distinct populations of elevated results which are spatially related (Figure 15). There is an elevated population of Cu, Zn, Fe, Mn and Ag in the northern part of the grid which is mirrored by a comparatively depleted response from Pb and As. The statistical cut-offs determined in Datadesk have been used to plot the distributions in AMG space for Zn, Pb and Cu in Figures. 16, 17 and 18 respectively. These show that the spatial clustering of the elemental populations is closely allied to the distribution of the Tertiary Basalt outcrop which has higher Zn and Cu than in the underlying Lower Palaeozoic basement with higher values in Pb.

The elemental abundances are at about the level of what is expected from a background non-mineralised population. At this stage, no immediate up work is planned in the area. However, these results will need to be considered in tandem with the interpretation of the Partial Leach survey recently completed along the Mt Charter Fault.

Stream Sediment Sampling

Eight (8) stream sediment samples were collected within the Bulgobac River area. Stream sediment sampling was undertaken to determine any correlation between soil and stream anomalies as highlighted and discussed in Murphy (1997) and, if possible, identify the source of the anomalies (ie: lower Palaeozoic bedrock source beneath Tertiary basalts or hydromorphic flow processes leading to enrichment along the sub-Tertiary unconformity [Murphy, 1997]).

Samples weighing approximately 150g were sieved to -80 mesh, dried and submitted to ALS (Queensland) for analysis. Again, two analytical techniques were employed to determine which was best for extracting the higher percentage of base metals (Appendix Seven). Samples were analysed for Au, Cu, Pb, Zn, Ag, As, Mn, Fe, Mo, Ba and Sb using ALS method IC587, and method IC588 was used to analyse for Cu, Pb, Zn, Ag, As, Mo and Sb.

Stream sediment sample locations are shown in Figure 14 and analytical results are detailed in Appendix Seven.

Rock Chip Sampling

Minor rock chip sampling was undertaken in the Bulgobac River area, to follow-up identified soil and stream anomalies (Murphy, 1997). Four (4) rock chip samples were collected and submitted to ALS (Queensland) for analysis. Samples were analysed for Au, Cu, Pb, Zn, Ag, As, Mn, Fe, Mo, Ba and Sb. Sample locations are shown in Figure14 and analytical results are detailed in Appendix Eight.

7. CONCLUSIONS & RECOMMENDATIONS

1. The Henty Fault has been mapped successfully by IP on the eight of the nine lines comprising the Tullabardine grid. In addition, the Mt Charter Fault has been interpreted from IP data on line 5385500N and 5385750N.
2. Several high chargeability low resistivity features are present close to the interpreted position of the Henty Fault. Anomalous IP features recommended for follow up occur on lines 5386500N (centred 389800E, 50m depth), 5386750N (390000E, 60m), 5387000N (390430E, 75m), 5387750N (390575E, 75m) and 538800N (390600E, 50m).
3. Partial leach geochemistry has identified several elevated multi-element responses coincident with high IP chargeability features. The most prominent feature occurs on line 5386500N (between 389700E & 390000E). A second area of interest occurs as a geochemical linear on lines 5387250N to 5387750N which coincides with an interpreted NW trending structure in the IP data and a change in orientation of the Henty Fault trend. Additional work (drill testing) is warranted on these targets.
4. The position of the Mt Charter Fault can be interpreted from the IP data. A weak chargeability feature is present on line 5385500N coincident with this structure. Mapping and drilling to the north (High Point area) suggest that the Mt Charter Fault may have been a growth fault during the Cambrian. The structure is largely untested in the area between Mt Charter and the Tullabardine grid and remains as one of the higher priority target areas remaining on the licence.

8. EXPENDITURE

Bulgobac River EL 19/94

Total expenditure for all work undertaken by Pasminco Exploration within Bulgobac River EL 19/94, for the 12 month period ending 30/09/1998 was $17,966. A detailed expenditure statement is given below.

Personnel		3,804
Travel & Accommodation		31
Consultants & Contractors		1,058
Drilling		0
Stores & Supplies		0
Vehicles Plant & Equipment		0
Land		2,711
Computing		0
Office		8,729
Administration Fee		1,633
	Total	**17,966**

Bulgobac Hill EL 37/89

Total expenditure for all work undertaken by Pasminco Exploration within Bulgobac Hill EL 37/89, for the 12 month period ending 30/09/1998 was $156,907. A detailed expenditure statement is given below.

Personnel		48,508
Travel & Accommodation		3,844
Consultants & Contractors		57,015
Drilling		698
Stores & Supplies		2,451
Vehicles Plant & Equipment		719
Land		2,915
Computing		0
Office		26,493
Administration Fee		14,264
	Total	**156,907**

9. KEYWORDS & LOCALITY

BULGOBAC HILL, BULGOBAC RIVER, QUE RIVER, HELLYER, TULLABARDINE, MACKINTOSH DAM, GEOCHEMISTRY, MAPPING, MMI, IP, ZINC, MAFIC, VOLCANICS,

BURNIE SK55-3

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APPENDIX ONE

IP Survey - Tullabardine Dam

PW Basford

APPENDIX TWO

Tullabardine Grid - MMI Soil Sampling

Analytical Results

APPENDIX THREE

Tullabardine Grid - Rock Chip Sampling

Analytical Results

APPENDIX FOUR

Mackintosh Dam - IP Review/Reinterpretation Memorandum & Figures

PW Basford

APPENDIX FIVE

Mackintosh Dam - C-Horizon Soil Sampling

Analytical Results

APPENDIX SIX

Bulgobac River Grid - C-Horizon Soil Sampling

Analytical Results

APPENDIX SEVEN

Bulgobac River Grid - Stream Sediment Sampling

Analytical Results

APPENDIX EIGHT

Bulgobac River Grid - Rock Chip Sampling

Analytical Results