

**PASMINCO EXPLORATION**

**THE PINNACLES (Silver Falls) EL 23/2000**

**ANNUAL REPORT**

**FOR THE PERIOD ENDING 8<sup>th</sup> NOVEMBER 2001**

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## 1. SUMMARY

Exploration activities in the first year of tenure of EL 23/2000 have focussed on the Silver Falls prospect. Work undertaken included:

- Grid Cutting (10.3 line km).
- Mapping and geological interpretation.
- Collection and analysis of B-horizon partial leach soil samples (447 samples).
- Rockchip sampling (4 samples).
- Petrographic description (5 samples).
- Pb-Isotope determination (2 samples).

Work has focussed on assessing the potential of the Silver Falls Prospect to host a deep (>150m) Rosebery – Hercules style deposit. The area has undergone considerable previous exploration, especially for C-Horizon conventional soil sampling surveys, and it is believed that the top 100 – 150m of the prospect has been sufficiently tested. In terms of modern exploration, truly efficient testing of the surface mineralisation at Silver Falls has been hampered by historical tenement boundaries splitting the prospect with no consistent tenement holdings over the entire prospect.

Exploration at the Silver Falls prospect during the reporting period confirmed the stratigraphic similarities to that at the Rosebery Zn-Pb-Cu-Ag-Au orebody. Geological mapping also identified a favourable alteration horizon. Three anomalous zones were identified based on the Partial Leach results and geological mapping; these are the Silver Falls Alteration Zone, the Northern Anomaly Zone and the Southern Anomaly Zone. All of these zones are located within the potential host horizon. Pb Isotope analysis was undertaken on samples of galena from interpreted footwall mineralisation, and was found to be Cambrian in age with a homogeneous mineralisation signature similar to that for the Que River orebody.

## **2. INTRODUCTION**

This report documents work undertaken on Exploration Licence 23/2000 Silver Falls for the period November 2000 to November 2001.

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

The EL covers 43.75 km<sup>2</sup> and is located 10 - 15km north of Rosebery (Figure 1). The principal target of exploration on the licence is a volcanic hosted base metal massive sulphide, similar to mineralisation at the Rosebery and Hercules mines in Western Tasmania. Access to the tenement is via the formed gravel surface 'Boco Road' off the Murchison Hwy. The Silver Falls prospect is accessible from an existing cut vehicle access track which heads north / northwest off 'Boco Road'.

Work completed during the reporting period focussed on the Silver Falls prospect, and included gridding, geological mapping, partial leach soil sampling, rockchip sampling, petrology, Pb-isotope analysis and relogging of historical drill hole HRD-1.

### **2.1 Attribution**

The following personnel were responsible for the work carried out within the Silver Falls Exploration Licence area during the reporting period:

Geologist: Terry Briggs - Pasminco Exploration Rosebery

## **3. LAND TENURE**

The initial area of EL 23/2000 Silver Falls (Figure 1) was granted for a five-year term on 8<sup>th</sup> December 2000 to Pasminco Limited and covers an area of 43.75 km<sup>2</sup>. The adjacent EL 05/2001 (Pinnacles) was granted for a period of 5 years on the 14<sup>th</sup> May 2001, and was subsequently amalgamated with EL 23/2000 on that date.

The EL is subject to a number of land classifications. The current land tenure includes land vested in Forest Reserves in the North Western portion of the EL and upper North Eastern portion. The majority of the remaining area within the EL is State Forest. All land categories are available for mineral exploration.

## **4. REGIONAL GEOLOGY**

EL23/2000 is located in the Dundas Trough in western Tasmania. The prospective sequence for volcanic hosted base metal mineralisation forms part of the mid- to late-Cambrian Mt Read Volcanics (Figure 2).

Basement in western Tasmania is Precambrian in age, comprising predominantly

greenschist facies metasediments with minor basalts and dolerites, although higher grade amphibolite and eclogite facies rocks are also present (Burrett and Martin, 1989). Basement is exposed west of the EL in the Huskisson River valley.

Cambrian volcanism and sedimentation development on the margin and within the rift can be subdivided into the Eo-Cambrian tholeiitic Crimson Creek Formation (CCF) and the mid to late Cambrian Dundas Group and predominantly calc-alkaline Mt Read Volcanics (MRV).

The CCF was deposited in shallow but rapidly subsiding basins (Brown, 1986) and consists of basaltic lavas and volcanoclastics, haematite facies turbidites, carbonates, chert and minor evaporites. The formation is exposed in the south-west corner and to the west of the EL.

The oldest MRV outcropping in the Silver Falls EL is the Pinnacles Rhyolite which outcrops as the topographic Pinnacles Ridge. This unit, a possible lateral equivalent of the Que-Hellyer Volcanics represents the top of the host sequence to the Browns Tunnel mineralisation to the south of the licence (Kirsner, 1992). Overlying the Pinnacles Rhyolite is a volcano-sedimentary sequence, derived from a felsic volcanic source, that is a correlate of the Southwell Subgroup or White Spur Formation and which covers a large part of the EL.

A poorly understood but stratigraphically important transition to the Tyndall Group correlates is marked by a magnetic correlate to the “Lynchford Tuff” on the eastern limb of the Silver Falls Syncline (McNeill & Richardson, 1997). Owen Conglomerate equivalents occupy the core of the Silver Falls Syncline in the central part of the EL but much of this area has a partial cover of Pleistocene glacials which mask underlying geology.

A package of Dundas Group sediments which possibly post-date the MRV occur in the western sector of the EL in the footwall to the Rosebery Fault. These sediments include dolomitic siltstones, conglomerates and quartz muscovite sandstone lithologies which are correlated with the Stitt Quartzite at Rosebery.

At least two phases of regional compression were associated with the mid Devonian Tabberabberan Orogeny (Keele, 1991). The development of folding, cleavage and regional thrusts in lower Palaeozoic rocks were associated with this event. Fold trends in the licences are N to NNE. The Silver Falls syncline and the Pinnacles Anticline are large fold sets within the EL, with the Silver Falls syncline the dominant structure as the Pinnacles Anticline dies out to the north. The dominant regional fault structure in the EL is the Rosebery Fault, splays of which extend into the Silver Falls area, the Henty Fault is located to the east of the EL.

Deformation was followed by the extensive intrusion of Devonian to Carboniferous granitoids. The Meredith Granite and its hornfels aureole outcrop to the west of the EL (Brown, 1986). After substantial erosion of this terrane extensive Tertiary flood basalts and sub-volcanic sediments were deposited. Remnants of the basalt flows are preserved between the Ramsay and Coldstream Rivers northeast of the licence.

## 5. PREVIOUS EXPLORATION

The Silver Falls area has been the focus of intermittent exploration activity since the discovery of outcropping Pb-Ag mineralisation by Jack Lynch in 1890. Modern exploration commenced in the area in the 1960's and is summarised in Table 1. A review of historical work relating to the Pinnacles and other parts of the Tenement will be undertaken during the next reporting period.

Table 1. Previous Exploration conducted in the Silver Falls Prospect area

PERIOD	EL	COMPANY	WORK COMPLETED	REFERENCE
1890	-	-	Ag-Pb mineralisation discovered in Ross Creek by Jack Lynch, named Silver Falls	Belstead, 1892
1949	-	EZ	Diamond Drilling – PP61, PP62, PP63, PP73, with minimal assaying	EZ Drill Logs, 1949
1954	-	EZ	Progress Report on the North Pieman Mineral Field - Review	Taylor, 1954
1968 – 1972	EL5/63	Comstaff	Geological Mapping	Cornwall, 1968; Fitch, 1968
			Regional Stream Sediment Sampling	
1977 – 1984	EL12/72	EZ	4WD Access Track	Mill, 1978-80-81; Mollison, 1980; Sainty & McDonald, 1982; Sainty, 1984; Taylor, 1986
			Gridding	
			Geological Mapping	
			Soil Sampling (C-Horizon)	
			Stream Sediment Sampling	
			Dipole-Dipole IP	
			Costeaming & Rock Chip Sampling	

Table 1. Continued.

PERIOD	EL	COMPANY	WORK COMPLETED	REFERENCE
1976 – 1982	EL22/74	Aberfoyle / Billiton	Gridding	Freytag, 1976; Taylor, 1979; Smyth, 1982
			Geological Mapping	
			Soil Sampling (C-Horizon)	
			Stream Sediment Sampling	
			Dipole-Dipole IP	
			DIGEM II airborne EM / Resistivity / Mag	
1990 - 1995	EL2/90	Pasminco	Gridding	Kirsner, 1992; Poltock, 1993-94; Saxon, 1995
			Geological Mapping	
			Photogrammetry	
			Soil Sampling (B/C-Horizon)	
			Gravity & Helimag & Pole-Dipole IP	
			Magnetic Susceptibility of Rock Samples	
1990 - 1993	EL15/90	RGC	Geological Mapping	Halley, 1991-92
			Aeromagnetic Interpretation (Gov.)	
1993 - 1998	EL1/93	Pasminco	Geological Mapping	Poltock & Saxon, 1994; Saxon & Basford, 1995; Basford, 1996; Hollamby, 1998
			Soil Sampling (B/C-Horizon)	
			Diamond Drilling - HRD1 (295.7m)	
			Metallogenic Modelling	
1996 - 1998	EL24/95	Aberfoyle	Geological Mapping	McNeill & Richardson, 1997; Richardson, 1998
			Soil Sampling	
			Lead Isotope Analysis	

## 6. WORK COMPLETED 2000-2001 REPORTING PERIOD

Work completed in the reporting period focussed on the Silver Falls Prospect in the NW corner of the EL, and comprised gridding, geological mapping, partial leach soil sampling, rockchip sampling, petrology, Pb-isotope analysis and relogging of historical drill hole HRD-1.

### 6.1 Gridding

10.3 line kilometres of grid were cut at the Silver Falls Prospect to give 11 E-W gridlines spaced 200m apart (north – south). Access was provided by a vehicle access track cleared by previous explorers. Cobbings Contracting undertook track cutting of the grid in accordance with exploration Code of Practice guidelines. The coordinates of the grid are shown in Table 2. A 200m access track was required to be cut between gridlines 9 and 10.

Table 2. Planned grid coordinates for Soil Sampling at Silver Falls

LINE	START_EAST	FINISH_EAST	NORTHING	LENGTH (m)
0	376850	377700	5390450	850
1	376800	377650	5390250	850
2	376700	377600	5390050	900
3	376650	377550	5389850	900
4	376600	377550	5389650	950
5	376600	377500	5389450	900
6	376600	377450	5389250	850
7	376550	377400	5389050	850
8	376500	377400	5388850	900
9	376400	377500	5388650	1100
10	376300	377550	5388450	1250

### 6.2 Geological Mapping

Geological mapping gridlines, creeks and the 4WD access track in the vicinity of the Silver Falls prospect was undertaken between January – March 2001 to produce factual and interpretive geological maps at a scale of 1:2500. Outcrop was usually confined to

exposures along the access track, creek beds and steep valley terrain. Outcrop was best represented in the central section of the mapped area, and poorest to the north and extreme central south. Limited additional information was available from drilling, with only one deep diamond drillhole in the area (HRD1 – Section 6.9), and four shallow holes drilled by EZ in 1949 along the Rosebery Fault. Aeromagnetic coverage, historical C-Horizon soil coverage and the current Partial Leach survey were used to assist interpretation of the geology.

### **6.3 Geological Interpretation**

The Silver Falls area is dominated by volcanoclastic and sedimentary sequences of inferred Cambrian Age (Corbett & McNeill, 1986). Eight stratigraphic units were identified by the current mapping, which have possible correlates at a regional scale, these units are described in Table 3 interpreted youngest to oldest units in the sequence.

Two main styles of mesoscopic scale hydrothermal alteration were identified in the mapped area: In the south, near the intersection of the north trending Rosebery Fault and the northeast trending South Fault, is a large zone of silica alteration. This affects most lithologies in the area, and ranges from silicified siltstones to quartz altered volcanoclastics. This latter alteration feature, referred to as “quartz flooding” give the rock the appearance of a granitic intrusion. Quartz flooding forms fine grained granular patches interstitial to larger albite and quartz grains. This alteration is empirically related to the Rosebery Fault zone, and the large extent into the hanging wall, and relatively narrow extent along strike, may be related to fracturing caused by the secondary South Fault which intersects the Rosebery Fault in this area.

Rocks of the CVC equivalents and the transitional sequence in the vicinity of the Silver Falls on Ross Creek and extending to the south and north over a distance of a few 100 metres is a zone of sericite-silica-sulphide alteration. This alteration is also present in two other mapped localities to the north and south. The rocks in the localities of this mapped alteration have undergone strong pervasive hydrothermal alteration, with development of replacement assemblages of carbonate (e.g. ferroan dolomite), quartz, albite and sericite with minor galena and traces of rutile, pyrite and sphalerite. The rocks are sometimes cut by irregular to sub-planar veins which have developed a stockwork texture ranging in size from a few millimetres to centimetres wide, containing carbonate, quartz or sericite, with occasional traces of galena. Most of the known mineralisation at the Silver Falls prospect is hosted within this alteration zone.

The dominant structural features of the mapped area are the Silver Falls Syncline, and the Rosebery Fault. The Silver Falls prospect is bound to the west by the Rosebery Fault and is located on the western limb of the Silver Falls syncline with sediments younging to the east. The closure of the fold is observed in the south eastern section of the mapped area, with the eastern limb inferred from regional mapping (Corbett & McNeill, 1986).

Table 3. Stratigraphic Units – Silver Falls Area.

	<b>UNIT</b>	<b>DESCRIPTION</b>
<b>YOUNGEST</b>	STITT QUARTZITE:	Quartz muscovite sandstone, dolomitic siltstone, quartzite. Meta sediment and felsic volcanic provenance. This unit has undergone significant soft sediment deformation in places, especially between siltstone / sandstone units. Located west of the Rosebery Fault. Intense veining and fracturing proximal to the Rosebery Fault.
	TYNDALL GROUP – UPPER (local):	Brown - grey siltstone and quartz-muscovite sandstone.
	TYNDALL GROUP – LOWER (regional):	Volcaniclastic sandstone – Lynchford Tuff equivalents? Mafic – intermediate volcanic provenance with lithics also present. Contains detrital magnetite.
	FELSIC PORPHYRY:	Felsic quartz porphyry, intrusive.
	WHITE SPUR FORMATION:	Grey – dark grey siltstones with graded lithic rich conglomerate–sandstone–siltstone cycles. Base of unit is quartz-feldspar phytic, grading to dominantly quartz phytic. Contains zones of small scale folding, possibly localised around faults.
	BLACK SHALE:	Grey – black siltstone / shale unit.
	TRANSITIONAL VOLCANIC SEQUENCE:	Comprised of a quartz–feldspar phytic, crystal rich coarse-grained sandstone and pumiceous sandstone, with some porphyritic felsic volcanics and crystal-lithic tuffs. This rock has undergone strong hydrothermal alteration in zones, with development of a replacement assemblage of carbonate (ferroan dolomite), quartz, albite and sericite, with minor galena and traces of rutile, pyrite and sphalerite.
<b>OLDEST</b>	CENTRAL VOLCANIC COMPLEX:	Felsic derived, with abundant altered former pumiceous fragments that have become a feldspar phytic pumice breccia in zones. This unit has also undergone strong hydrothermal alteration in zones, with development of fine-grained quartz with subordinate albite, sericite and carbonate (e.g. ankerite), and traces of pyrite, galena and graphite. A stockwork of quartz ± carbonate veins pervades in

The Rosebery Fault is a north - south striking, which was observed in outcrops in the creek bed in the southwest of the mapped area. The fault was usually represented by the change in stratigraphy from Stitt Quartzite to CVC / White Spur rocks, with the actual contact best observed slightly west of the Falls in the Ross Creek and nearby tributaries, where it displayed a moderate easterly dip, and was often brecciated along the contact. A major NE-SW trending structure is apparent in the south of the mapped area and has been called the South Fault. This fault is best expressed by the change in strike of bedding and steepness of bedding dips over a small section of the map. There is also a disruption in the area to the aeromagnetic data which is inferred to be tracing bedding (Tyndall Group base), as well as a sudden truncation in the Pb-Partial Leach geochemistry which maps out the Transitional sequence. This fault is seen to be quite late, as it appears to truncate the CVC / Transitional Sequence of rocks up against the Rosebery Fault, forming the southern boundary of these units. The strike trend of these units is slightly oblique to the Rosebery Fault, which forms the northern terminus of these units.

There are three important observations that can be made from the mapping at Silver Falls and how it fits into a regional context. These include:

- The presence of Central Volcanic Complex equivalents
- The stratigraphic thickness of the White Spur Formation equivalents
- The presence of Tyndall Group equivalents

Three possible interpretations are shown in Figure 3 of how such a thin sliver of CVC equivalents could be present at the Silver Falls prospect. The first interpretation is that it is a natural contact as seen to the south between a feldspar phyric sequence and a quartz phyric sequence, which is truncated by the Rosebery Fault, and would once have been part of a much larger sequence of rocks, that has since been truncated and moved via folding and faulting. The second possibility is that the thin wedge of CVC is in fact fault bounded and has been emplaced between the Stitt Quartzite and White Spur Formation. A third possibility is that the rocks are not in fact CVC rocks, but are an altered section of the White Spur Formation caused by the Rosebery Fault. Mapping has shown that the unit has a distinct geochemical and geological characteristic that is quite distinctive from the overlying Transitional Sequence and White Spur Formation. This unit forms the hanging wall to the Rosebery Fault, and is possibly altered by fluids moving up the fault. It is inferred that this sequence is indeed CVC, and the local setting is more akin to possibility 1, a natural contact with the TS & WSF, with no noticeable large scale faults observed between these units.

The White Spur Formation in this locality has been mapped at between 300 – 800 metres thick. The regional thickness of the White Spur Formation or equivalents in the Southwell subgroup are poorly constrained. The thickness of this unit in the Hellyer area underneath the Tyndall Group is inferred to be up 1500 metres, yet at Rosebery and Hercules the unit is faulted out (pers. comm. A.McNeill, Pasminco). The Pinnacles Rhyolite to the east may have had an impact on the thickness of this unit locally as there appears to be a significantly thinner sequence on the western limb of

the Silver Falls syncline compared to the eastern limb (inferred from regional maps). If the Pinnacles Rhyolite was a topographic high in the Cambrian then sedimentation may have thinned to the west, and have since have been folded into the current situation.

The White Spur Formation at Silver Falls is bound on its upper margins by a series of rocks which appear to belong to the Tyndall Group. The exact nature of this contact is poorly confined, but appears to be conformable where inferred in the field, and possibly erosional from the variable thickness of the underlying White Spur Formation. These rocks display very similar textures to Tyndall Group rocks in other localities in the Mount Read Volcanics in that they are variably magnetic volcanoclastics comprised in part of mafic material, are extremely hard and where labelled as Tyndall Group Lower, outcrop as kernels, a characteristic of the Lynchford Tuff. Field checking with Greg Ebsworth (CODES, PhD student studying the Tyndall Group correlates in Western / Northern Tasmania) confirmed the observations made on this unit. The presence of Tyndall Group equivalents in the area was first recognised by Aberfoyle on EL24/95 (McNeill & Ricardson, 1997) in the area around the confluence of the Bulgobac and Que Rivers as a crystal-rich sandstone unit in the basal part of the Tyndall Group. This unit was found to be anomalous for Pb - Zn in rock chips, and in reconnaissance total and partial digest soil sampling. This unit in the Silver Falls area was of interest to Aberfoyle where it trends towards the NW in the upper northeastern corner of the mapped area. This area is not considered as highly prospective for potential large scale VHMS target and is seen purely as an anomalous stratigraphy.

The important points that can be made about the mapping campaign and interpretation at Silver Falls are summarised as follows:

1. The presence of the “Holy Host” is inferred as the Transitional Sequence, and has sufficient strike and thickness to host a VHMS deposit.
2. There is a transition from a feldspar-phyric to a quartz-phyric sequence.
3. The CVC in the footwall to the “Holy Host” shows a characteristic alteration assemblage of Sericite – Quartz – Carbonate – Sulphide.
4. Previous exploration may not have tested the best part of this alteration zone at depth.

#### **6.4 Partial Leach Soil Sampling**

Pasminco completed B-Horizon soil sampling during the reporting period at the Silver Falls Prospect for analysis by Partial Leach methods. Sampling was undertaken at 25m intervals pegged out from tape & compass whilst grid cutting. Coordinates of selected sample locations (with emphasis on the end of lines) were collected by differential GPS with infill coordinates extrapolated from these readings using Microsoft Excel. A total of 447 samples were submitted from the program, including; 424 soil samples; 14 field duplicates and 9 standards. Samples were analysed by Partial Leach Extraction at Analabs using method IC8/42, with later reanalysis by IC8/43 for samples with a post digest pH<8 (see McNeill & Simpson, 2001 for discussion).

The following elements were analysed: Cu, Pb, Zn, Ba, Ag, As, Au, Co, Ni, Bi, Mo, Y, Zr, La, Ce, Sm, Eu, Cd, Gd.

## 6.5 Partial Leach Soil Sampling – Quality Control

Quality Control procedures have been implemented when submitting samples for analysis by analytical techniques such as Partial Leach. For each batch of 100 samples randomised sample numbers are used, as well as the collection of 3 field duplicates and the submission of two different (known) control standards.

The results of duplicates and standards submitted for the Silver Falls Partial Leach survey are included in Appendix 2 along with the original sampling results. It can be seen that the duplicates closely matched the original values, with only occasional spuriously different results for Arsenic and Cobalt. One Lead sample did vary from 119.2ppm to 217.9ppm (349952 / 349958), this set of duplicate samples was within the expected ranges for other elements.

Two different standards are submitted with partial leach batches. A total of 10 standards were submitted for the Silver Falls soil sampling grid. Appendix 2 lists the expected and actual ( $\pm 2SD$ ) results for each element. Overall, comparison of the expected and actual results for the standards is within the expected tolerance. The exceptions to this are Zinc for standard PXTAS1A, with expected range of 19.38–24.77, and an actual range from 31.7–35.9. For standard PXTAS2, Molybdenum was the only element with a large number of values greater the expected range of 0.076–0.171 with an actual range of 0.076–0.292.

A comparison of the standards by SDS shows that for standard PXTAS1A, results were very close between the four submitted samples. For standard PXTAS2 however, variance was observable for most elements (As, Ba, Cd, Co, La, Ni, Pb, Sm, Zn, Zr) between SDS3895 (2 samples) and SDS3897 (3 samples), with the former usually closer to or below the expected value minus two standard deviations, and the later usually closer to the expected value plus two standard deviations, representing a difference in the base value between the two SDS, but both within the expected range.

There appears to be potential contamination / line errors for the precious metals Silver and Gold. Figure 17 shows the results from the sampling coloured using the response from the 90<sup>th</sup> percentile of results. It can be seen that both samples have line problems with consecutive samples along a cut line all showing an anomalous response. This problem was confined to gold and silver.

When analysis is undertaken by partial leach methods, the laboratory records a post digest pH. The effectiveness of the leach is dependent on a number of factors, and when the pH of the sample is below pH 8 for method IC8/42 sometimes spurious results can be obtained. For samples with a pH < 8, they are reanalysed by method IC8/43 where the solution is buffered for samples as low as initial pH 6 to be above pH 8. For the Silver Falls Sampling, a total of 27 samples had a pH < 8, representing approximately 6% of the samples submitted. These samples were resubmitted for

analysis by method IC8/43, with two additional zones containing 5 samples which had acceptable post-digest pH  $\geq 8$ , amongst 8 consecutive samples (i.e. 3 with a pH  $< 8$ ; Figure 4). This was done to compare that the initial elemental values of the samples with acceptable pH values were not significantly changed when analysed by method IC8/43. The mean pH value of samples with pH  $< 8$  was 7.177 for the Silver Falls grid (method IC8/42), this changed to 8.285 when analysed by method IC8/43, which is within acceptable limits.

Table 4. Statistical comparison of IC8/42 & IC8/43 Results

ELEMENT	METHOD	MEAN	MEDIAN	STD DEV	RANGE	VARIANCE
Ag	IC8/42	0.0097	0.0076	0.0089	0.0401	0.0001
Ag	IC8/43	0.0235	0.0200	0.0161	0.0811	0.0003
As	IC8/42	0.3351	0.2770	0.2571	1.2790	0.0661
As	IC8/43	0.2731	0.2480	0.1612	0.7300	0.0260
Au	IC8/42	0.0005	0.0001	0.0012	0.0048	0.0000
Au	IC8/43	0.0005	0.0004	0.0005	0.0021	0.0000
Bi	IC8/42	0.0027	0.0022	0.0019	0.0074	0.0000
Bi	IC8/43	0.0022	0.0020	0.0015	0.0060	0.0000
Cd	IC8/42	0.0867	0.0780	0.0558	0.2540	0.0031
Cd	IC8/43	0.0893	0.0790	0.0493	0.2440	0.0024
Cu	IC8/42	2.6386	2.2400	1.5409	5.5870	2.3742
Cu	IC8/43	3.0285	3.1200	0.8655	4.3200	0.7492
Pb	IC8/42	11.7059	9.3800	9.2658	50.9700	85.8551
Pb	IC8/43	13.0496	12.0000	7.5056	36.0500	56.3342
Zn	IC8/42	15.0833	12.4000	11.9175	54.4100	142.0270
Zn	IC8/43	5.7441	4.9900	3.2663	13.6900	10.6689

(Total Count = 27; Initial low pH [IC8/42] samples only)

Two zones were selected (Figure 4) for comparison of results of samples with initial low and acceptable pH values, these were located in the eastern section of the grid on lines 8650N / 90050N. They were chosen, as they both had 3 closely spaced samples with pH  $< 8$ , and were surrounded by samples with pH  $\geq 8$ . A total of 8 consecutive samples were resubmitted for analysis by method IC8/43, and a comparison of the

results of this method with the original IC8/42 method was undertaken. Figure 5 shows the buffering effect of IC8/43, with all samples showing a pH > 8, with the change largely affecting the samples with low pH's only. It is the effect which this had on the elements which was of most interest, and could we include the reanalysed samples for comparison with the original IC8/42 analysis, and discard the results from the initial analysis for samples with pH <8 and replace them with the reanalysed results from method IC8/43. Table 4 shows effect on the low pH samples only, on the statistical change of the values when comparison is made between the two methods, it is anticipated that the results from IC8/43 will more correctly represent the true value, and provide a level comparison with other samples from IC8/42 which initially showed the correct pH >8.

The overall effect of reanalysing the samples by method IC8/43 was to reduce the spurious zinc anomalies in regions that were not expected to be enriched in zinc (such as the NW corner in the Stitt Quartzite). The reanalysis did however, enhance the response from most elements, with large changes in the values for Lead, Copper and Silver with only minor changes in the other elements. The variance for each element (except Silver) went down when compared to the initial results from IC8/42.

Two case studies were undertaken to compare IC8/42 with IC8/43 on lines 8650N & 90050N (Figure 4). The results from 8650N (Figure 6), analysing the major elements of Cu-Pb-Zn, showed that the general form of the response (line profiles) remained unchanged, with adjustment of the initially low pH (<8) responses only. This is the ideal situation, and increases the confidence that the initially low pH (<8) reanalysed results can be compared to with the initial results from IC8/42 (samples with pH  $\geq$  8). The results from the 90050N profile (Figure 7) showed a similar response to those commented on for 8650N with the general form of the curve unchanged. The response of the elements in this case was not consistently enhanced or reduced, showing that generalisations can not be applied to every case.

## **6.6 Partial Leach Interpretation**

The location of the Silver Falls partial leach survey (Figure 8) was undertaken to cover a zone which has been the focus of previous exploration and is potentially sterilised for large tonnage base metal mineralisation to 150 metres below surface due to C-Horizon conventional soil sampling, IP surveys and surface geological mapping by previous explorers. The area contains a known alteration and mineralised sequence of rocks, and is located in a favourable sequence of rocks within a Rosebery mineralisation setting. It was decided to undertake a soil sampling program using Partial Leach methods, with the aim of detecting potential mineralisation to depths greater than 150m depth. The survey roughly runs north – south along what was the inferred location of the Rosebery Fault, which would represent absolute footwall to any potential mineralisation, and is centred on the known historical workings on the Ross Creek (Figure 9). The vegetation in the area is mixed forest and rainforest, with numerous creeks cutting the grid (Figure 9).

Geological mapping was undertaken on the cut lines used for soil sampling, and the final interpretive geological map, utilised some of the information provided by the results of the soil sampling. It was found that where the host sequence and footwall rocks were exposed at surface, there was an anomalous expression in the Zinc and Lead values (Figure 10). This situation is expected, as any potential mineralisation in the host rocks or Rosebery Fault will be brought to the surface in this zone most readily. The Tyndall Group equivalents were mapped out moderately well by Barium, Nickel and Bismuth (Figure 11). This could be a response to the ultramafic clasts in the volcanoclastic rocks which comprise this sequence of rocks.

Figures 15-18 show 90<sup>th</sup> percentile maps of the geochemistry at Silver Falls for Zn-Pb-Cu-Cd-Au-Ag-As-Bi. Figures 19-25 show line profiles of Zn-Pb-Cu-Ag-As-Bi between 8850N and 90050N.

Three anomalous zones were identified based on the Partial Leach results and geological mapping. These are the Silver Falls Alteration Zone (centred on Local North 9450N), the Northern Anomaly Zone (between Local North 9650-9850N) and the Southern Anomaly Zone (centred on Local North 9050N). All of these zones are located within the potential host horizon (TS) with anomalism extending into the footwall or hanging wall surface geological expression.

The Silver Falls Alteration Zone (Figure 12 & 22) is represented by Zn-Pb-Cd-Bi anomalism (95<sup>th</sup> percentile) with moderate alteration for Cu-Ag-As. This zone of anomalism closely coincides with the mapped Silica-Sericite-Sulphide Silver Falls Alteration Zone, which contains the historical workings at the Silver Falls on Ross Creek. This zone has not been drill tested, and the moderate dip of the stratigraphy to the east, and the overlapping of anomalism into the Hanging Wall rocks gives considerable depth potential for a target at this location of multi-element and surface anomalism. This is the highest ranked anomaly on the Silver Falls PL grid.

The Northern Anomaly Zone (Figure 13) is not as anomalous for all elements (with Zinc notably non-anomalous), however it is tightly constrained by Pb-Cu-As-Ag-Bi, and is coincident with a conventional C-Horizon Zn-Pb-Cu anomalism, and may represent near surface low level mineralisation. This anomaly is ranked second on the Silver Falls grid

The Southern Anomaly Zone is a small low order anomaly that is best present as a zone of mild Zn-Cu-Cd-Ag-Bi±Pb. This anomaly is an order of magnitude lower than the Silver Falls Alteration Zone, and is ranked third on the Silver Falls grid.

There are other zones of anomalism present in the Silver Falls grid, yet are located much higher in the sequence and would require a review of the model of mineralisation being targeted (currently Rosebery position). These other zones of anomalism often do not contain multi-element anomalism or any surface alteration expression.

## 6.7 Rock Chip Sampling

Four rock chip samples were submitted to Analabs for chemical analysis, see appendix 3 for results and information on the sample descriptions and locations. These samples complement samples which were petrographically described, or submitted for Pb Isotope analysis. The best results were obtained from mineralised samples of the altered footwall pumiceous breccias, including 4.65%Pb + 0.17%Zn + 0.17%Ba + 26.9ppmAg (337026) and 4.20%Pb + 0.08%Zn + 0.01%Cu (337027).

## 6.8 Petrographic Report

Five samples were submitted to Associate Professor Paul Ashley (University of New England – Earth Sciences Department) for petrographic description. The aim of this work was to determine:

1. The nature of the interpreted footwall rock type and mineralisation / alteration, and is this material a possible equivalent of the Central Volcanic Complex (i.e. feldspar phytic). Samples were collected from rockchip sampling and drill core (HRD-1). Samples 337027 & 337028.
2. The nature of the interpreted host sequence lithology and mineralisation / alteration style. Samples were collected from rockchip sampling and drill core (HRD-1). Samples 337025 & 337030.
3. The nature of a quartz / silica altered rock located near the Rosebery Fault zone as a possible granitic intrusion or an altered volcanoclastic. Sample collected from rockchip sampling. Sample 337029.

It was found that each of the samples represented either porphyritic felsic volcanic rock or rock derived from pyroclastic or epiclastic material. The original volcanic material is interpreted to have been dacitic to rhyolitic in composition expected from samples of the Mount Read Volcanics. All samples in the suite have experienced hydrothermal alteration and considerable mineralogical reconstitution. Relict textures are variably preserved and it is common to find relict quartz. Feldspars are locally preserved, but have undergone significant alteration. The alteration effects are mostly pervasive and have most strongly affected finer groundmass material and former pumiceous fragments. However, several samples also show evidence of fracturing and subsequent veining. Evidence of sulphide mineralisation (galena-pyrite-sphalerite) is restricted to samples 337025 and 337027. The amount of quartz in the samples interpreted to be CVC equivalents was found to be high, but includes not only original phenocrystal quartz and groundmass quartz, but largely comprises fine grained quartz formed during hydrothermal alteration.

The results from the petrological analysis are described in detail in Appendix 3.

## 6.9 Pb Isotope Analysis

During the reporting period, two samples of mineralised rocks from the Silver Falls area were submitted to Sirotope for Pb-Isotope determination. Table 5 shows details of the results. They were shown to have Cambrian initial ratios and have the same Pb isotopic composition (i.e., within analytical fractionation).

The results plot between the Que River and Rosebery ellipses. The samples indicate a homogeneous signature that was more likely to be associated with the Que River event rather than Rosebery. These results are also consistent with those obtained by Aberfoyle (McNeill & Richardson, 1997) in 1996 from samples taken in the Silver Falls area.

Table 5. Pb Isotope Analysis – Silver Falls

Sample No.	$^{206}\text{Pb}/^{204}\text{Pb}$	$^{207}\text{Pb}/^{204}\text{Pb}$	$^{208}\text{Pb}/^{204}\text{Pb}$	Easting	Northing
337025	18.274	15.583	38.067	376985	5389180
337026	18.299	15.612	38.147	376750	5389450

- 337025 – HRD-1 Drill Core (200.70 – 200.95m): Un-weathered, altered coarse-grained qtz-fsp sandstone with galena-quartz-carbonate veining. Interpreted Host Horizon
- 337026 – ROCKCHIP: Partially weathered, feldspar-phyric pumiceous breccia, sericite – galena alteration / mineralisation. Interpreted Footwall Mineralisation (CVC).

## 6.10 Diamond drill hole HRD-1

Pasminco Exploration drilled diamond drill hole HRD-1 in 1994 on historical EL 1/93 Huskisson River. The hole was drilled to test a coincident Pb-Zn C-Horizon geochemical anomaly associated with altered felsic volcanics 150 metres south of the Silver Falls historical workings. Its location also appears to have been strongly influenced by the vehicle access track. Re-logging of this drill hole was undertaken to gain a better understanding of the stratigraphy and possible style of alteration / mineralisation in the Silver Falls area. The drill core is currently housed at the MRT core yard in Hobart.

The reinterpreted downhole sequence of rocks shows cyclical conglomerate – sandstone – siltstone – shale sequences that correlate with the basal White Spur Formation. This unit overlies a transitional sequence of quartz – feldspar phyric coarse grained sandstones & conglomerates. Below this unit is a sequence of pumiceous volcanics interpreted to be CVC equivalents. The Rosebery Fault truncates this unit, with Stitt Quartzite equivalents in the footwall to the fault. A summary of the slightly modified interpretation of the HRD-1 sequence intersected is as follows, with the interpreted “Host” horizon being the Transitional Sequence:

- 0 – 195.4m            White Spur Formation (≡HW)
- 195.4 – 218.8            Transitional Sequence (≡HOST)
- 218.8 – 256.9            Central Volcanic Complex (≡FW)
- 256.9 – 260.57    Rosebery Fault Zone
- 260.57 – 295.7    Stitt Quartzite

Mineralisation intersected in HRD-1 includes disseminated and veinlet style galena > sphalerite with a carbonate - quartz gangue (Poltock & Saxon, 1994). The best intervals include 2m @ 0.19%Pb + 0.70%Zn (178-180m) within the Hanging Wall Shale, and 6m @ 1.12%Pb (213-219m) within the interpreted Host Transitional Sequence. The style of mineralisation and the associated alteration is similar to that exposed in the Silver Falls workings.

It was initially inferred that mineralisation at Silver Falls was Devonian in age and hosted in all lithologies above the Rosebery Fault (Poltock & Saxon, 1994). These two assumptions proved to be incorrect, with a Cambrian Pb-Isotope signature (section 6.9) and mineralisation confined to brecciation zones near the Rosebery Fault, the CVC (“footwall”) – Transitional (“host”) sequence and the basal shale of the White Spur Formation equivalents. The White Spur Formation equivalents are barren of mineralisation. This drill hole was enormously beneficial as a stratigraphic hole, and confirmed the sequence of rocks seen outcropping at surface as being in a similar stratigraphic setting to that which hosts the polymetallic Rosebery orebody to the south.

## **7. CONCLUSIONS AND RECOMMENDATIONS**

The work completed in the first year of tenure of the Silver Falls EL23/2000 has delineated a sequence of altered rocks with an associated partial leach anomaly, and Cambrian age mineralisation that has not been tested at depth by drilling.

The presence of a potentially conductive shale package would discourage any prospect scale EM being conducted. We therefore propose to drill 2 x 300m diamond drill holes to test the Transitional Sequence below the Silver Falls Alteration Zone. These holes and drill hole HRD1 should then be tested with downhole EM.

Further follow-up mapping to the south of the Silver Falls grid should be undertaken to determine what happens to the host sequence. Mapping at the south of the grid shows that the unit is faulted out against the Rosebery Fault by the South Fault, it is not known if another fault or the Silver Falls syncline expose this unit to the south. This would require track cutting, as access is difficult.

An assessment of previous work for the remaining areas within the tenement should also be completed during the next reporting period.

## 8. EXPENDITURE

The total expenditure for all work undertaken by Pasmaenco Exploration within Silver Falls EL 23/00 for the twelve month period to the end of November 2001 was \$92569.33. A detailed expenditure statement is given below.

Personnel	52302.00
Travel and Accommodation	687.58
Geological Consultants	1318.88
Geochemical Consultants & Assays	10494.46
Geophysical Surveys & Contractors	0.00
Other Contractors	12043.13
Drilling Contractors	0.00
Stores & Supplies	1554.70
Vehicles Plant & Equipment	3489.03
Land	0.00
Computing	830.21
Office	1433.95
Administration Fee 10%	8415.39
<b>Total Tenement Expenditure</b>	<b>92569.33</b>

## 9. KEYWORDS AND LOCALITY

SILVER FALLS, PINNACLES, GEOLOGY, MT READ VOLCANICS, WHITE SPUR FORMATION, TYNDALL GROUP, STITT QUARTZITE, CVC, VHMS, ROSEBERY FAULT, SOIL GEOCHEMISTRY, PARTIAL LEACH, Pb ISOTOPE, GALENA, SPHALERITE, SERICITE, PETROLOGY, DRILLING.

PARSONS & RAMSAY 1:25000

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