



**QUEENSBERRY (HENTY RIVER) EL 11/2001**

**ANNUAL REPORT  
FOR THE PERIOD ENDING 3<sup>rd</sup> JULY 2005**

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## **1. SUMMARY**

This report details exploration work undertaken on EL 11/2001 Queensberry (Henty River) during the period 3<sup>rd</sup> July 2004 to 3<sup>rd</sup> July 2005, the fourth year of the tenement. During the year work focussed on gridding (3.35 line km), surveying the grid with GPS and partial leach soil sampling (142 samples, including standards and duplicates, collected and submitted for analysis).

This work has focused on the area around Melody Creek where volcanics, including probable Lynchford Tuff correlates, are associated with spikily anomalous soil geochemistry. Further work is recommended.

## **2. INTRODUCTION**

This report details exploration work undertaken on Queensberry (Henty River) EL 11/2001 during the period 3 July 2004 to 3 July 2005, the fourth year of this tenement.

Zinifex's main target on EL 11/2001 is Cambrian Rosebery or Hellyer type, Zn-Pb-Cu-Au-rich VHMS mineralisation hosted by the Mount Read Volcanics (MRV). A secondary target is Pb-Zn Devonian vein style mineralisation of the type found at the Queensberry Mine. The tenement covers a fault-bounded outlier of Cambrian volcanoclastics and sediments that have been correlated with the Tyndall Group (see Section 4 below).

Zinifex plan to systematically explore the EL using a combination of geological mapping and partial leach soil geochemistry, followed-up by ground time-domain EM over areas of interest.

The only access to the tenement is via the Henty Road (B27), linking Zeehan and Strahan, then east and south via the ~9 km long Queensberry Track, which finishes at the Queensberry Mine in the centre of the tenement. Otherwise, the tenement is heavily forested, rugged and difficult to access with no useable exploration grids.

### **2.1 Attribution**

The following personnel were responsible for the work carried out by Zinifex Rosebery Mine on the EL 11/2001 Queensberry licence area during the reporting period:

Senior Geologist:                      Andrew McNeill – Zinifex Rosebery Mine

### 3. LAND TENURE

EL 11/2001 Queensberry (10 sq km) was granted to Pasminco on 3 August 2001 for a period of 5 years. The location of the tenement is shown on Figure 1. EL 11/2001 covers ground that fell vacant on the relinquishment of EL 34/88 (Rio Tinto Exploration) in December 1998. On 5<sup>th</sup> April 2004, a refloat of some assets, including the Rosebery Mine and exploration licences, of the failed Pasminco was completed and the assets are now owned by of Zinifex Australia Limited.

EL 7/2001 falls entirely within the Mt Dundas Regional Reserve all of which is available for exploration under the Mineral Resources Development Act 1995.

### 4. GEOLOGY

The regional geology of the tenement area is described by the Strahan 1:50,000 Geological Survey sheet and explanatory notes (Baillie et al., 1977 and 1985). Recent regional correlations are shown on Brown et al. (1995) and Corbett (2002) and are discussed in Selley and Meffre (1997).

The geology of EL 11/2001 Queensberry is dominated by a major regional fault system, the Firewood Siding Fault (FSF). The FSF extends some 35 km from Queenstown to near Trial Harbour on the west coast, has a general E-W to NNW trend and is offset by several NW to NNE faults, including the South Henty Fault. Stratigraphic and structural relationships indicate the FSF has had a prolonged history, with evidence of movements:

- Later than Jurassic, juxtaposing Permian sediments and Jurassic dolerite against Ordovician to Devonian sediments to the west of EL 11/2001 (Blissett and Guilline, 1962).
- In the Devonian, as indicated by the development of F<sub>3</sub> structures adjacent to the FSF. Devonian movement on the FSF appears to be sinistral (Baillie and Williams, 1975; Selley and Meffre, 1997)
- In the Late Cambrian, based on thickness variations in Denison Group correlates to the north of the fault (Baillie, et al., 1985) and the effect of the fault on interpreted Cambrian folds (Selley and Meffre, 1997). Selley and Meffre (ibid) conclude that there is no structural or stratigraphic evidence that the FSF was active in the Middle Cambrian i.e., time of VHMS formation. However, the localisation near Pearl Creek to the east of EL 11/2001, of “Middle Cambrian mafic volcanic units along the present trace of the FSF may provide evidence of an ancient syn-magmatic fracture system” (Selley and Meffre, 1997).

The geology of EL 11/2001 can be subdivided into 3 lithological domains:

1. Correlates of the Devonian Bell Shale, interbedded quartz sandstone and mudstones south of the FSF.
2. A ~2.7 sq km fault bounded block of Mount Read Volcanic (Tyndall Group) correlates in the Firewood Siding Fault system. Additional areas of Tyndall Group

correlates have been interpreted along the FSF immediately east and west of EL 11/2001 by Corbett (2002).

3. A marine sedimentary sequence north of the FSF, with fossils of Upper Cambrian age that is correlated with the Denison Group.

Of these three, domain 2 is considered VHMS prospective. Lithologies from domain 2 have been described in some detail by Baillie et al (1985) and include siltstone, slate, lithicwacke (with a minor volcanogenic component) and volcanoclastics. The volcanoclastics are feldspar-quartz-phyric crystal-rich sandstones, shard-rich ashy siltstones and lesser coarse sandstones, with a volcanolithic component. Poor outcrop and complex structure have prevented the location or tracing of any marker horizons (Baillie et al., 1985).

Known economic mineralisation on the tenement area is restricted to the Queensberry Mine, discovered in 1891 and worked prior to 1924, producing approximately 767t of Pb-Ag ore. More recently drilling (8 shallow holes) and surface sampling (Lennox, 1970) allowed the calculation of an 'inferred resource' of 28,300t @ 0.32% Cu, 11.53% Pb, 8.76% Zn and 52 g/t Ag (Green in Baillie et al., 1985). Only two Au assays of the ore are available and are in the range 0.2-0.3 g/t Au (Mathison, 1988). The geology of the Queensberry mine has been described in detail by Reid (1927), Forsythe (1968a), Lennox (1970) and Green (in Baillie et al., 1985). The deposit comprises 4 lodes (a fifth was known during initial mining but, has not been relocated in recent times) most of which have a northerly strike and west dip. Mineralogically the lodes comprise pyrite, arsenopyrite, sphalerite, chalcopyrite, galena, tetrahedrite and bournonite in a quartz-siderite gangue. Green (in Baillie et al., 1985) considered the mineralogy, coarse grain size, textures and paragenetic sequence of minerals was very similar to that of the Zeehan mineral field and concluded that the Queensberry Mine was a Devonian fissure fill deposit.

## 5. PREVIOUS EXPLORATION

The area of EL 11/2001 Queensberry has a long and complex tenement history with modern exploration commencing in the 1960s (see Table 1). Previous exploration by Pasmenco/Zinifex on El 11/2001 is summarised in Table 2.

**Table 1 Previous exploration on the area of EL 11/2001 Queensberry**

Reporting Period/Tenement	Work Completed
1968 ML 11/12M66 SPL 25 (Forsythe, 1968a,b)	Queensberry Mine: 7 km of line cutting, mapping, rock-chip, soil and stream sediment sampling was completed. An intense Pb-Zn anomaly west of lodes creek was the main target worthy of follow-up. Regional: establishment of access tracks, reconnaissance mapping, rock-chip and stream sediment sampling. Further work recommended.
1970 ML 11/12M66 SPL 62 (Lennox, 1970)	Detailed investigations of the Queensberry Mine area: Approximately 3300m of trenching and side-cutting over areas of interest, detailed mapping and soil geochemistry and 8 DDH (640.1m total). Initial metallurgical test work was also completed.
1981-1982 ML 11/12M66 (Bendall, 1982)	Mapping and relocating old workings and drill holes; estimation of a resource.
1983-1984 EL 4/78 (Jones, 1984)	Regional stream sediment sampling located a significant anomaly on Malcolm Creek. Airborne magnetic anomalies were followed-up.
1985-1986 EL 10/85 (Bendall, 1986)	Regional scale mapping and track cutting for access; no further outcrops of Cambrian volcanoclastics located.
1987 EL 10/85 (Leaman, 1987)	Reviewed available regional geophysical datasets (magnetics and gravity) and concluded that the mineralisation has a subtle geophysical signature much larger than the known mineralisation. Concluded that prospective corridor within 1500m of FSF. Indicated magnetic anomalies A and B (Amoco's anomalies I and F/G) warranted some ground checking.
1987-1988 EL 4/78 (Mathison, 1988)	Review previous data and field visit to collect samples for Au analysis – best result 0.058 g/t from a dump sample near the main shaft. No further work recommended.
1989-1990 EL 34/88 (Anon, 1990))	An orientation gradient array IP survey was completed over a 300x200m area at Queensberry; results not reported in any detail.
1990-1998 EL 34/88	No Field work. Kratochvil (1991) recommended stream sediment and other geochemical sampling at Queensberry to locate ‘leakage’ on major faults, but, this was not done as exploration rapidly focussed on the Gordon Limestone.

**Table 2 Previous exploration on EL 11/2001 Queensberry**

Reporting Period	Work Completed
2001-2002 (McNeill, 2002)	Work on the licence focussed on compiling previous exploration data and reconnaissance field visits were made to locate old workings and to collect rock chip samples for Pb-Isotope analysis. Results of this sampling indicate that the Pb in the known mineralisation at Queensberry Mine has the target Cambrian (Rosebery) signature.
2002-2003 (McNeill, 2003)	Work included gridding (7.7 line km), surveying the grid with GPS, geological mapping, partial leach soil sampling (325 samples) and rock chip sampling (2 samples analysed). This work focused on the area around Melody Creek where volcanics, including probable Lynchford Tuff correlates, are associated with spikily anomalous soil geochemistry. Further work was recommended.

**Table 2 Previous exploration on EL 11/2001 Queensberry cont..**

Reporting Period	Work Completed
2003-2004 (McNeill, 2004)	Work focussed on gridding (4.45 line km), surveying the grid with GPS, geological mapping, partial leach soil sampling (186 samples, including standards and duplicates, collected and submitted for analysis) and rock chip sampling (20 samples analysed). Further work was recommended

## **6. WORK COMPLETED 2004-2005 REPORTING PERIOD**

### **6.1 Partial Leach Soil Geochemistry**

Sampling on EL 11/2001 was completed on lines 5345400mN and 5346000mN (3.35 km total) that were cut during the reporting period.

Randomised sample numbers were used in partial leach sampling to reduce the effect of analytical variations. The partial leach soil samples were collected at 25m intervals, at or near a grid peg, and involved digging a hole with a pick, removing the organic rich A-horizon and collecting approximately 500g of sample from the nominal B horizon. The samples were then placed in ziplock plastic bags and, once returned to the field office, the bags were stored open to prevent anaerobic reactions. When a batch of 200 to 300 samples was collected, the sample bags were sealed and the samples despatched to Amdel in South Australia for analysis by partial leach technique DL42. Elements determined were Ag, As, Au, Ba, Bi, Cd, Cu, Co, Mo, Ni, Pb, Ni, Y, Zn, Zr and the rare earth elements Ce, Eu, Gd, La and Sm. The pH of the soil and of the leachate, after digestion, were also determined. Results are included as Appendix 1 and 2 and sample locations are shown on Plan 1.

Three duplicate and two standard samples were collected per 100 samples. The field duplicates were also analysed in duplicate to allow assessment of both the sample and laboratory variance. Additionally at each sample site a small amount of soil was collected and stored in a chip tray for reference and to allow soil colour to be recorded. Soil colour was assigned from a Munsell Colour chart with 19 colours and was then assigned to one of six colour groups.

The 142 samples (including duplicates and standards) collected on EL 11/2001 were analysed as part of one batch (SDS 4547).

No samples are obviously contaminated, however, 37 samples, 26% of the data set, have a low (pH<8.0) post-digest pH. At these 'low' pHs the speciation of reagents in DL42 may change and the resulting assays may be unreliable. Many of the low-pH samples had high Pb and Zn results that could be important in the interpretation of the dataset. These 37 samples would previously not have been considered in the analysis of the data set. However, test work at Amdel indicated that decreasing the sample:liquid from 10:1 (method DL42) to 5:1 (method DL43) could buffer the

solution to a higher, acceptable, final pH (for samples with a post-digest pH of >7.2) and not significantly affect the precision of the analysis. Accordingly 37 samples, with low post-digest pH, were re-assayed with the new protocol with the result that 33 had post-digest pHs of >8.0. In the interpretation discussed below the low (pH 6.7-7.95) samples from the original dataset have had their assay results replaced by the re-assayed data and samples 361229, 361242, 361260 and 361307, with low pH's after analysis by DL43, have been deleted, giving a dataset of 136 samples.

Line profiles of selected elements for lines 5345400mN and 5346000mN are presented as Figures 3 and 4 respectively and gridded images of all raw data, including soil pH, from EL 11/2001 Queensberry are presented as Figures 5-13. The line profiles define a Pb-Cu-Zn anomaly on line 5345400mN, which is offset to the east from an As-Bi anomaly at the western end of this line. Results from 5346000mN are spikier, but with elevated As-Bi-Pb in the Melody Creek area. Images of the entire dataset (Figures 5-13) indicate the Cu-Pb-Zn anomaly on 5345400mN is not supported by results from line 5345000mN, albeit 400m to the south. The volcanics in Melody creek are overlain by a Bi-As-Ag anomaly (although obvious in the line profiles for line 5346000mN, this anomaly is not obvious in the images on that line, possibly as a result of level shifts between analytical batches).

These results are not overly encouraging, however, a final detailed interpretation will be completed when the follow-up sampling recommended below (Section 7) is completed and by comparing individual element line profiles.

## **7. CONCLUSIONS & RECOMMENDATIONS**

Work during the fourth year of tenure of EL 11/2001 Queensberry (Henty River) comprised gridding (3.35 line km), surveying the grid with GPS, and partial leach soil sampling (142 samples, including standards and duplicates) were all completed. Initial interpretation indicates that no significant geochemical anomalies have been located, but more detailed work is required.

It is therefore recommended that:

- A reconnaissance visit be made to the window of Cambrian volcanics on the Henty River shown on the Strahan 1:50,000 regional Geology Map (Baillie et al, 1977).
- Total digest soil sampling and additional rock chip sampling be completed to follow-up the partial leach soil results.
- Geophysical surveys be planned to cover the prospective volcanics in the vicinity of Melody Creek.
- In addition (or instead of the geophysical surveys) a 250-300m deep helicopter supported drill hole be completed in the Melody Creek area to test for mineralisation/alteration and confirm stratigraphic correlations.

## 8. EXPENDITURE

Expenditure on EL 11/2001 during the 12 month period ending 3<sup>rd</sup> July 2005 was **\$21,299**. A detailed breakdown of this expenditure is presented below.

Personnel	\$1,652
Travel & Accommodation	\$0
Consultants & Contractors	\$9,622
Geological Consultants	\$0
Geochemical Consultants & Assays	\$3,742
Geophysical Surveys & Contractors	\$0
Drilling	\$0
Stores & Supplies	\$255
Vehicles Plant & Equipment	\$277
Land	\$342
Computing	\$3,479
Office	\$0
Administration Fee	\$1,930
<b>Total Tenement Expenditure</b>	<b>\$21,299</b>

## 9. KEYWORDS & LOCALITY

### Keywords

Queensberry Mine, Tyndall Group, Lynchford Tuff, Firewood Siding Fault, partial leach soil sampling.

### Locality

1:250,000	QUEENSTOWN SK55-5
1:100,000	CAPE SORELL 7913
1:25,000	PROFESSOR 3634

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