EL 6910 "HOME OF BULLION"
BARROW CREEK - NORTHERN TERRITORY

REPORT ON EXPLORATION ACTIVITIES
FOR THE YEAR ENDED
19th November 1992

Distribution:

NTDME (1)
ARL Hawthorn (1)
ARL Adelaide (1)
Allender, Le Brun, Hosking, Yates (1)

Prepared By:
C G DROWN
Senior Geologist

Issued By:
JA ANDERSON
Regional Manager

ARL Report No. HOB 2
December 1992
CONTENTS

1. INTRODUCTION
   1.1 Location
   1.2 Tenure
   1.3 Exploration and Mining History

2. FIELD OBSERVATIONS AND INTERPRETATION
   2.1 Geology
   2.2 Mineralisation
   2.3 Mineralisation Genesis
   2.4 Geophysics

3. BASE METAL POTENTIAL OF EL 6910
   3.1 Overview
   3.2 Pb-Zn Database Review
   3.3 Additional Analysis of Grade Potential
   3.4 Summary of Tonnage-Grade Potential
   3.5 Extent of Prospective Stratigraphy on EL 6910
   3.6 Effectiveness of Past Exploration
   3.7 Conclusions

4. EXPENDITURE

5. PROPOSED PROGRAMME AND BUDGET

6. REFERENCES

TABLES

Table 1a Ore Width/Grade Information
(from reference materials)

Table 1b Aberfoyle Assays

Table 2 1992 Expenditure Summary
FIGURES

Figure 1  Location Plan

Figure 2  Surface Extent of Gossans

Figure 3  Geological Compilation - EL 6910
           (includes accompanying reference sheet)

Figure 4  Underground Workings - Assays

Figure 5  Airborne Magnetics - EL 6910

Figure 6  IP Anomalies

Figure 7  Early Proterozoic VMS Deposits - Tonnage and Grade Distribution

Figure 8  Early Proterozoic VMS Deposits - Log Probability Plots - Tonnage and Grade

Figure 9  VMS Deposit Type

Figure 10 Early Proterozoic VMS Deposits - Tonnage vs Grade

Figure 11 EL 6910 - Prospectivity Summary

Figure 12 Minesite Environ - Summary Plan
PHOTOGRAPHIC PLATES

Plate 1  Home of Bullion Minesite
Plate 2  Main Lode Gossan Exposure
Plate 3  South Lode #1 Gossan Exposure
Plate 4  Chlorite Alteration - Main Lode
Plate 5  Sericite (?) Altered Footwall Unit - Main Lode
Plate 6  Banded Gossan - South Lode #1
Plate 7  Folded, Interbedded Schist in Main Lode Gossan
Plate 8  Flat Lying Central Mount Stuart Formation
Plate 9  Unconformity of Bullion Schist/Cent. Mt. Stuart Formation
Plate 10  Concordant Eastern Lode Gossan
Plate 11  Bedding in South Lode #2 Gossan
Plate 12  Folds in Main Lode Gossan
Plate 13  Ptygmatic Folds - Main Lode Gossan
Plate 14  Late Stage Veining - Main Lode Gossan

APPENDICES

Appendix 1  Petrographic Report
Appendix 2  Assays
Appendix 3  Pb Isotope Memo
1. INTRODUCTION

1.1 Location

EL 6910 "Home of Bullion" is situated to the east of the Stuart Highway near Barrow Creek in the Northern Territory (Figure 1). It is situated within the Neutral Junction Perpetual Pastoral Lease No. 969 (Portion 3375).

1.2 Tenure

EL 6910 (456 sq.km) was granted on 20th November 1990 to J F Allender and A F G Le Brun for a period of 6 years. Four small mineral leases, MLC's 490-493 inclusive (68 ha. total) cover the Home of Bullion mine within EL 6910 and are owned by a separate party. An option agreement between the owner of the MLC's and Allender et. al. allows the title holders of EL 6910 to explore the MLC's. In accordance with NT regulations the area of EL 6910 was reduced by 50% on 20th November 1992 (Figure 1).

A Joint Venture Agreement between Allender et. al. and Aberfoyle Resources Ltd. is currently being negotiated. Upon execution of the agreement Aberfoyle will manage exploration under EL 6910.

1.3 Exploration and Mining History (from Hosking & Allender, 1991)

Regional

Significant previous mineral exploration activities in the general area are:

- Copper and nickel in gabbroic rocks of the Osborne-Crawford Ranges area - summarised in Felderhof and Barraclough (1974).


- Late Proterozoic arenites of the Central Mount Stuart Formation also have been investigated for their uranium potential to the near west of EL 6910.

- Base and precious metals have sought in the black shales within the Cambro-Ordovician units of the Georgina Basin to the east of EL 6910.

Home of Bullion Mine

The following details summarise the main events which have occurred in the life of the Home of Bullion Mine.

1923  Discovery by cattleman Hayes who brought the prospect to the attention of a Queensland prospector W Garnett; 11 samples collected by Garnett and assayed by Mines Branch, Darwin (Cu to 46.6%; Pb to 47.5%); leases acquired by Garnett and possibly Hayes.

1924  Leases sold by Garnett to Central Australian Silver, Lead and Copper Prospecting Syndicate (later Central Australian Silver, Lead and Copper Mining Company NL); prospect examined by Dr Herbert Basedow who reported favourably; prospect sampled by costeans (26 samples) with results Ag to 26oz 4 dwt/ton, Au to 15 grains/ton, Cu to 49.5%, Pb to 27.2%; mine development commenced.
Aberfoyle Resources Limited
EXPLORATION DIVISION

FIGURE 1

NORTHERN TERRITORY
HOME OF BULLION - EL 6910
LOCATION PLAN

Location Code: 6717
Scale: As shown
Date: December, 1992
Plate No.: NT 15
1925-1934 Spasmodic development under several mine managers; assessments by several mining and metallurgical consultants who reported favourably.

1934 Prospect assessed by Dr C T Madigan; sampling gave results Ag to 4oz 6 dwt, Au trace, Cu to 22.6%, Pb to 10.3%.

1936 Following invitations from leaseholder Commonwealth Sulphur and Metals Corp Ltd, prospect assessed by R Blanchard of American Smelting and Refining Co. (ASARCO) of Mount Isa fame; mineralisation considered in light of possible feed for Mount Isa operation; he estimated 40,000 tons of 4% Cu in oxidised zone, 53,000 tons of 12.5% Cu, 2oz/ton in secondarily enriched zone to 200 feet, and possibly 100,000 tons of enriched ore to 300 feet; he provided a detailed description of mine workings and an account of the mine's history to 1936 (Blanchard, 1936).

1937 Prospect assessed by Dr P S Hossfeld of the Aerial Geological and Geophysical Survey of Northern Australia; he mapped the mine surrounds and sampled extensively underground; he estimated the grade of oxidised ore to be Cu 3.8%, Pb 2%, Au 0.4 dwt/ton, Ag 1.3oz/ton and grade of secondarily enriched ore to be Cu 12%, Pb 0.7%, Au 3.4 dwt/ton, Ag 1oz/ton (Hossfeld, 1937).

1942 Feasibility of mining operations examined by P Clarke for Commonwealth Minerals Committee as part of WW2 Mineral Procurement Program reporting to M Mawby and G Lindesay Clarke (Clarke, 1942).

1950 Prospect assessed by B P Thomson for Zinc Corporation Ltd.; mapping, sampling and ground magnetic surveying involved; deemed to be too small (Thomson, 1950).

1950 Mapping and supervision of core drilling by C J Sullivan of the BMR for Mines Branch, NT Administration; 5 holes drilled, 4 into the Main Lode and 1 into the South Lode (Sullivan, 1950, 1953).

1950 Ore treatment processes investigated by (?) Lyons and G Brittingham for Electrolytic Smelting and Refining Company of Australia Pty Ltd. (Port Kembla); leases at time held by a W Hartley of Adelaide and had been acquired earlier by him from Lindley Duffield and Co., London - this company in turn had acquired them in 1946 (Lyons, 1950; Brittingham, 1950).

1969 Geophysical investigations (notably induced polarisation) by Australian geophysical; also soil sampling per shallow drilling (Australian geophysical, 1965a, 1965b).

1971 Mine examined by North Coast Mining Ltd to assess feasibility of reopening (Cimino et al, 1971).

Previous Production

Total recorded production is approx. 1000t Cu from 5-6000t of ore (Stewart and Warren, 1977) however the real figure may be somewhat higher.
Ore Reserves

Sullivan (1950) calculated a reserve of approx 75,000t @ 7.1% Cu, 2 to 3% Pb, 5-10% Zn, approx 80 g/t Ag and 1.2 g/t Au for the Main Lode to a depth of approx. 100m.

Bell (1953) calculated a reserve of 130,000t @ 7.1% Cu, 1 to 2% Pb and 4 to 6% Zn for the Main Lode and material above the lowest level of development on the South Lode #2.

Production since 1953 is unknown.

2. FIELD OBSERVATIONS AND INTERPRETATION

2.1 Geology

The Home of Bullion deposit was examined to assess the regional potential within the area of EL 6910. Mineralisation outcrops in four gossans at the Home of Bullion mithnite (Plates 1-3) (Figure 2). They occur on two trends with the Main Lode and Eastern Lode forming the northern lodes and the South Lode #1 and South Lode #2 forming the southern lodes. Gossans from both lode systems dip steeply to the north.

The host rocks in the mine environs are dominated by muscovite schists (Bullion schist) with interbedded/interlayered amphibolites present as a significant component of the stratigraphy. Petrography shows the host schist to be essentially a quartz-muscovite schist with retrograded porphyroblasts rich in tourmaline and sericite, and to have contained trace amounts of pyrite (Appendix 1 sample PET-6). Bedding in the Bullion schist is normally destroyed by a strong tectonic fabric, however several localities where found where $S_0$ was preserved. At these places the bedding was defined by differences in the grainsize of quartz in the schist and are thought to represent primary grainsize variations from fine to medium grained psammites to pelites. Wherever $S_0$ was observed it was parallel to the dominant tectonic fabric (cleavage) and dipped steeply to the north. The bedding parallel relationship of $S_1$ is supported by study of the petrographic slides. It is therefore considered that the early deformation event was the result of N-S shortening and produced upright isoclinal folds with a strong layer parallel cleavage developed on $F_1$ fold limbs, and further that the gossans occur on the limbs of such a structure.

A later tectonic event has overprinted the early phase producing small scale $F_2$ folds, in either $S_0$ or the $S_0$ parallel $S_1$ fabric, which plunge to the NE. An exceptionally well developed crenulation cleavage $S_2$ is present in most exposures. The second phase of folding resulted from essentially SE-NW shortening.
HOME OF BULLION MINE
BARROW CREEK N.T
SKETCH OF DRILLING LAY-OUT

REFERENCE

X - location of Abbeyle boundary sample.

FIGURE 2

Enclosure 3

Dr. No. 510
The nature of the amphibolites present in the stratigraphy is uncertain. They are concordant with the Bullion schists and have been folded by the early deformational event (F1 folds are evident in amphibolite units to both the NW and E of the mine) indicating they were an early addition to the stratigraphy. It is unclear, however whether they represent mafic volcanics or early, syndepositional mafic sills. Petrographic studies suggest both intrusive (Appendix 1 - Metadolerite sample PET-9) and extrusive (Appendix 1 - Metabasalt sample PET-5) mafics are present in the sequence.

The relationship between the southern and northern lode systems is unclear at this stage.

Stratigraphy across the northern lodes (Main and Eastern lodes) was observed in several places. Footwall to the gossans, unaltered Bullion Schist is seen to be gradually altered to a chlorite schist, with alteration increasing towards the mineralisation (Plate 4). In the immediate footwall of the gossans a narrow (<0.5m) unit of pale coloured schist occurs (Plate 5). The lower contact of this unit is relatively sharp and it is suggested that the abrupt change from chlorite to sericite (?) alteration is reflecting different initial major element geochemistry of the parent lithologies. Minor Cu carbonate staining is present in the altered footwall rocks.

The gossans consist primarily of limonite, copper carbonates, cerrusite and silica in varying amounts. Banding in the gossans is suggested in the northern lodes and obvious in the Southern Lode #1 (Plate 6). Minor interbedded schist was observed at two localities in the northern zone gossans (Plate 7).

The hangingwall of the northern gossans is often marked by development of a thin (<10cm) cherty unit. Chlorite alteration is evident in the hangingwall schists for some distance above the mineralisation. A distinctive unit characterised by very large (to 3 cm) retrogressed andalusite (?) porphyroblasts is present approx. 10m above the mineralisation.

This unit was observed in several locations above the northern lodes. The sudden appearance of the porphyroblasts is again possibly a response to initial lithological heterogeneity. Fuchsite is also observed in the mine area however it is not clear whether it is an alteration phase or simply a component of the host rocks.

One of the most significant features of the altered host rocks at Home of Bullion is the fact that the two cleavages developed in the unaltered, unmineralised host schists are both present in the alteration zones, suggesting that the alteration predated deformation.

Towards the western end of the Main Lode narrow gossans or veins occur in a zone of intense chlorite alteration. Three gossans of variable thickness and extent were observed in this area and were totally surrounded by intense alteration. An unusual alteration type includes magnetite as a minor phase. (Appendix 1, sample PET-10).
Further ground checking was made of an area some 9km to the west of the minesite where a minor Cu occurrence, and mafic and calc-silicate units were noted on NTGS geological maps. No evidence could be found of any Cu at the prospect, although minor trenching and blasting of non-deformed mafic rocks was evident. The calc-silicates however, proved to be of great interest. They occur as thin (<10cm) units interbedded with typical Bullion Schist. Normally they are highly siliceous rocks however some contain significant amounts of magnetite and one sample was found which contained disseminated sulphides (Appendix 1 - sample PET-2). Magnetites suggest they occur along strike from the mineralisation at Home of Bullion mine. The calc-silicates may be interpreted as distal mineralisation facies lithologies - possibly exhalites. In addition one narrow unit was found which could possibly be interpreted as a weathered felsic volcanic (although see Appendix 1 - sample PET-1).

The Bullion Schist is overlain by flat lying sediments of the Central Mount Stuart Formation to the south of the mine (Plate 8). Minor Central Mt Stuart Formation occurs in the vicinity of the south lodes. The unconformable contact is exposed in a shallow trench (Plate 9).

Figure 3 (in sleeve) presents a 1:25,000 scale compilation of published geology for the area within EL 6910.

2.2 Mineralisation

Previous studies (Sullivan, 1950; Bell, 1953; Hossfeld, 1937; others) of the mineralisation at Home of Bullion included reasonably comprehensive sampling of the ore and as such the author has only submitted five samples for assay (results in Appendix 2). Of the four lodes only two have recorded production the Main Lode and the South Lode #2 (also referred to as the Lovechild Lode) however a single shaft was located on the South Lode #1 and shallow surface workings occur on the Eastern Lode. Vertically, three mineralised zones are recognised by the early workers and relate to the position of the mineralisation in the weathering profile. From the surface to 35m the mineralisation takes the form of limonite gossan with minor to major Cu carbonates and cerussite. Grades are typically 2 to 12%Cu, 1 to 5%Pb, <2%Zn (although Zn was only occasionally determined), 30 to 60ppm Ag and <1 g/t Au. The author submitted two samples for assay from this zone (399044, 399045 in table 1b).

Supergene enrichment occurs between 35 and approx. 65m (deepest u/g development) with Cu in particular highly enriched. Mineralogy is dominated by chalcocite and tennantite. Grades from the supergene zone are as high as 49% Cu and 6.1 g/t Au however are more typically thought to be in the range 12 to 25% Cu, 2 to 3% Pb, 1.6% Zn, 30-60 (?) g/t Ag and approx. 1.5 g/t Au. Two samples from this zone (taken from the mine dumps) were submitted for petrology (PET-3 and 4 in Appendix 1) and assay (samples 399047, 399048).
Primary mineralisation is only known from diamond drilling carried out in 1950. Grades were of the order of 3 to 5% Cu, 1 to 6% Pb, ? to 15% Zn with no data for Ag or Au. The primary and supergene sulphides are described as being often massive (Bell 1953) and the sulphide mineralogy in the diamond holes in order of decreasing abundance is noted as being pyrite-sphalerite-bornite-chalcopyrite-galena and minor chalcocite (Sullivan, 1950).

It is clear that while Cu is highly enriched in the supergene zone, Zn is depleted until the primary sulphide zone is reached. There exists the possibility that a high-grade supergene zone of zinc may be developed as a narrow (?) interval above the base of primary sulphides somewhere between 65m and 95m (some deposits such as Highway-Reward exhibit this feature while others such as Flura do not).

There is some evidence of metal zonation preserved in the supergene zone at Home of Bullion. In the Main Lode sulphides nearer the southern footwall contact generally display higher grades of Cu than the upper portion of the lode (Figure 4). Pb, Ag and Au appear to lack zonation. Insufficient assays allow observations on possible zonation for Zn.

The width of mineralisation varies to some degree. The main lode varies from <1m to about 5.4m based on u/g sampling reported by Hossfeld, 1937 (Figure 4). Present day exposures of the main lode reach approx. 4m although much of the surface exposure is now destroyed. An average of 3.2m was used by Sullivan (1953) in ore reserve estimate calculations. True widths of primary mineralisation intersected in the diamond holes varied from 0.4m to 3.0m.

The South Lode #2 reaches widths of 6.8m in the No. 3 shaft development (Hossfeld, 1937) however Bell (1953) used an average of 3m in ore reserve estimate calculations. The South Lode #1 reportedly reaches widths of 15m on the surface (Bell, 1953). No width information is known for the South Lode #1 at depth. The Eastern Lode is the narrowest with present gossan exposure from about 0.5 to 1.0m.

The South Lode #1 appears to be quite different from the other three lodes. It is low grade and mineralogically is dominated by carbonates (from old petrological studies). In addition a Pb isotope on a low Pb sample (610 ppm) returned a radiogenic Pb 206/204 signature suggesting that the South Lode #1 may represent a different style of mineralisation. It is possible that it is localised in a fault structure evident to the west of the lode on air photographs.
ASSAY PLANS AND SECTIONS
UNDERGROUND WORKINGS
HOME OF BULLION MINE
BARROW CREEK, N.T.
Scale 20 feet to an inch
Sampling by W. M. Cottle

Figure 4
Two Pb isotopes were determined on samples of the Main Lode mineralisation. They show a small degree of inhomogeneity with Pb 206/204 values of 15.870 and 15.982. The lower result plots in the normal Arunta ellipse (e.g. Plenty River, Edwards Creek) whilst the higher result (a high Pb sample) plots in the centre of the Broken Hill ellipse (see Appendix 3). With only two data points it is difficult to draw too many conclusions from the Pb isotopes at this stage. The limited spread of the two values is consistent with an homogenous Pb source which is viewed positively. The fact that one sample plots within the Broken Hill ellipse is of little consequence and may be coincidental. More Pb isotope data is required before any major conclusions can be drawn.

Table 1a summarises grade and width information for the HOB lodes taken from reference material. Table 1b shows assay results of samples submitted by the author.

2.3 Mineralisation Genesis

Previous workers (Hossfeld, 1937; Sullivan, 1950; Bell, 1953; Stewart and Warren, 1977) have reported a strong structural control to the HOB mineralisation with sulphides thought to be localized in fault or shear zones. Hosking and Allender (1991), while recognising the potential for EL 6910 to contain syngenetic VMS(?) mineralisation also suggest shearing is an important control on mineralisation localisation at the Home of Bullion minesite.

The view of the author, however, is that the mineralisation at the Home of Bullion mine is predominantly stratiform and syngenetic in origin. The following evidence is cited in support of this opinion.

1. Surface exposures show the gossans to be concordant with the S₁ cleavage which was always observed to be bedding parallel in the mine environs (Plate 10).

2. If the sericite schist (footwall to the northern lodes), and the porphyroblastic schist above the hangingwall of the lodes represent initial lithological heterogeneity, then the gossans are concordant with bedding. Petrology supports the assumption that S₀ is parallel to S₁.

3. The gossans display banded textures, and even bedding (?) in places (Plate 11).

4. The mineralisation is largely massive sulphide.

5. The cherty unit at the top of the northern lodes is interpreted to be a bed and possibly an exhalite cap similar to those over documented VMS deposits.

6. The mineralisation appears to display metal zonation with Cu rich ore occurring towards the footwall of the northern lodes (Figure 4).
### Table 1a
(Data from Reports)

**Summary of Mineralisation Widths & Grades**

<table>
<thead>
<tr>
<th>Lode</th>
<th>Location</th>
<th>Zone</th>
<th>Width (m)</th>
<th>Cut</th>
<th>Pct</th>
<th>Zn%</th>
<th>Ag (ppm)</th>
<th>Au (ppm)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Lode</td>
<td>Main Shaft-44m level</td>
<td>Supergene</td>
<td>4.3</td>
<td>11.8</td>
<td>0.9</td>
<td>6.3</td>
<td>28</td>
<td>6.1</td>
<td>Hosfield 1997</td>
</tr>
<tr>
<td>Main Lode</td>
<td>No 2 shaft-13m level</td>
<td>Oxide</td>
<td>5.4</td>
<td>5.6</td>
<td>0.2</td>
<td>?</td>
<td>31</td>
<td>0.6</td>
<td>Hosfield 1997</td>
</tr>
<tr>
<td>Main Lode</td>
<td>No 1 shaft-15m level</td>
<td>Oxide</td>
<td>5.4</td>
<td>4.7</td>
<td>4.6</td>
<td>?</td>
<td>83</td>
<td>0.6</td>
<td>Hosfield 1997</td>
</tr>
<tr>
<td>Main Lode</td>
<td>No 1 shaft-26m level</td>
<td>Oxide</td>
<td>4.3</td>
<td>1.9</td>
<td>3.1</td>
<td>?</td>
<td>27</td>
<td>0.8</td>
<td>Hosfield 1997</td>
</tr>
<tr>
<td>South Lode</td>
<td>No 3 shaft-16m level</td>
<td>Oxide</td>
<td>6.8</td>
<td>4.6</td>
<td>5.3</td>
<td>?</td>
<td>339</td>
<td>0.1</td>
<td>Hosfield 1997</td>
</tr>
<tr>
<td>Main Lode</td>
<td>DDH #1-90m level</td>
<td>Primary/Supergene</td>
<td>3.0</td>
<td>3.4</td>
<td>4.1</td>
<td>&lt;15</td>
<td>?</td>
<td>?</td>
<td>Hosking &amp; Allender 1990 - Last Figure</td>
</tr>
<tr>
<td>Main Lode</td>
<td>DDH #2-115m level</td>
<td>Primary/Supergene</td>
<td>?</td>
<td>2.6</td>
<td>&lt;6.0</td>
<td>&lt;15</td>
<td>?</td>
<td>?</td>
<td>Hosking &amp; Allender 1990 - Last Figure</td>
</tr>
<tr>
<td>Main Lode</td>
<td>DEE #3-90m level</td>
<td>Primary/Supergene</td>
<td>2.7</td>
<td>5.1</td>
<td>1.0</td>
<td>&lt;15</td>
<td>?</td>
<td>?</td>
<td>Hosking &amp; Allender 1990 - Last Figure</td>
</tr>
<tr>
<td>Main Lode</td>
<td>DEE #4-90m level</td>
<td>Primary/Supergene</td>
<td>0.4</td>
<td>5.6</td>
<td>&lt;6.0</td>
<td>&lt;15</td>
<td>?</td>
<td>?</td>
<td>Hosking &amp; Allender 1990 - Last Figure</td>
</tr>
<tr>
<td>Main Lode</td>
<td>2500t ore shipment</td>
<td>Oxide + Supergene</td>
<td>-</td>
<td>22.5</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>Sullivan 1953</td>
</tr>
<tr>
<td>Main Lode</td>
<td>0-14m depth</td>
<td>Oxide</td>
<td>to 4.6m</td>
<td>4.0</td>
<td>2.5</td>
<td>?</td>
<td>30-60</td>
<td>1</td>
<td>Sullivan 1950</td>
</tr>
<tr>
<td>Main Lode</td>
<td>16-61m depth</td>
<td>Supergene</td>
<td>12-24</td>
<td>2-3</td>
<td>1.0</td>
<td>?</td>
<td>1.5</td>
<td>?</td>
<td>Sullivan 1950</td>
</tr>
<tr>
<td>Main Lode</td>
<td>&gt;90m depth (DDH’s)</td>
<td>Primary</td>
<td>3-5</td>
<td>1-6</td>
<td>5-10</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>Sullivan 1950</td>
</tr>
<tr>
<td>South Lode</td>
<td>Gossan</td>
<td>Oxide</td>
<td>to 6.1m</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sullivan 1950</td>
</tr>
<tr>
<td>South Lode</td>
<td>Gossan</td>
<td>Oxide</td>
<td>&lt;15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bell, 1953</td>
</tr>
<tr>
<td>South Lode</td>
<td>3m ave</td>
<td>Oxide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bell, 1953</td>
</tr>
<tr>
<td>Main Lode</td>
<td>3.2m ave</td>
<td>Oxide</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bell, 1953</td>
</tr>
<tr>
<td>Main Lode</td>
<td>West Shoot-42m level</td>
<td>Supergene</td>
<td>?</td>
<td>8</td>
<td>1.8</td>
<td>3.6</td>
<td>?</td>
<td>?</td>
<td>Bell, 1953</td>
</tr>
<tr>
<td>Main Lode</td>
<td></td>
<td>Oxide</td>
<td>?</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bell, 1953</td>
</tr>
<tr>
<td>Sample No.</td>
<td>Loca</td>
<td>Location</td>
<td>Zone</td>
<td>Cu%</td>
<td>Pb%</td>
<td>Zn%</td>
<td>Ag ppm</td>
<td>Au ppm</td>
<td>Hg ppm</td>
</tr>
<tr>
<td>----------</td>
<td>------</td>
<td>---------------------------</td>
<td>--------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>399044</td>
<td>South #1</td>
<td>Surface Gossan</td>
<td>Oxide</td>
<td>425</td>
<td>610</td>
<td>240</td>
<td>8</td>
<td>0.09</td>
<td>1.000</td>
</tr>
<tr>
<td>399045</td>
<td>Main</td>
<td>Surface Gossan-eastend</td>
<td>Oxide</td>
<td>9.36</td>
<td>13.13</td>
<td>1.65</td>
<td>103</td>
<td>0.178</td>
<td>23.500</td>
</tr>
<tr>
<td>* 399046</td>
<td>N.A.</td>
<td>Well in Creek to East of Mine</td>
<td>Oxide</td>
<td>201</td>
<td>204</td>
<td>113</td>
<td>0.5</td>
<td>0.009</td>
<td>0.005</td>
</tr>
<tr>
<td>399047</td>
<td>Main</td>
<td>Waste Dump</td>
<td>Supergene</td>
<td>48.9</td>
<td>0.14</td>
<td>1.38</td>
<td>30</td>
<td>0.367</td>
<td>11.600</td>
</tr>
<tr>
<td>399048</td>
<td>Main</td>
<td>Waste Dump</td>
<td>Supergene</td>
<td>6.75</td>
<td>0.18</td>
<td>1.72</td>
<td>16</td>
<td>0.004</td>
<td>9.300</td>
</tr>
</tbody>
</table>

* Cu Pb Zn in ppm
7. The presence of occasionally significant Au and Hg is suggestive of a syngentic (VMS or Angas type) origin, as is the pyrite (Fe) rich mineralogy of the primary sulphides.

8. Some gossans appear to contain thin interbedded schistose sediment (c.f. Hellyer, Rosebery) (Plate 7).

9. The alteration associated with the mineralisation is very clearly pre-deformational with both regional cleavages well developed in the altered rocks (observable in hand specimen and petrology slides).

10. Petrological slides of the supergene sulphides show metamorphic textures. PET-4 in particular shows quartz in the host rock to exhibit a granoblastic, polygonal texture with no evidence that the sulphides occupy sheared or brittle structural sites.

11. No evidence of shearing was observed (it is believed the previous workers may have misinterpreted the strong cleavage development as shearing however it must be kept in mind that they had access to u/g exposure and presumably more complete surface exposure).

12. The cherty bed on the hangingwall of the mineralisation has been folded by the second deformational event, and other folded units were observed within the gossans (Plates 12, 13 & 7).

13. The only brittle structures observed in the mine environment were filled with barren quartz.

14. The only brittle structures observed in close association with gossans cut both the alteration and the gossans (Plate 14).

15. The early workers investigated the prospect before syngeneric models of ore formation were popular, and the more recent workers have simply repeated the view of the early workers, although Stewart and Warren (1977) suggest possible similarities with the Jervois mineralisation thought by some (e.g. Ypma et. al., 1984) to be syngeneric.

I believe these factors present very strong evidence that EL 6910 hosts syngeneric mineralisation. On a larger scale the presence of the interesting calc-silicate units may prove to be closely related to the ore forming processes, and may prove worthy of closer examination.
Conceptually, there is also an intriguing relationship apparent on the 1:25,000 geology plan (Figure 3) between the occurrence of the amphibolites, the presence of mineralisation and the calc-silicates, and the position of \( F_1 \) folds. It appears that the four elements are closely associated. \( F_1 \) fold development appears to be restricted to the area close to, and along strike from the HOB mineralisation, as are the amphibolites and calc-silicates. This may be reflecting the presence at depth of a major structure that was active during basin (and mineralisation) formation. The postulated structure provides a plumbing system for hydrothermal fluids, a zone of weakness for mafic volcanism/intrusion, and a topographic trap for sulphide accumulation and exhalative (?) calc-silicate deposition.

During later compression and associated closing of the basin the structure localises \( F_1 \) folding in overlying basin sediments.

### 2.4 Geophysics

Airborne Magnetics - EL 6910 was recently (1981) flown by Austirex International Limited on behalf of the NTDME. The survey was flown at a height of 100m with a flight line spacing of 500m. Figure 5 (in sleeve) presents a 1:25,000 scale compilation of the survey for the area covering EL 6910.

The most useful feature on the magnetics contour map appears to be the recognition of a distinctive magnetic signature associated with the host stratigraphy of the HOB mineralisation. The extent of the host sequence can be traced as a continuous feature from east of the HOB mine for 20km to the west which is within 2km of the western boundary of EL 6910. Much of the magnetic feature is under Quaternary cover indicating that the extent of the host sequence is far greater than suggested on the geological sheet. A large area with similar magnetic character is centred some 7km north of the HOB mine. This northern feature is virtually all under Quaternary cover with outcrop of Bullion Schist restricted to one small area.

Radiometrics - radiometrics were flown simultaneously with the airborne magnetics.

Induced Polarisation - in 1969 Australian Geophysical conducted an IP survey centred on the HOB minesite. The survey covered 5km of strike and anomalies were recorded on every line surveyed, with both the northern and southern lodes at the minesite producing anomalies. Line spacing was 600m (Figure 6).

Electromagnetics - No EM surveys are known to have been done.
3. BASE METAL POTENTIAL OF EL 6910

3.1 Overview

EL 6910 (and contained MLC's) is known to host high-grade Cu-Zn (Pb-Ag-Au) massive sulphides developed over moderate widths. Furthermore, the mineralisation is thought to be syngeneic in origin - possibly of VMS affinity due to the presence of mafic and possible felsic volcanics in the stratigraphy, the mixed Cu+Pb+Zn nature of the sulphides, and the presence of significant Au and Hg in the mineralisation.

Age-wise, several well known Early Proterozoic VMS provinces occur elsewhere in the world (see below). Petrographic similarities exist between the clastic schists and "calc-silicates" at Home of Bullion and Broken Hill style environments (see petrologists report - Appendix 1), and stratigraphic similarities exist with the Besshi district in Japan where massive sulphides are hosted by a sequence of clastic schists and amphibolites.

3.2 Pb-Zn Database Review

Checking of Aberfoyle's Pb-Zn database reveals that to date no major Early Proterozoic VMS provinces are recognised in Australia, although the Koongie Park and Angelo prospects in the Hall's Creek province may be of VMS style. There are, however, significant Early Proterozoic base metal provinces elsewhere in the world. The Churchill, Labrador and Southern provinces in Canada, Karelian province in Finland, Skellefte province in Sweden and the Arizona and Wisconsin provinces in the USA are all of Early Proterozoic age. Each province contains more than one deposit, and additionally all except the Labrador province in Canada include at least one deposit having greater than the economic equivalent of 1Mt of contained Zn metal (Cu, Pb and Ag are expressed in terms of Zn using the formula Zn equiv = Zn + 2 x Cu + Pb/2.7 + Ag/110). For comparison Hellyer contained the equivalent of 2.9Mt of Zn metal and Que River contained the equivalent of 0.6Mt of Zn metal.

Tonnage

Figure 7a shows the distribution in size of the Early Proterozoic deposits included in the Pb-Zn database. Median deposit size is shown to be 2.19Mt with 10% of deposits being >19Mt. Figure 8a is a log-probability plot of the tonnage data from the database. When modelled it predicts that 50% of deposits will be greater than 2.1Mt, 25% of deposits greater than 6Mt and 10% of deposits >16Mt. Assuming that this tonnage distribution is applicable to Australia then the chances of a discovery being of medium to large size are considered to be good.

Grade

Figure 7b shows the distribution of grade (again expressed as Zn equivalent %) for the Early Proterozoic deposits from the database. The majority of deposits are relatively low grade. Modelling the log-probability plot (Figure 8b) suggests 50% of deposits will be >6.5% Zn equiv, 25% >9.5% Zn equiv and 10% greater than 13.7% Zn equivalent.
Figure 7

Aberfoyle Resources Limited
EXPLORATION DIVISION

NORTHERN TERRITORY
EL 6910 - HOME OF BULLION
EARLY PROTEROZOIC VMS DEPOSITS
TONNEAGE and GRADE DISTRIBUTIONS
Data from Pb-Zn data base

<table>
<thead>
<tr>
<th>REVISIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Init. Date</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

| Compiled : CGD |
| Drawn : CGD |
| Traced : NB |
| Checked :    |

Location Code: Scale: AS SHOWN Date: SEPTEMBER 1992 Plate No: NT-8

---

N = 80
Min = 0.09
1st quartile = 0.67
Median = 2.19
3rd quartile = 6.00
Max = 70.00
10% of deposits are >1SMt

Zn equiv. = Zn + \( \frac{Pb}{2.7} \) + \( 2 \times Cu \) + \( \frac{Ag}{110} \)

---

---
Figure 8

Aberfoyle Resources Limited
EXPLORATION DIVISION

NORTHERN TERRITORY
EL 6910 - HOME OF BULLION
EARLY PROTEROZOIC VMS DEPOSITS
LOG PROBABILITY PLOT
Data from Pb-Zn data base

Compiled : CGD
Drawn : CGD
Traced : NB
Checked : 
Plate No. : NT - 9

REVISIONS
Init. Date Init. Date

Location Code : Scale : AS SHOWN Date : SEPTEMBER 1992
3.3 **Additional Analysis of Grade Potential**

The above analysis of the Pb-Zn database suggests that the grade of Early Proterozoic VMS deposits is likely to be low, certainly too low to be attractive for the remote Home of Bullion location. Three different pieces of evidence, however, suggest that the grade indicated by modelling the Pb-Zn database examples is not applicable to the Home of Bullion situation.

a) Metal contents reported by NTDBE workers from primary mineralisation intersected in 4 diamond holes drilled in 1950 indicate the grades are high (approximately 15% to 25% Zn equivalent).

b) The type of VMS deposit (whether Cu, Cu-Zn, or Cu-Pb-Zn type as defined by Large, 1992) has an effect on grade. The ternary diagram in Figure 9 shows the fields for the 3 different types of VMS deposit. The Early Proterozoic deposits from the Pb-Zn database are plotted onto it. All three types are represented. The table below the ternary diagram shows the median grades for the different types. The Cu type are the lowest grade, Cu-Zn type intermediate and the Cu-Pb-Zn the highest grade. The approximate field for the Home of Bullion mineralisation is shown, clearly plotting in the Cu-Pb-Zn field.

c) Australian VMS deposits are often of considerably higher grade than their overseas counterparts. Also shown in the table on Figure 9 are median Zn equiv grades for Australian VMS deposits. The relative order of the grade of the 3 types is the same as for the Early Proterozoic deposits but the Cu-Zn and Cu-Pb-Zn types are significantly richer.

3.4 **Summary of Tonnage - Grade Potential**

Figure 10 shows tonnage plotted against Zn equivalent grade for the Early Proterozoic deposits. The probable grade range for the Home of Bullion situation is shown. If the predictions that can be made from the tonnage model (Figure 8a) are incorporated into Figure 10 it can be tentatively concluded that the chance for a discovery to contain greater than the equivalent of 1Mt of Zn metal is approximately 25-30%.

3.5 **Extent of Prospective Stratigraphy on EL 6910**

The Home of Bullion minesite occurs within a distinctive 19km x 3km magnetic feature that strikes WNW and traverses the EL. A second, northern feature (located approximately 7km due North of the minesite) exhibits the same magnetic character as the main trend and covers an area of at least 6km x 2km (Figures 3, 5 in sleeve).

Magnetite is present as;
- an alteration phase closely associated with the mineralisation
- in the ‘calc-silicate’ bands, and
- presumably at low levels in the amphibolites.
$\text{ZR} = 100 \frac{\text{Zn}}{\text{Zn-Pb}}$
$\text{CR} = 100 \frac{\text{Cu}}{\text{Cu-Zn}}$

based on average ore grades in mass percent

(Modified from LARGE, 1992)

Fields for Cu, Cu-Zn, and Cu-Pb-Zn type VHMS deposits. Data points are for Early Proterozoic deposits (data from Pb-Zn database). The approximate field for Home of Bullion based on reported metal contents for primary ore from 1950 diamond drilling is shown.

<table>
<thead>
<tr>
<th>Early Proterozoic VMS deposits (1)</th>
<th>median Zn equiv. grade %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cu-type</td>
<td>6.51</td>
</tr>
<tr>
<td>Cu-Zn type</td>
<td>6.98</td>
</tr>
<tr>
<td>Cu-Pb-Zn type</td>
<td>8.58</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Australian VHMS deposits (2)</th>
<th>median Zn equiv. grade %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cu-type</td>
<td>5.30</td>
</tr>
<tr>
<td>Cu-Zn type</td>
<td>11.29</td>
</tr>
<tr>
<td>Cu-Pb-Zn type</td>
<td>18.84</td>
</tr>
</tbody>
</table>

Comparison of Zn equivalent grade between Cu, Cu-Zn, and Cu-Pb-Zn type VMS deposits. Note that the Cu-Pb-Zn type are the highest in grade, and that Australian deposits are of higher grade than their overseas counterparts.

(1) Data from Pb-Zn database.
(2) Data from LARGE, 1992
Aberfoyle Resources Limited

EARLY PROTEROZOIC VMS DEPOSITS
TONEAGE vs GRADE

**Figure 10**

**Zn equiv. %**

**Tonneage (Mt)**

- **Koongie Park (WA)**
- **Vihanfi**
- **Jerome**
- **Films Ferry**
- **Cranone**
- **Outokumpu**
- **Kristineburg**
- **Plyholme**
- **Rutton Lake**
- **Angelo (WA)**

---

**Legend:**

- **Filled Icons** indicate deposits with Pb-Zn mineralization.
- **Open Icons** indicate deposits with Cu-Zn mineralization.

**Equation:**

\[ Zn \text{ equiv.} = Zn + \frac{Pb}{2} + 2\times Cu + \frac{Ag}{110} \]

**Note:** Many of these deposits contain significant Au.

**N:** 80
All three of these lithologies are possibly closely related to mineralisation (see Section 2.3, page 9) and as such the two zones of distinctive magnetic character are considered to be of high prospectivity within the EL. The total area encompassed by the two magnetic zones is not less than 70 km². Most of this area (estimate 90%) is covered by Quaternary deposits, much of which is described as a red earth soil with pisolithic lag. The Quaternary deposits may represent a thin, residual weathered mantle above the host stratigraphy.

3.6 Effectiveness of Past Exploration

Past exploration has essentially been restricted to underground development and 5 shallow diamond drillholes at the Home of Bullion mine. Both the drillholes and the mine openings suggest local continuity of mineralisation width and grade. It is assumed that most outcrops of the host sequence would have been prospected during the 1930’s, however the evidence from the recent airborne magnetics suggests that only a limited proportion of the host sequence outcrops, the majority occurring under shallow (?) Quaternary cover.

IP anomalies along strike from the HOB mine were tested by only six shallow (<10m) proline drillholes, all of which were a considerable distance from the HOB minesite.

Modern exploration techniques such as EM, geochemistry and the application of syngenetic geological models have not been applied on the EL.

The perceived prospectivity of EL 6910 is summarised on Figure 11 (in sleeve) at 1:50,000 scale. Figure 12 (in sleeve) is a 1:50,000 scale enlargement of the minesite showing geology and the location of the IP anomalies.

3.7 Conclusion

The potential for EL 6910 to contain moderate size, high grade base metal deposits is considered to be high as;

- The Early Proterozoic produced several major VMS provinces worldwide and the Home of Bullion mineralisation is considered to be essentially of VMS style.

- Analysis of the Pb-Zn database reveals that moderate to large tonnage deposits of VMS style occur in the Early Proterozoic (1 in 4>6Mt; 1 in 10>16Mt).

- Worldwide but one of the Early Proterozoic provinces contains at least one deposit containing greater than the equivalent of 1Mt of Zn metal.

- High grades in the primary sulphides are indicated by the 1950 diamond drilling, a feature consistent with the Cu+Pb+Zn type of deposit and its location in Australia.
The area of prospective stratigraphy defined by airborne magnetics is large (minimum of 70km² in two areas).

Only a small part of this area would have been covered by surface prospecting in the past as approximately 90% of the prospective stratigraphy is under thin (?) Quaternary cover.

Previous exploration is limited to the environs of the existing mineralisation.

Untested IP anomalies occur along strike and under cover from the minesite.

Modern exploration techniques, particularly EM, have not been applied on the EL.

4. **EXPENDITURE**

Aberfoyle Resources Ltd expended an amount of $18,029 on the field/office evaluation of EL 6910 up to the 20th November 1992. A breakdown of the expenditure is presented in Table 2 below.

**Table 2**

<table>
<thead>
<tr>
<th><strong>Expenditure Summary</strong></th>
<th><strong>EL 6910 to 20.11.92</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries</td>
<td>$10,710</td>
</tr>
<tr>
<td>Travel/Accommodation</td>
<td>2,416</td>
</tr>
<tr>
<td>Analyses</td>
<td>1,120</td>
</tr>
<tr>
<td>Petrology</td>
<td>800</td>
</tr>
<tr>
<td>Materials</td>
<td>476</td>
</tr>
<tr>
<td>Drafting/Secretaryial</td>
<td>1,009</td>
</tr>
<tr>
<td>Administration</td>
<td>1,498</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$18,029</strong></td>
</tr>
</tbody>
</table>
5. **PROPOSED PROGRAMME AND BUDGET**

Aberfoyle Resources proposes to expend $115,000 on exploration of EL 6910 in 1993.

The objective of the 1993 exploration is to locate targets that may represent large, high grade base metal deposits. Electromagnetic exploration techniques should be particularly applicable to the Home of Bullion situation for several reasons:

a) known base metal mineralisation is essentially massive sulphide
b) the primary mineralogy is dominated by the conductive sulphides pyrite and chalcopyrite
c) mineralisation at the old minesite appears continuous and undisturbed or offset by faulting
d) there is an apparent lack of other lithologies within the host stratigraphy that may act as bedrock conductors (e.g. black shales or graphitic schists).

It is therefore proposed to fly EL 6910 with airborne EM and subsequently follow up significant anomalies with ground EM combined with geological and structural mapping. Aberfoyle also proposes to acquire the digital aeromagnetics data from the NTDME for the area covering EL 6910 for in-house imaging and interpretation.

A summary of the proposed expenditure is given below.

a) GEOTEM over 258 km$^2$ @ $280/km^2$ $70,000$
b) Acquisition and imaging of NTDME aeromagnetics $5,000$
c) Ground EM follow-up of GEOTEM anomalies (est. 5 loops) $25,000$
d) Geological and structural mapping of follow-up areas $15,000$

**TOTAL** $115,000$
6. REFERENCES

Australian Geophysical Pty Ltd. 1965a: Results of prospecting at Mulbanga’s Prospect (AP 1326), Barrow Creek, NT. Northern Territory Department of Mines and Energy, Open File Company Report, CR 65/2 (unpublished).


Sullivan, C.J., 1953: The Home of Bullion Mine, Barrow Creek, Northern Territory. Unpublished note for AIMM.


Plate 1: Home of Bullion mine site

Plate 2: Main Lode gossan exposure
Plate 3: South Lode #1 gossan exposure

Plate 4: Chlorite alteration - Main Lode
Plate 5: Main Lode #1 Shaft - Sericite altered unit in footwall of gossan.

Plate 6: South Lode #1 - banded gossan
Plate 7: Interbedded schist in Main Lode gossan.

Plate 8: Flat lying sediments of the Central Mount Stuart Formation form the hills in the background. Photo taken from an outcrop of Bullion Schist.
Plate 9: Unconformity between Bullion Schist (bottom right) and Central Mount Stuart Formation (middle left) on line of south lodes.

Plate 10: Eastern Lode gossan showing (normally) concordant nature.
Plate 11: Bedding in South Lode #2 gossan.

Plate 12: Second phase folds (F2) in Main Lode gossan.
Plate 13: Ptygmatic folds in Main Lode gossan.

Plate 14: Late stage cross-cutting veins, western end of Main Lode.
APPENDIX 1

PETROGRAPHIC REPORT
MINERALOGICAL REPORT NO. 6148
by A.C. Purvis, PhD

August 7th, 1992

TO: Mr Chris Drown
Aberfoyle Resources Ltd
91 Beulah Rd
NORWOOD SA 5067

YOUR REFERENCE: Order No. 1066

MATERIAL: 10 rock samples
& IDENTIFICATION: PET 1 to PET 10 inclusive

WORK REQUESTED: Thin and polished thin section preparation and description, with comments as specified.

SAMPLES & SECTIONS: Returned to you with this report.

PONTIFEX & ASSOCIATES PTY LTD
SUMMARY COMMENTS

This report discusses ten samples from a lower amphibolite facies terrane in the Arunta Inlier, Northern Territory. Four of these samples were made into polished thin sections and six into normal thin sections, as requested.

Some of the samples are very similar to metasediments in the Macclesfield-Strathalbyn and Springton areas of the Kanmantoo in South Australia (e.g. samples submitted by Stephen Tottef: Pontifex Mineralogical Report No. 6072, 6/4/92.) For example, two facies of metasandstones are present: a ‘pelitic’ facies, with muscovite and biotite ± sodic plagioclase and a ‘calcareous’ facies with hornblende, bytownite, epidote and calcic garnet (PET 1, 7 and PET 2, respectively).

One of the pelitic schists (PET 6) contains altered porphyroblasts, rich in tourmaline, a feature also seen in pelitic schists in the Springton area of the Kanmantoo. In this area, there is evidence that the porphyroblasts have developed along layers which were essentially aquifers for the metamorphic fluids. Both planar and finger-like fluid flow patterns have been recognised, during a high-grade metamorphism. Similar flow patterns in the area from which these samples were collected, could control the shapes of potential sulphide accumulations, for example.

Chloritisation has affected pelites (PET 7) and basic rocks (PET 10), and may have occurred within and adjacent to shear zones. For example, PET 10 could be a sheared equivalent of PET 9, also PET 5 could be a metamorphosed altered basalt, with iron and copper sulphides preferentially associated with coarse late-stage chlorite patches.

The relative age of sulphide development in PET 3 (massive sulphide) and PET 4 (quartz-sulphide rock) is not clear, but some recrystallisation is evident in the quartz in PET 4. This may indicate an early or even pre-metamorphic origin for the sulphides. The possibly late metamorphic sulphides in PET 5 are much poorer in copper and zinc than those in PET 3, 4.

Most of the samples have a single schistosity, but PET 8 shows some crenulation in the more pelitic layer. There are suggestions of two foliations in PET 10, but these may have developed within a metasomatic shear zone, and may post-date the penetrative schistosity in the other samples.
<table>
<thead>
<tr>
<th>PET 1</th>
<th>Metasandstone (&quot;pelitic&quot;)</th>
<th>Quartz-albite-muscovite-biotite</th>
</tr>
</thead>
<tbody>
<tr>
<td>PET 2</td>
<td>Metasandstone (&quot;calcareous&quot;)</td>
<td>Quartz-hornblende-?bytownite-epidote-(sphene-pyrite-garnet)</td>
</tr>
<tr>
<td>PET 3</td>
<td>Massive sulphide</td>
<td>Chalcopyrite &gt; sphalerite, pyrite &gt; &gt; galena; secondary pyrite, marcasite, ?digenite, covellite, malachite.</td>
</tr>
<tr>
<td>PET 4</td>
<td>Quartz with sulphides; trace muscovite, chlorite</td>
<td>Chalcopyrite &gt; pyrite, sphalerite, trace chalcocite, covellite</td>
</tr>
<tr>
<td>PET 5</td>
<td>Metabasalt with chlorite and</td>
<td>Actinolite-plagioclase (→ sericite)-chlorite-epidote-(ilmenite-sphene-pyrite-marcasite-chalcopyrite)</td>
</tr>
<tr>
<td>PET 6</td>
<td>Pelite</td>
<td>Quartz-muscovite-tourmaline schist with sericite after andalusite or cordierite. Trace limonite after pyrite.</td>
</tr>
<tr>
<td>PET 7</td>
<td>Pelite (altered)</td>
<td>Quartz-chlorite-(muscovite-limonite); quartz-muscovite vein</td>
</tr>
<tr>
<td>PET 8</td>
<td>Fine sandstone and shale</td>
<td>Quartz-muscovite-altered biotite schist; muscovite schist, weakly crenulated, minor quartz, limonite</td>
</tr>
<tr>
<td>PET 9</td>
<td>Metadolerite</td>
<td>Hornblende, plagioclase, biotite, ilmenite, sphene</td>
</tr>
<tr>
<td>PET 10</td>
<td>Metasomatized basic igneous rock</td>
<td>Chlorite-epidote-magnetite-ilmenite</td>
</tr>
</tbody>
</table>
INDIVIDUAL DESCRIPTIONS

PET 1

Non-schistose probable metasandstone with quartz, muscovite, biotite and minor albite.

Quartz grains 0.2 to 0.5mm in size (mostly medium sand size) dominate this rock, with scattered unoriented flakes of muscovite and biotite (about 15% each) and minor clouded albite (5%). Some of the muscovite appears to have been derived from plagioclase and some of the biotite has been altered to clays and chlorite.

Very fine opaque oxides are present, but heavy minerals are not abundant.

PET 2

Metasandstone with hornblende, calcic plagioclase, epidote; very minor sphene, pyrite, calcium garnet.

Quartz grains 0.1 to 0.4mm in size are abundant in this rock, together with 5-10% green hornblende and 15-20% calcic plagioclase, probably bytownite. In some layers and lenses to 4mm in apparent thickness, the plagioclase has been partly replaced by epidote and there is very minor accessory pyrite. Accessory sphene is scattered and there are traces of calcium garnet. Thin conformable quartz veins are present.

This assemblage is common in calcareous sandstones in the Kanmantoo Group, for example.
PET 3

Massive chalcopyrite > sphalerite > galena; pyrite–marcasite–?digenite patches, abundant veins, ?digenite → covellite, also malachite veins.

Coarse granular chalcopyrite is the dominant constituent of this rock and is veined by blue digenite, locally containing cores of covellite. Coarse composite pyrite ± marcasite ± digenite ± covellite patches are also present. Zoned sphalerite is a minor component and has been veined by digenite and covellite. Minor vein quartz occurs locally. Very minor pyrite and ?gallena are present in the chalcopyrite, and traces of chalcopyrite occur in the sphalerite. Late veins of malachite have cut the sulphides and are partly open.

PET 4

Quartz with chalcopyrite > pyrite, sphalerite.
Trace chalcopyrite, covellite.

This sample is essentially granular quartz with irregular, crudely layered sulphides constituting 25-30% of the rock. Minor chlorite is present in some of the larger sulphide lenses, to 5mm in width, and rare muscovite occurs in the quartz.

The quartz consists of old strained grains to 5mm in size and recrystallised grains 0.2 to 1mm in size.

Coarse chalcopyrite in the main sulphide, enclosing pyrite ± marcasite and minor sphalerite. Separate grains and lenses of pyrite ± marcasite and sphalerite occur. Very minor chalcopyrite occurs as grains and veins in the sphalerite. Secondary chalcocite and covellite are rare, mostly rimming chalcopyrite.
PET 5


Actinolite and sericite after plagioclase are the dominant constituents of this sample, with minor chlorite and epidote, and scattered ilmenite grains rimmed by sphene. A grain size of 0.2 to 0.5mm suggests a former basalt rather than a dolerite. Coarser chlorite flakes (to 1mm long) occur in aggregates with abundant sulphide.

Euhedral pyrite crystals are scattered but the main sulphide appears to be pyrite-marcasite after pyrrhotite. Minor chalcopyrite is scattered. The sulphides are mostly 0.05 to 0.5mm in grain size and comprise 15% of the rock.

PET 6

Quartz-muscovite-chlorite-tourmaline-sericite schist with retrogressed porphyroblasts. Trace limonite after pyrite.

This is essentially a quartz-muscovite schist with porphyroblasts to 10mm diameter, rich in finer green tourmaline inclusions and altered to sericite. Post tectonic chlorite porphyroblasts to 2mm long may be after biotite, but could be primary. There are rare lenses of totally limonitised pyrite.

The nature of the porphyroblast is not certain, it was probably andalusite or cordierite. The formation of porphyroblasts in these rocks may be partly related to alteration by acid borate fluids during prograde metamorphism, as some porphyroblastic schists are uniformly richer in tourmaline than otherwise similar schistose lacking porphyroblasts (see Summary Comments).
PET 7
Quartz-chlorite-(muscovite-limonite) schist with a quartz limonite vein.

This quartz-chlorite schist has limonite boxworks after scattered probable garnet crystals < 1mm in size, and may have been originally biotite-rich. Post tectonic muscovite flakes are scattered somewhat sparsely and there are some post-tectonic muscovite-chlorite lenses.

A cross cutting vein 4mm wide has been lined by quartz crystals and infilled by limonite. Some limonite-filled fractures extend into the host schist.

PET 8
Quartz-muscovite-biotite schist and crenulated muscovite schist with minor quartz and limonite.

Quartz grains 0.1 to 3mm in size dominate this rock with about 7-10% each of schistose fresh muscovite and altered biotite. A layer at least 5mm in apparent width along one side of the sample is >90% schistose muscovite, with minor quartz. Limonite occurs as elongate thin lenses, possibly after biotite, and in partly leached lenses, possibly partly after pyrite. The muscovite in this layer is weakly crenulated.
Amphibolite with ilmenite and sphene, derived from a dolerite.

Patches of recrystallised probably ilmenite ± sphene to 2mm long have replaced originally skeletal oxide crystals in this rock, indicating a former dolerite. Dark green to bluish green hornblende is abundant crystals to 2mm long, but is only weakly schistose. The plagioclase has been totally recrystallised to grains <0.1mm in size and there is minor biotite. The plagioclase has been very weakly sericitised.

Accessory apatite is present.

Chlorite-epidote-magnetite rock, with minor ilmenite and sphene. Metasomatised possibly basalt.

Green iron-rich chlorite is the dominant component in this rock. It is weakly schistose to crenulated in most of the rock, where it encloses abundant strongly oriented epidote crystals to 1mm long. However, irregular vein-like masses of relatively coarse chlorite are present, with little or no epidote. Fresh to oxidised magnetite crystals are abundant, locally with patches of a brown micaceous mineral (?biotite, stilpnomelane, vermiculite or nontronite) and minor weakly schistose ilmenite ± sphene. In some areas the epidote has been altered to possible nontronite.
APPENDIX 2

ASSAYS
# ANALYTICAL REPORT

**Report No:** 100580.35.08293

**Invoice To:**
Mr C Drown  
Aberfoyle Resources Limited  
91 Beulah Road  
Norwood SA 5067

**Date Received:** 27/07/92  
**Results Required:** ASAP  

**No. of Pages of Results Reported:** 2  
**Date Reported:** 11/08/92  
**No. of Copies:** 1  
**Total No. of Samples:** 1

## SAMPLE NUMBERS
<table>
<thead>
<tr>
<th>No.</th>
<th>Date</th>
<th>Description</th>
<th>Element/Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>434089/94,20434090</td>
<td>19/04/94, 04/06/94</td>
<td>Cu, Pb, Zn, Sn, In, Ag, As</td>
<td></td>
</tr>
<tr>
<td>399044/48</td>
<td>08/08/94</td>
<td>Cu, Pb, As, Sn, Ag, Zn</td>
<td></td>
</tr>
<tr>
<td>399044/48</td>
<td>15/04/94</td>
<td>Cu, Pb, Sn, In, Zn</td>
<td></td>
</tr>
<tr>
<td>399044/48</td>
<td>08/08/94</td>
<td>Cu, Pb, As, Sn, Ag, Zn</td>
<td></td>
</tr>
<tr>
<td>399044/48</td>
<td>15/04/94</td>
<td>Cu, Pb, Sn, In, Zn</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

**Results to:**
Mr C Drown  
Aberfoyle Resources Limited  
91 Beulah Road  
Norwood SA 5067

**Received:** 13 AUG 1992  
**Authorised Officer:**

---

**Phone:** (08) 3365099  
**Fax:** (08) 3365564  
**Address:** 16 Sunbeak Road, Glynde, S.A. 5070
<table>
<thead>
<tr>
<th>TUBE No</th>
<th>SAMPLE No</th>
<th>Cu</th>
<th>Cu1</th>
<th>Pb</th>
<th>Pb</th>
<th>Zn</th>
<th>Ag</th>
<th>Cd</th>
<th>Cu</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>399044</td>
<td>425</td>
<td>-</td>
<td>610</td>
<td>-</td>
<td>240</td>
<td>10</td>
<td>8.0</td>
<td>280</td>
</tr>
<tr>
<td>2</td>
<td>399045</td>
<td>&gt;50000</td>
<td>9.36</td>
<td>&gt;25000</td>
<td>11.89</td>
<td>16500</td>
<td>103</td>
<td>-</td>
<td>190</td>
</tr>
<tr>
<td>3</td>
<td>399046</td>
<td>201</td>
<td>-</td>
<td>204</td>
<td>-</td>
<td>113</td>
<td>&lt;10</td>
<td>&lt;1.0</td>
<td>170</td>
</tr>
<tr>
<td>4</td>
<td>399047</td>
<td>&gt;50000</td>
<td>48.93</td>
<td>1443</td>
<td>-</td>
<td>13800</td>
<td>30</td>
<td>-</td>
<td>670</td>
</tr>
<tr>
<td>5</td>
<td>399048</td>
<td>&gt;50000</td>
<td>6.75</td>
<td>1832</td>
<td>-</td>
<td>17200</td>
<td>16</td>
<td>-</td>
<td>130</td>
</tr>
</tbody>
</table>

| DETECTION | 20 | 0.01 | 25 | 0.01 | 20 | 10 | 1.0 | 10 |

<table>
<thead>
<tr>
<th>UNITS</th>
<th>PPM</th>
<th>%</th>
<th>PPM</th>
<th>%</th>
<th>PPM</th>
<th>%</th>
<th>ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>METHOD</td>
<td>GA104</td>
<td>GA104</td>
<td>GA104</td>
<td>C-12</td>
<td>GA104</td>
<td>GA104</td>
<td>GA140</td>
</tr>
</tbody>
</table>

Results in ppm unless otherwise specified.
1 = element present but concentration too low to measure
X = element concentration is below detection limit
- = element not determined
## ANALYTICAL DATA

<table>
<thead>
<tr>
<th>SAMPLE No.</th>
<th>BL</th>
<th>Au</th>
<th>Hg</th>
<th>Hg</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>399044</td>
<td>45</td>
<td>0.090</td>
<td>1.000</td>
<td>-</td>
<td>11.0</td>
</tr>
<tr>
<td>399045</td>
<td>1870</td>
<td>0.178</td>
<td>-</td>
<td>20.000</td>
<td>23.5</td>
</tr>
<tr>
<td>399046</td>
<td>16</td>
<td>0.009</td>
<td>-</td>
<td>0.005</td>
<td>-</td>
</tr>
<tr>
<td>399047</td>
<td>36</td>
<td>0.367</td>
<td>-</td>
<td>11.600</td>
<td>-</td>
</tr>
<tr>
<td>399048</td>
<td>38</td>
<td>0.400</td>
<td>-</td>
<td>8.300</td>
<td>-</td>
</tr>
</tbody>
</table>

### DETECTION

<table>
<thead>
<tr>
<th>UNITS</th>
<th>ppm</th>
<th>ppm</th>
<th>ppm</th>
<th>ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>DETECTION</td>
<td>10</td>
<td>0.005</td>
<td>0.005</td>
<td>0.1</td>
</tr>
<tr>
<td>METHOD</td>
<td>GA101</td>
<td>GG313</td>
<td>GA122</td>
<td>GA199</td>
</tr>
</tbody>
</table>

Results in ppm unless otherwise specified.
- = element present but concentration too low to measure
< = current concentration is below detection limit
- = element not determined

AUTHORISED: K. Hand
OFFICER
# Analytical Report

**Analytical Report No.** 100890.35.08404

**Invoiced To:**
Mr C. Dran
Aberfoyle Resources Limited
91 Beulah Road
Norwood SA 5067

**Order No.** 1061

**Date Received:** 13/09/92

**Results Required:** ASAP

<table>
<thead>
<tr>
<th>No. of Pages of Results</th>
<th>Date Reported</th>
<th>No. of Copies</th>
<th>Total No. of Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>25/08/92</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample Numbers</th>
<th>Sample Description</th>
<th>Element/Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>599,045,047-0</td>
<td>Pu Prep</td>
<td>0.70, 91222, Pb: 61223</td>
</tr>
</tbody>
</table>

**Results To:**
Mr C. Dran
Aberfoyle Resources Limited
91 Beulah Road
Norwood SA 5067

**Remarks:**

---

**Authorised Officer:**
<table>
<thead>
<tr>
<th>SAMPLE PREFIX</th>
<th>REPORT NUMBER</th>
<th>REPORT DATE</th>
<th>CLIENT ORDER NO</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>100580.35.08404</td>
<td>25/08/92</td>
<td>1061</td>
<td>1 of 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>SAMP No.</th>
<th>U</th>
<th>Th</th>
<th>Pb4+6</th>
<th>Pb7+6</th>
<th>Pb8+6</th>
<th>Pb6+4</th>
<th>Pb7+4</th>
<th>Pb8+4</th>
<th>Pb4+7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>399045</td>
<td>19.10</td>
<td>11.70</td>
<td>2.5060</td>
<td>1.0090</td>
<td>0.0282</td>
<td>0.40</td>
<td>0.40</td>
<td>0.01</td>
<td>2.4836</td>
</tr>
<tr>
<td>2</td>
<td>399047</td>
<td>0.22</td>
<td>4.09</td>
<td>0.0640</td>
<td>0.9722</td>
<td>2.1880</td>
<td>15.63</td>
<td>15.19</td>
<td>34.19</td>
<td>0.0658</td>
</tr>
<tr>
<td>3</td>
<td>399048</td>
<td>2.47</td>
<td>2.00</td>
<td>0.0645</td>
<td>0.9714</td>
<td>2.1490</td>
<td>15.50</td>
<td>15.06</td>
<td>33.32</td>
<td>0.0664</td>
</tr>
</tbody>
</table>

DETECTION 0.05 0.05 0.0000 0.0000 0.0000 0.00 0.00 0.00 0.0000

UNITS ppm ppm

METHOD G1222 G1222 G1223 G1223 G1223 G1223 G1223 G1223 G1223
<table>
<thead>
<tr>
<th>NO.</th>
<th>SAMPLE NO.</th>
<th>Pb617</th>
<th>Pb817</th>
<th>Pb41B</th>
<th>Pb61B</th>
<th>Pb71B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>399045</td>
<td>0.991</td>
<td>0.028</td>
<td>88.865</td>
<td>35.461</td>
<td>35.780</td>
</tr>
<tr>
<td>2</td>
<td>399047</td>
<td>1.029</td>
<td>2.251</td>
<td>0.0293</td>
<td>0.4570</td>
<td>0.4443</td>
</tr>
<tr>
<td>3</td>
<td>399048</td>
<td>1.029</td>
<td>2.212</td>
<td>0.0300</td>
<td>0.4653</td>
<td>0.4520</td>
</tr>
</tbody>
</table>

DETECTION 0.000 0.000 0.0000 0.0000 0.0000

UNITS

METHOD G1223 G1223 G1223 G1223 G1223
APPENDIX 3

Ph ISOTOPE MEMO
Chris, plots as requested. Don't write off prospect yet. The very high Pb sample is identical to Broken Hill. Any geological significance in this?

Cheers, Judy Dowen
### Table 1. Lead Isotope Data for the Home of Bullion Samples

<table>
<thead>
<tr>
<th>Sample</th>
<th>$^{208}Pb$</th>
<th>$^{207}Pb$</th>
<th>$^{206}Pb$</th>
<th>$^{207}Pb$</th>
<th>$^{208}Pb$</th>
<th>$^{209}Pb$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 399050</td>
<td>2.2267</td>
<td>0.9627</td>
<td>15.982</td>
<td>15.285</td>
<td>35.588</td>
<td>41.0</td>
</tr>
<tr>
<td>2 399051</td>
<td>2.2340</td>
<td>0.9683</td>
<td>15.870</td>
<td>15.285</td>
<td>35.454</td>
<td>1190</td>
</tr>
<tr>
<td>3 399052</td>
<td>2.1491</td>
<td>0.9069</td>
<td>17.200</td>
<td>15.598</td>
<td>36.955</td>
<td>438</td>
</tr>
</tbody>
</table>

Pb contents determined by isotope dilution. Sample number prefixes refer to plotted points on figures.