DIVISION OF EXPLORATION AND MINING

EXPLORATION AND MINING REPORT 863C

Pb ISOTOPE ANALYSIS AND INTERPRETATION OF SAMPLES FROM BASTYAN DAM, LANGDONS MINE, RING RIVER AND CUTTY SARK PROSPECT, WESTERN TASMANIA

Denton G.J., Carr, G.R., Korsch, M.J., Gardner, B.L.

Sirotope

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Pasminco Limited

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CSIRO Division of Exploration and Mining
Newbigin Close, Riverside Corporate Park, NORTH RYDE 2113

Distribution List

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AIM

To determine the Pb isotopic composition and metallogenic association of galena samples from Langdon Mine and the Bastyan Dam, from high-Pb soil samples from the Ring River area and of pyritic andesite from the Cu-Au-Bi Cutty Sark Prospect. If the samples have a Cambrian signature, determine whether their Pb isotopic signature is similar to the Que River, Hellyer or Rosebery ore bodies.

SAMPLES

Six samples were provided from the four prospects with the following information

***Table 1:** Sample Information*

SAMPLE	Pb (conc)	Description	E	N
274170	-	Gn vein	380317	5378835
274171	-	Gn-spl-sid vein	380317	5378835
274172	?	Whole rock – py andesite	378770	5378463
274173	?	Whole rock – py andesite	378770	5378463
274174	-	Py-gn clast	378143	5378857
337034	426	Soil sample (C1 anomaly)	375052	5367251

RESULTS

The results of the analyses are listed in Table 1 and in Figure 1.

***Table 2:** Pb isotopic composition of samples from the 4 prospects.*

Lab No	Sample No	$^{206}Pb/^{204}Pb$	$^{207}Pb/^{204}Pb$	$^{208}Pb/^{204}Pb$	Pb (conc)	Q
Langdons Mine						
1 T988gn	274171	18.493	15.635	38.373	0.00E+00	6
2 T987gn	274170	18.529	15.635	38.404	0.00E+00	1
Cutty Sark Prospect						
1 T990	274173	18.837	15.641	38.716	2.20E+02	4
2 T989	274172	18.711	15.631	38.589	4.40E+02	3
Bastyan Dam						
1 T991gn	274174	18.521	15.625	38.36	0.00E+00	2
Ring River Area						
1 T992	337034	18.213	15.608	38.06	3.82E+02	1

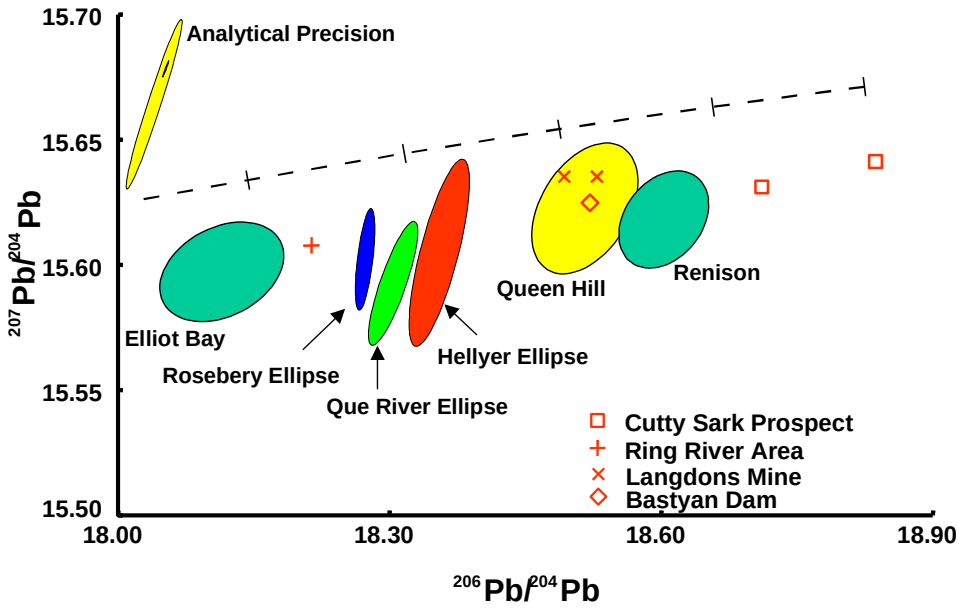

Figure 1 $^{207}Pb/^{204}Pb$ vs $^{206}Pb/^{204}Pb$ plot showing the results from this study in comparison to the 95% confidence ellipses for Cambrian massive sulfide mineralisation at Rosebery, Que River and Hellyer, data ranges for Cambrian mineralisation at Elliot Bay and Devonian mineralisation at Queen Hill and Renison.

INTERPRETATION

The initial ratios of galena from *Bastyan Dam* and from the *Langdons Mine* are distinctly different from those at Rosebery, Que River and Hellyer and are thus considered to have a very low probability of representing Cambrian mineralisation. They have the greatest similarity to mineralisation at Queen Hill.

The *Ring River* soil sample has about 400 ppm Pb and probably closely approximates to an initial ratio. Its has significantly lower $^{206}Pb/^{204}Pb$ ratios than the triumvirate of massive sulfide ore deposits in the region and is similar to the majority of data from the Elliot Bay region. Our interpretation of these data is that they most probably represent Cambrian Pb, but with a tectonic affiliation that has hitherto not been associated with significant ore systems.

The two *Cutty Sark* samples have distinctly higher $^{206}Pb/^{204}Pb$ ratios than either the Cambrian or Devonian mineralisation and contain relatively high levels of Pb - 220 and 440 ppm. On the assumption these samples were Cambrian in age, between 20 and 30 ppm U would need to be present in the samples to account for their present isotopic composition, and on the assumption they are Devonian in age and had similar isotopic ratios to Renison, then approximately 10 ppm U would be required. Such U levels, especially for the Cambrian model, are unlikely in these samples and so we conclude there is a low probability that the samples represent Cambrian mineralisation. A Devonian age is more likely, although probably with higher initial $^{206}Pb/^{204}Pb$ ratios than Renison.

Appendix 1 Level of Confidence of Interpretations

Interpretations of the economic significance of exploration samples using Pb isotopes are based on comparisons with a Pb isotope database of other mineralisation within the relevant geological province. The level of confidence of such interpretations is related to the amount and quality of data available and the level of understanding of the relationship between these "signatures" and the nature and timing of mineralisation in the context of the overall tectonic evolution of the province. A threefold classification has been developed to signify the confidence level for interpretations in all Australian geological provinces. Only the Lachlan Fold Belt falls into Category 1. The majority of prospective Australian geological provinces fall into Category 2 and it is the aim of research within the Division of Exploration and Mining to upgrade these to Category 1.

Category 1 Information
Lead isotopic signatures of each hydrothermal event represented in a geological province can be discretely defined (There are at least 10 examples of each event). There is a very good understanding of the metallogenic history of the prospect region, including the ages of different hydrothermal events and the style of mineralisation that is likely to be associated with each event. Interpretations based on Category 1 information can discriminate between mineralisation or anomalous surface geochemistry that has derived from either;

1. the main mineralisation window of a major mineralising epoch , or
2. minor mineralisation from waxing or waning stages of a major epoch or where only small hydrothermal cells were developed, or
3. minor mineralisation from an overprinted (epigenetic) hydrothermal event, or
4. near surface concentration due to weathering processes (false anomalies)

Category 2 Information
There are a number of known Pb isotopic signatures in a geological province, however, there is an incomplete understanding of the relationship of these signatures to metallogenesis and the timing of hydrothermal activity. Although discrimination of events can be made based on these signatures it is with a significantly reduced degree of confidence. Interpretations based on Category 2 information can discriminate between mineralisation or anomalous surface geochemistry that has derived from either;

1. a major mineralising epoch, or
2. minor mineralisation from an overprinted (epigenetic) hydrothermal event, or
3. near surface concentration due to weathering processes (false anomalies)

Category 3 Information
Lead isotopic signatures, and/or the metallogenic framework are only poorly understood in the prospect region. Discrimination can be made in some cases based on general principles and on comparisons with other similar, better understood provinces. Interpretations based on Category 3 information can discriminate between mineralisation or anomalous surface geochemistry that has derived from either;

1. small scale hydrothermal cells, or
2. near surface concentration due to weathering processes (false anomalies)