



## GALENA LEAD ISOTOPE RESEARCH ON MINERAL DEPOSITS AT THE UNIVERSITY OF BRITISH COLUMBIA\*

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Research by the Lead Isotope Research Group at The University of British Columbia, directed by the senior author in collaboration with R.L. Armstrong's Geochronology Laboratory, emphasizes the interpretation of galena lead isotopes to support decisions in mineral exploration, and contribute to the understanding of metallogeny in British Columbia. Lead isotopes from galena in mineral showings can be used to "fingerprint" mineral deposits to identify those with high potential; the isotopic signatures enhance the ability to classify deposits by age and genesis and focus exploration on high priority targets. The significance for increasing the effectiveness of mineral exploration is substantial and, in addition, our research should provide a sounder basis for the study of metallogeny as it relates to resource evaluation.

Our group is: (1) acquiring a library and computer-based file of galena samples from as many deposits as possible in the Canadian Cordillera, (2) developing case histories of exploration application, and (3) continuing research in models relevant to the study of metallogeny. Some details of these pursuits are outlined below.

Our library of galena currently consists of about 1400 samples. About 1000 of these are from 450 deposits in British Columbia. Most have been analysed at The University of British Columbia, at different times, with varying degrees of precision. These analyses, together with those available in the literature, have been entered into a computer-based "LEADTABLE". This (dBASEII) file contains: sample numbers; deposit name; details on the collector; location by latitude, longitude, NTS and MINFILE number; details on deposit type, age, host rock, and tectonic terrane; geological comments; details on the analyst and analytical quality; and galena lead isotope ratios with errors. Galena lead isotope data collected to date will be published as a British Columbia Ministry of Energy, Mines and Petroleum Resources paper in 1987. **Individuals with galena samples from deposits, particularly from recently discovered or remote showings, are urged to submit them to the authors.**

The study of galena lead isotope data is now commonly considered an essential element of detailed mapping of mineral deposits. In this report of activities, for example, galena lead isotopes are interpreted for the Stewart area (Alldrick *et al.*, 1987), and the Bend deposit in southeastern British Columbia (Reddy and Godwin,

1987). Goutier (1986) has recently completed a metallogenic study based on galena lead isotopes from 42 mineral occurrences on the Adams Plateau in south-central British Columbia. This study allows veins and volcanogenic deposits cogenetic with the Devon-Mississippian volcanics to be distinguished from all other types of occurrences. Goutier's work also illustrates that all occurrences on the plateau contain lead that is upper crustal in origin (this is unusual for lead from most volcanogenic deposits worldwide). This, together with Triassic apparent lead dates for deposits such as the Lucky Coon, tentatively indicate that part of the Eagle Bay Formation may be correlative with the Sicamous Formation and Slocan assemblage, rather than the current Cambrian interpretation (Schiarrizza and Preto, 1985).

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### REFERENCES

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British Columbia Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork, 1986, Paper 1987-1.