AUSTRALIAN MINERAL EXPLORATION: CHALLENGES FOR THE 21st CENTURY

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Australia is a leading mineral resource nation. It has the world's largest economic demonstrated resources of lead, mineral sands, nickel, silver, tantalum, uranium and zinc. It is in the top six countries for bauxite, black coal, brown coal, copper cobalt, gold, iron ore, lithium, manganese or, rare earth oxides, gem/near gem diamond, and vanadium. These resources underpin Australia's largest export sector, with mineral exports contributing $55.6 billion to the Australian economy in 2000-01. In this period Australia was among the top three producers of gold, diamond, zinc, tantalum and nickel.

Australia's strength in the mineral sector owes much to a massive, sustained and successful exploration effort that began in the 1950s and continues to the present. Even though global exploration investment has fallen in recent years, Australia continues to rank as the world's number one destination for exploration investment, with the country attracting more than 17% of the world's total budgeted exploration expenditure in the year 2000.

Many factors contribute to the attractiveness of a country for mineral exploration investment. A perception of prospectivity and an investment climate that is stable and financially competitive are very important and are features that Australia has traditionally demonstrated. The intellectual property base of the country is also critical, particularly in the areas of geoscientific knowledge and concepts, and exploration methods and technologies. Australia's proud record of mineral exploration success is due in no small part to the particularly strong collaborative research and development effort between industry and government. The impact of this collaboration is highlighted by past successes and private-sector risk taken within a knowledge framework supported by government is now commonly cited as "world's best practice" – a practice other countries that have not realised their mineral potential are now attempting to emulate.

Within the broad spectrum of Australian research and development into mineral exploration, our universities are focused on basic research into geological processes and Australia's geology, with some strategic research on mineral exploration models built on an understanding of the genesis of our mineral deposits. AGSO - Geoscience Australia, in collaboration with the State and Northern Territory geological surveys, undertakes strategic research that produces world class pre-competitive geoscience data and information on the nation's geology. CSIRO focuses on the applied end of the research and development spectrum, including in particular the development of exploration tools and techniques that are most appropriate to the unique Australian geological environment.

Various mineral-exploration focused Cooperative Research Centres (CRCs) bring these agencies together with industry partners to solve particular problems, and some of the most important recent breakthroughs and innovations have come from the CRCs. Although industry supports public-sector research and development, usually through the Australian Minerals Industry Research Association, a considerable amount of industrial research and development is conducted in-house.

Mineral deposits in Australia, as elsewhere are becoming harder to find. Gone are the days when prospectors stumbled over outcropping world-class deposits because most economic deposits near the surface have already been discovered. Many more giant mineral deposits undoubtedly exist in Australia but they are likely to be buried beneath surface cover, increasing the challenge of exploration success.

To meet the challenge of the tyranny of depth, Australia's research and development effort in exploration is concentrating on:

- new data-acquisition tools that allow explorers and geoscientists to probe further beneath the Earth's surface;
- new analytical methods for interpreting both existing and new geoscience data; and
- new exploration models that overcome the predictive weaknesses of current models.

With our record of success and our history of unique collaboration between government and industry in mineral exploration, Australia is well placed to maintain its dominant global exploration position.

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