



RESUMÉ

GRANT BOXER

**FAIG (RPGeo Mineral Exploration), Member Geol Soc Aust
Member Meteoritical Society , Member Geological Remote
Sensing Group (UK), Member Mineralogical Society of WA**

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SUMMARY OF PROFESSIONAL EXPERIENCE

I have worked in exploration and mining geology since completing my studies in geology in 1973 at the Royal Melbourne Institute of Technology, Victoria, Australia. The past 42 years have been spent in the exploration and mining industry undertaking exploration, evaluation, bulk sampling and mining activities. I was employed by Rio Tinto (CRA Exploration Pty Ltd and Argyle Diamonds) from 1978 until 1997, and during this time, spent 10 years located at the Argyle mine (East Kimberley) and in the West Kimberley undertaking exploration, evaluation programs, feasibility studies and mine development. This work included the design, supervision and analysis of drilling and bulk sampling programmes and the analysis of diamond size distributions in exploration, evaluation and mining operations on both pipe and alluvial deposits.

In the period 1993 until late 1997, I was engaged in diamond, nickel and gold exploration with Rio Tinto Exploration, based in Perth, which also included the use of MapInfo and Discover GIS packages for the compilation of geological, geophysical and remote sensing data sets.

From 1998 until mid-2002, I was employed by Astro Mining NL and Quantum Resources Limited, undertaking project reviews, field visits, project management and project generation for diamonds in Western Australia, Northern Territory and China. Activities included exploration on areas adjacent to the Argyle diamond mine, including the adjacent alluvial diamond Bow River Mine area, in the far north of WA and kimberlite exploration on tenements held in the Northern Territory.

Since 2002, I have consulted to the worldwide diamond exploration and mining industry for clients involved in diamond exploration in Australia, Brazil, China, Eastern Africa and India. Consulting activities range from grass roots exploration programme planning, through diamond project opportunity reviews to the analysis of exploration and evaluation diamond data.

Since early 2007, I have also been involved with a variety of exploration projects, including evaluation of Channel Iron Deposits and supergene iron ore deposits in the Pilbara and Yilgarn regions, manganese projects in the East Kimberley and a graphite project in Western Australia. Diamond exploration was also carried out during this period in India and Western Australia.



I also have an interest in meteorite impact craters and impact structures and have recently worked with Curtin University on a suspected impact structure in the western Yilgarn. My other interests include astronomy and astrophotography.

During the past few years, I have been organising and running workshops for the Australian Institute of Geoscientists (AIG) and other clients tailored for geologists on the use of QGIS (open-source geographic information system) including the import of vector, raster and satellite data, access to public datasets for planning exploration and geological data compilation and map production. More recently I have been exploring the application of satellite hyperspectral data for mineral exploration and geological mapping

QGIS is a free and open-source GIS program offering users unlimited access to GIS compilation and analysis. This is of particular relevance working when working with clients in areas of restricted budgets where purchase of proprietary software is not possible.

PROFESSIONAL MEMBERSHIPS

Fellow and Registered Professional in the field of Mineral Exploration of the Australian Institute of Geoscientists.

Member of the Geological Society of Australia

Member of the Meteoritical Association

Member of the Geological Remote Sensing Group (UK)

Members of the Mineralogical Society of WA

TERTIARY QUALIFICATIONS

Fellowship Diploma in Geology from the Royal Melbourne Institute of Technology (RMIT), awarded 1974.

COMPUTING SKILLS

Extensive experience with QGIS, *MapInfo* and *Discover* (GIS), *Excel*, *Word*, *Access* and *Powerpoint* software packages. Integration and interpretation of various exploration data in QGIS and MapInfo and Discover. Use of the Discover and QGIS for geophysical data import, presentation and interpretation of geological, geochemical and geophysical data.

PUBLISHED PAPERS

Recent Publications

Boxer G L and Rockett G. 2018. Geology, Resources and Exploration Potential of the Ellendale Diamond Project, West Kimberley, Western Australia. Record 2018/8, Geological Survey of Western Australia, Perth.

Rayner M J, Moss S W, Lorenz V, Jaques A L, Boxer G L, Smith C B and Webb K. 2018. New insights into volcanic processes from deep mining of the southern diatreme within the Argyle lamproite pipe, Western Australia. *Mineralogy and Petrology*. Published online 8th August 2018.

Boxer G L, Jaques A L and Rayner M J. 2017. The Argyle (AK1) Diamond Deposit, Western Australia, In *Australian Ore Deposits* (ed: N Phillips), p. 527-532, (The Australasian Institute of Mining and Metallurgy)

Rayner M J, Moss S W, Jaques A L, Lorenz V, Boxer G L, Smith C B and Webb K. 2017. New insights into volcanic processes and diamond grades from deep mining at Argyle. 11th International Kimberlite Conference, Extended Abstracts No. 11IKC-4483.



Rayner M J, Jaques A L, **Boxer G L**, Smith C B, Lorenz V, Moss S W, Ford D, and Webb K. 2018 The Geology and Volcanology of the Argyle (AK1) Lamproite, Western Australia. Economic Geology, Special Publication 20, pp. 89-117.

Previous Publications

Atkinson W J, Smith C B and **Boxer G L**. 1984. The Discovery and Evaluation of the Ellendale and Argyle Lamproite Diamond Deposits, Kimberley Region, Western Australia. SME-AIME Fall Meeting, Denver, Colorado, USA.

Lorenz V, **Boxer G L** and Smith G B. 1986. Zur Vulkanologie der diamantführenden Lamproit-Tuffschote im Kimberley-Gebiet, West-Australien. Presented by V Lorenz at DMG annual meeting, Mainz, West Germany.

Boxer G L, Lorenz V and Smith C B. 1989. The Geology and Volcanology of the Argyle (AK1) Lamproite Diatreme, Western Australia. In: Kimberlites and Related Rocks, vol. 1: Their Composition, Occurrence, Origin and Emplacement. Geological Society of Australia Special Publication No. 14, pp. 140-152. (Proceedings of the 4th International Kimberlite Conference, Perth, WA, 1986).

Jaques A L, Haggerty S E, Lucas H and **Boxer G L**. 1989. Mineralogy and Petrology of the Argyle (AK1) Lamproite Pipe, Western Australia. In: Kimberlites and Related Rocks, vol. 1: Their Composition, Occurrence, Origin and Emplacement. Geological Society of Australia Special Publication No. 14, pp. 153-169. (Proceedings of the 4th International Kimberlite Conference, Perth, WA, 1986).

Deakin A S, **Boxer G L**, Meakins A E, Haebig A E and Lew J. 1989. Geology of the Argyle Alluvial Diamond Deposits, Western Australia. In: Kimberlites and Related Rocks, vol. 2: Their Mantle/Crust Setting, Diamonds and Diamond Exploration. Geological Society of Australia Special Publication No. 14, pp. 1108-1116. (Proceedings of the 4th International Kimberlite Conference, Perth, WA, 1986).

Deakin A S and **Boxer G L**. 1989. Argyle AK1 Diamond Size Distribution: The Use of Fine Diamonds to Predict the Occurrence of Commercial Size Diamonds. In: Kimberlites and Related Rocks, vol. 2: Their Mantle/Crust Setting, Diamonds and Diamond Exploration. Geological Society of Australia Special Publication No. 14, pp. 1117-1122. (Proceedings of the 4th International Kimberlite Conference, Perth, WA, 1986).

Boxer G L and Jaques A L. 1990. Argyle (AK1) Diamond Deposits. In: Geology of the Mineral Deposits of Australia and Papua New Guinea, F E Hughes (ed.), The Australasian Institute of Mining and Metallurgy, Monograph No. 14, pp. 697-706.

Boxer G L and Deakin A S. 1990. Argyle Alluvial Diamond Deposits. In: Geology of the Mineral Deposits of Australia and Papua New Guinea, F E Hughes (ed.), The Australasian Institute of Mining and Metallurgy, Monograph No. 14, pp. 1655-1658.

Grice J D and **Boxer G L**. 1990. Diamonds from Kimberley, Western Australia. The Mineralogical Record, vol. 21, pp. 559-564.

Boxer G L. 2002. Origin and Significance of the Quartz Sand in the "Sandy Tuff" of the Diamondiferous Olivine Lamproite Diatreme of the Argyle Mine, Western Australia. Geological Society of Australia, Learned Australasian Volcanology Association (LAVA) specialist group newsletter, July 2002, pp. 7-11.

Boxer G L. 2002. Evidence for the Phreatomagmatic Origin of the Diamondiferous Argyle Diatreme, North Western Australia. Geological Society of Australia, Learned Australasian Volcanology Association (LAVA) specialist group newsletter, December 2002, pp. 10-18.

Chapman J G and **Boxer G L**. 2003. Size Distribution Analyses for Estimating Diamond Grade and Value. Extended Abstracts, 8th International Kimberlite Conference, Victoria, BC, Canada, June 22-27 2003.

Also co-editor of a diamond industry magazine, **Rough Diamond Review**, which produced eight issues over two years (2003 – 2005) and catered for the interests ranging from exploration and evaluation, to diamond valuation and manufacturing.



WORKSHOPS & TRAINING

1982 Modern and Ancient Volcanic Successions, volcanology workshop, Bairnsdale, Victoria run by Monash University, Victoria, Australia.

1986 Preparation and presentation of technical paper on the geology and volcanology of the Argyle diamond pipe and associated papers on the diamond size distribution and the diamondiferous alluvial deposits of Argyle. Assistance in the organisation of the 4th International Kimberlite Conference post-conference tour, and tour guide for the Kimberley area, WA.

1988 Course in "Financial Management for Engineers, Metallurgists and other Technologists", Fremantle, Western Australia.

Dec 1990 Ore Reserve Methodology Workshop, CRAE (Rio Tinto) workshop run by S Carras (consultant).

1991 Conference and mine visits during the African Mining Conference in Harare, Zimbabwe and the 5th International Kimberlite Conference at Araxá in central Brazil.

April 1992 Rock Magnetism and Magnetic Petrology Applied to Geological Interpretation of Magnetic Surveys, AMIRA Technology Transfer, Project P96C.

Nov 1992 International Roundtable Conference on Diamond Exploration and Mining, New Delhi, India.

Feb 1995 Magmatic Ni, PGE and Cr Ores, University of Western Australia - Short Course.

July 1996 Post-Archaean Magmatic Sulphide Deposits - Theory, Reality and Exploration. Australian Mineral Foundation Workshop Course 975/96, run by Tony Naldrett.

Oct 1997 Sampling Mineral Deposits - Theory and Practice, In-house Rio Tinto workshop. Other conferences and workshops related to diamonds, nickel exploration and mining.

Various visits to mines in eastern and southern Africa (copper, nickel, diamonds, chrome, gold, asbestos), Canada (gold, nickel), India (diamonds), Russia (diamonds), and Australia (diamonds, gold, iron ore, manganese, nickel).

PROFESSIONAL EXPERIENCE

CONSULTING GEOLOGIST

2008 – present

Recent Clients: AusQuest Limited, Chalice Gold, CSA Global, Flinders Mining Limited, Leopold Diamonds, Moonlake Minerals, Strategic Resource Management, Venus Metals Corporation and Zambesi Resources.

Activities included running training workshops for geoscientists in the use of QGIS in mineral exploration. GIS data management of various project data and project generation. Design and supervision of exploration and drilling programs for CID iron ore and manganese. Diamond exploration activities included exploration project reviews, exploration project planning, interpretation of aeromagnetic data in the search for kimberlite and lamproite pipes, ground geophysical followup, drilling and bulk sample planning. Activities included kimberlite, lamproite and alluvial diamond explorations (Australia and India).

CONSULTING GEOLOGIST

2002 – 2007

Clients: Argyle Diamonds, Ausquest Limited, Conquest Mining Ltd, Dwyka Diamonds Limited, Elkedra Diamonds NL, Flinders Mining Limited, Redox Diamonds Ltd, Rio Tinto Exploration Pty Limited, Tasman Resources NL and Tawana Resources NL.

Specific activities include diamond exploration project reviews, exploration and evaluation project planning, interpretation of aeromagnetic data in the search for kimberlite and lamproite pipes, bulk sample planning and supervision, diamond size distribution analysis, and analysis of bulk sampling and production data. Activities included kimberlite, lamproite and alluvial



diamond exploration in Australia, Brazil, China, Greenland and India, graphite exploration (Western Australia) and iron ore exploration projects (Western Australia).

ASTRO MINING NL & QUANTUM RESOURCES LIMITED 1998 – 2002

Position: PROJECT MANAGER (Perth, WA)

Commodity: Diamond

Responsibilities:

- Project generation and planning of field programs for diamond exploration in the Northern Territory comprising review of regional geological data, open file exploration data, processing and assessment of Landsat TM and geophysical data (2000 – 2002).
- Exploration for lamproite and alluvial diamonds in Bow River mine area, and adjacent areas in the East Kimberley of Western Australia, and management of exploration in joint venture tenements (1998 – 2002).
- Project review and management of diamond exploration programs in China for Quantum Resources joint venture activities (1999 – 2000), inclusive of field visits and recommendations for joint venture proposals and exploration programs.
- Project management of due-diligence program for diamond exploration at the Abminga Project (joint venture), northern South Australia, inclusive of interpretation of aeromagnetic and ground magnetic surveys and drill follow-up (1998).
- Detailed project review of diamond exploration carried out by Great Central Mines and Astro Mining on their Nabberu Project tenements in WA (1998).
- Review, examination and recommendation of exploration opportunities for Astro Mining and Quantum Resources (2000 to 2002).

RIO TINTO LIMITED (FORMERLY CRA LTD)

Rio Tinto Exploration Pty Limited

1992 – 1997

Position: PRINCIPAL GEOLOGIST (Perth, WA)

Geology: Archaean Yilgarn Province, Proterozoic cover sequences, Cenozoic regolith

Commodities: Gold, nickel, diamond Responsibilities:

- Project generation and supervision of a **Proterozoic gold** exploration programme in the Ashburton basin, WA (1997).
- Evaluation of an **Archaean gold** deposit including the understanding of the regolith and involving the delineation drilling, resource estimation, with liaison for mine planning and metallurgical studies (1996).
- Project generation for komatiite and mafic-hosted **nickel sulphide** deposits and a review of nickel laterite resources of WA (1995).
- Design and supervision of regional **diamond** exploration programs in southern WA (1993 - 1995).
- Technical advisor for regional **diamond** exploration in WA and project evaluation overseas, including regional diamond sampling in central Manitoba, Canada (1992).

Argyle Diamond Mines Pty Limited

1988 – 1991

Position: SENIOR TECHNICAL ANALYST (Perth and Argyle Mine, WA)

Geology: Diamond-bearing kimberlite and olivine lamproite diatremes

Commodity: Diamond



Responsibilities:

- Seeking world wide joint venture opportunities in diamond exploration and mining for CRA Diamonds with preliminary economic evaluation using DCF analyses of potential joint venture opportunities (1991).
- Review, data compilation and re-evaluation of the **Ellendale diamond pipes** of the West Kimberley of WA, inclusive of the design and implementation of a large diameter hole bulk sampling programme with the collection of grade, metallurgical, diamond size distribution and diamond valuation data, and subsequent resource estimation (1988 - 1990) for input into feasibility study.

Argyle Diamond Mines Pty Limited

1981 – 1987

Position: SENIOR GEOLOGIST (Argyle Mine, WA)

Geology: Diamondiferous olivine lamproite diatreme and diamondiferous alluvials

Commodity: Diamond

Responsibilities:

- Research into the geology and volcanology of the Argyle diamond pipe and diamond size distribution (1985-7).
- Exploration on the Argyle mine leases for additional pipe and alluvial diamond resources (1985-7).
- Sampling and evaluation of the Smoke and Limestone Creek alluvial diamond deposits (1985-87).
- Geological input into the Argyle mine feasibility study, inclusive of drilling, sampling and diamond size distribution data (1981-5).

CRA Exploration Pty Limited

1978 – 1980

Position: EXPLORATION GEOLOGIST (Derby and Kununurra, WA)

Geology: Diamond-bearing olivine lamproite diatremes

Commodity: Diamond

Responsibilities:

- Geological mapping and data input into the initial evaluation of the Argyle diamond pipe (1980).
- Supervision of drilling and bulk sampling operations of the Argyle pipe and adjacent alluvials (1980).
- Regional diamond exploration in the West and East Kimberley of WA (1978).
- Delineation and bulk sampling of lamproite pipes in the Calwynyardah and Noonkanbah lamproite fields, West Kimberley region of WA by ground magnetic surveys, drilling and trenching (1979).

MacINTYRE MINES (AUSTRALIA) PTY LIMITED

1978

Position: EXPLORATION GEOLOGIST (Kara, Tasmania)

MESSINA (TVL) DEVELOPMENT CO. LIMITED

1977

Position: GEOLOGIST (Avoca Mine, County Wicklow, Eire)

MESSINA (TVL) DEVELOPMENT CO. LIMITED

1975 – 1977

Position: GEOLOGIST (Messina group of mines, South Africa)



Responsibilities:

- Underground and surface geological mapping of Messina copper mines in northern South Africa. Providing input into underground mine planning and exploration activities both underground and at surface for extensions of known mineralisation and testing for new deposits.

CRA EXPLORATION PTY LIMITED

1974

Position: GEOLOGICAL FIELD ASSISTANT (Bowen Basin, Central Queensland)

TECHMIN PTY LTD

1973 & 1974

Position: CONTRACT GEOLOGIST (Central and Eastern Victoria)

HAMERSLEY IRON PTY LTD

1972 – 1973

Student Vacation Work (Tom Price, WA, Dec 1972 - Feb 1973)

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