



CURRICULUM VITAE – IAN GRAY

1994 – Present, Managing Director Sigra Pty Ltd ([http:// www.sigra.com.au](http://www.sigra.com.au)).

Sigra is a consulting, service and manufacturing company to the civil, mining and petroleum industries. Its areas of particular specialisation are matters related to the ground, especially fluids and rock mechanics. Sigra has developed the specialist tools used for this purpose. These include stress measurement systems, drill stem test tools, packers, gas content measurement systems, cementing equipment, separators and well control systems. They have also developed the electronics to go with this. Sigra measures in the field, analyses the results and designs solutions to civil, mining or coal seam gas needs.

Sigra also has its own laboratory for rock mechanics and gas work as well as a substantial workshop. Ian Gray has developed much of this equipment. Under Ian's control Sigra has taken a number of projects right through from exploration to design. This design includes mines, coal seam gas production and some civil works in tunnelling and slope stability. He is the holder of a number of patents in equipment, mining and drilling.

Major projects undertaken under the in last 10 years

- Queensland Coal Seam Gas. (QGC, Arrow, Santos). Sigra developed field testing equipment compatible with mining exploration drilling equipment to measure permeability and gas content over the Surat and Bowen Basins. This testing formed the basis for the reserve estimates that led to this industries development.
- Cut 3 & 4, Centennial Highway, Springfield (TMR)– Hydrogeology for slope stabilisation. Field work and analysis. Maintenance of pumping system.
- Belvedere Mine (Vale) – Exploration and design of a four seam longwall to 1000 m depth.
- Sydney Tunnelling Projects. Sigra has been involved in the site investigations for all the major rail and road tunnelling projects in Sydney since 2014. This work has principally involved stress and material property testing.
- Moranbah North and Grosvenor mines (Anglo) – Reviews of mine gas drainage practises and substantial exploration and consulting work.
- Kestrel mine (Rio Tinto). Review of mine design and two large exploration programmes to delineate gas and geotechnical parameters.
- Snowy 2.0 (SMEC, GHD and Snowy Hydro). Site investigation for this project including stress measurement, permeability testing, rock property testing and a geotechnical review of the project.
- Syferfontein longwalls (Sasol). Exploration, geotechnical measurements and design of two longwall mines.
- ACARP research projects into outbursting and rockbursting, coal mechanical properties, drilling developments and longwall rock mechanics.



1990-1994 Principal Engineer, Safety in Mines Testing and Research Station, Department of Minerals and Energy, Queensland Government.

- Engineer responsible for mine safety research. As part of this undertook gas drainage, frictional ignition and underground wind blast studies.
- Review of Moura No 4 mine disaster. Examined dust explosion cases.
- Provided expert advice in mine accidents to the government and mine clients.
- Designed and organised the first surface to in seam drilling operation in Australia at Central Colliery, German Creek.
- Wrote the first stiff drill string torque and drag model to analyse the drilling behaviour. Conducted study 'Optimisation of Long Hole Drilling Equipment'.

1989-1990 Senior Engineer, D J Douglas and Partners, Geotechnical Consultants

- Responsible for building up a mining wing of that company.
- The work also involved hydrogeology, deep retaining wall and foundation design.

1983-1988 Geotechnical Engineer, Geotechnical Control Office, Hong Kong Government.

- Responsible for landslide prevention measures, especially in the Mid-levels.
- Acted as Colony's Hydrogeologist.
- Worked on tunnelling projects for government.
- Did slope, foundation and structural checking.
- Developed an instrumentation division.
- R & D into piling.

1979-1982 Engineering Geologist, Australian Coal Industry Research Laboratories Ltd.

- Responsible for research into outbursting and gas drainage in coal mines at Leichhardt Colliery, Bowen No 2 mine and Moura No 4 mine.
- Spent 3 months in Japanese coal mines and wrote report on Japanese mining.
- Spent a lot of time physically working drilling and testing. This work formed the basis of my PhD.

1977-1978 Drainage Design Engineer, Auckland City Council.

Qualifications and Professional Memberships

- BE Civil (Auckland) 1977.
- MAppSc Hydrogeology, Engineering Geology (UNSW) 1979. Rock Mechanics of No 12 Stope New Broken Hill Consolidated Mine.
- PhD - Factors Influencing Outbursting and Gas Drainage in Underground Coal Mines (UNSW) 1983
- Member Society of Petroleum Engineers
- Member of the Australasian Institute of Mining and Metallurgy
- Registered Professional Engineer Queensland - Mining and Civil

Publications

- Ian has written 80 papers for conferences and journals.
- These cover slope stability tunnelling, mining, piling, hydrogeology, rock properties and drilling.
- He has presented the keynote lecture at the Eurock 2018 conference.