

Gary Meyer

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Principal Consultant

**Education**

BSc Geology and Chemistry, University of Adelaide.

Graduate Course in Hydrology, University of New South Wales.

Graduate Certificate in Management, University of Western Australia.

Areas of Expertise

- Hydrogeology, Hydrochemistry and Hydrology
- Environmental Water Management
- Groundwater and Surface Water Resource Management
- Mine Dewatering & Mine Water Management
- Groundwater, Flow & Solute Transport Modelling
- Geothermal Water Exploration
- Geothermal Resource Exploration and Assessment
- Coal Geology and Exploration

Career Summary

Mr Gary Meyer has over 30 years professional experience, focussed on hydrogeology since 1984, environmental management since 1994 and geothermal exploration and evaluation since 2004. He has worked in Canada, USA, Philippines, Cuba, Uzbekistan, Finland and Brazil on diverse water and environmental projects. Mr Meyer has experience in provision of water supplies to mining operations as well as mine dewatering and in the detection, control and assessment of risk at mine site and industrial site tailings, waste and water storage facilities. He has been involved in environmental baseline studies at several mining and industrial projects and in the development of environmental data management systems. He has developed numerical groundwater flow models for water supply and mine dewatering projects and flow and solute transport models for contaminated sites. Recently he has managed geothermal project aimed at evaluating the potential of a hot granite bodies and sedimentary aquifers for power generation and studied the geothermal potential of Australia and Hungary. Prior to 1985, Mr. Meyer was a coal exploration geologist for Western Mining Corporation.

Career Detail**Hydrogeological and Geothermal Work Experience from 2004-2016**

- **CSBP Limited, WA:** Supervised environmental water sampling for compliance and investigative projects. Managed a two year water sampling contract. Completed a groundwater flow and solute transport model to aid the optimisation of borefield production and to support an application for an increased allocation.
- **Territory Iron, NT:** Total site water balance model for pit water management and environmental studies. Pit closure studies.
- **Tronox Ltd, WA:** Hydrogeology of a conceptual pump and infiltration study to preserve Groundwater Dependent Ecosystems. Routine annual aquifer reviews.
- **Image Resources, WA:** Lead consultant for hydrogeology and hydrology studies for new mineral sands mining operations.
- **Crescent Gold, WA:** Mine dewatering studies for the Summit underground mine and the Calypso and Apollo open pit mines near Laverton, WA. Groundwater flow modelling to predict the impact of pumping on groundwater drawdown rates. Hydrogeology reports for water licence applications.
- **Ramelius Resources, WA:** Rehabilitation of mine water resources at the Mt Magnet Gold Operations. Airlift testing and down-hole camera inspections. Bore cleaning and rehabilitation studies. Hydrogeological studies on several open pit gold mines in the Eastern Goldfields, WA.

- **AngloGold Ashanti Tropicana Gold Project, WA:** Groundwater exploration for the Process Water Supply Borefield located in the Minigwal Trough, Officer Basin. Review of drilling and exploration methodologies, including use of gravity and magnetic data. Management and interpretation of pumping tests. Construction of a complex, calibrated groundwater flow model to predict long term water supply rates and optimum bore spacing. Sensitivity analyses. Hydrogeology reports for a water licence applications. Review of mine dewatering and water supplies for road construction. Total site water balance model.
- **Mutiny Gold, Gullewa Gold Project, WA:** Evaluation of potential surface water flows and their potential impacts on the Gullewa gold mining and milling operations.
- **Red5 and Greenstone Resources, Siana Gold Mine, Philippines:** Installation of five large dewatering bores with combined capacity in excess of 120L/sec. Review of pit dewatering operations. Ongoing environmental sampling at the Siana Gold Mine and baseline environmental water sampling in new exploration prospects.
- **Oceana Gold, Didipio Gold-Copper Mine, Philippines:** Completed a comprehensive groundwater flow model to predict dewatering requirements and optimum bore spacing. Two initial dewatering bores were installed based on modelling results. Completed a surface water flow model to predict low and high water flow events. Reviewed water quality data.
- **CSA Global (for ARMZ Uranium Operation), Russia:** The hydrogeology and dewatering requirements of the Argunskoye Uranium Deposit were reviewed as part of an overall review of mining concepts.
- **BHP Billiton, Nickel West Kwinana, WA:** Various environmental studies including ongoing review of groundwater quality at two sites. Soil contamination mapping and impact assessment. Evaluation of trigger levels for groundwater chemistry. Contaminated Site clean-up and final closeout report. Compilation of management plans, site investigation plans and quality control and assurance documents.
- **CSA Global (for Archipelago Resources), CoDinh Chromite Deposit, Vietnam:** Evaluation of groundwater and surface water at the deposit. Construction of groundwater and surface water flow models. Installation and testing of piezometers.
- **Green Rock Energy, Geothermal Projects:** Management of technical, environmental and heritage issues for a Hot Dry Rock (HDR) geothermal energy project located near Olympic Dam in South Australia. Included geological, geophysical, geotechnical, geothermal, drilling and water supply investigations. Managed geothermal exploration programs covering most of Australia. Geothermal evaluation and exploration in Hungary. Detailed evaluation of geothermal reservoirs and thermal potential of various prospects in the Zala, Jaszbereny and Pannonian basins. Regional geothermal evaluation of Hungary. Evaluation of the geothermal potential of the Perth, Collie, Carnarvon and Canning basins in Western Australia. Contributed to successful bids for geothermal permits in the Perth and Collie basins. Evaluation of the geothermal

potential of the Western suburbs of the Perth metropolitan area. Temperature mapping, reservoir evaluation, heat flow calculations and contributions to geothermal well designs, reservoir testing programs and pumping/injection designs.

- **Regis Resources:** Groundwater exploration for the Moolart Well Gold Deposit in Western Australia. Palaeochannel, saprolite and fractured rock aquifer targeting, drilling and evaluation.
- **OceanaGold Limited, Philippines prior 2009:** Hydrogeological investigations for open pit and underground mine dewatering at the Didipio Gold-Copper Project in the Philippines. Reviewed previous drilling and pumping test data. Set up a preliminary Modflow flow model to estimate potential dewatering requirements including design of the dewatering borefield. Next stage is to upgrade the model by testing the hydraulic behaviour of superficial alluvial and colluvial sediments and estimating stream flow and groundwater interactions. Also legal and environmental impacts of dewatering will be reviewed and dewatering bore sites will be selected from geological and geotechnical drilling information.
- **Niagara Mining:** Application for a licence to dewater and dispose effluent from the historic Windarra Nickel Mine in Western Australia. The mine is currently flooded after being abandoned for 12 years. The study required review of current mine water chemistry and assessment of risk for disposal of mine water effluent to an old gold tailings storage facility. Also provision of general advice on legal options for effluent disposal.
- **Minara Resources:** Assessment of risk to the environment from tailings storage facility seepage at the Murrin Murrin nickel operations in Western Australia. Review of geological results from previous drilling followed by the design of a seepage recovery borefield using a Modflow groundwater flow model. Set up programs for water supply borefields and review of environmental management plans. Supervised the setup of a Modflow flow model for estimating potential water supply from the Grey Mare borefield. This borefield was developed in alluvial and palaeochannel sand aquifers.
- **LionOre Australia (MPI):** Peer review of previous mine dewatering assessments for the Wedgetail Nickel Deposit at Honeymoon Well, Western Australia. Included detailed comparison of geological models used in the development of the model.
- **Kalgoorlie Nickel Smelter and Kambalda Nickel Concentrator:** Review of surface water issues and contributions to reviews of groundwater issues. Determination of peak water discharges and assessment of risk of storm water flow to neighbouring properties.
- **Indophil Resources, Philippines:** Water management plan for the Tampakan Copper Project. Comprehensive review of all water issues, including mine dewatering, water supply, acid rock drainage, storm impacts, community water supply impacts and seepage control. Set up work programs for pre-development studies including a dewatering investigation drilling programs. Supervised airlift recovery and water injection tests

prior to compiling a preliminary Modflow dewatering model for estimation of the dewatering requirements. Attended community water planning and management meetings.

- **Red5 Limited, Philippines prior 2009:** Completed water management modules for the Siana Gold Mine scoping, pre-feasibility and bankable feasibility studies. This included mine dewatering investigations, surface runoff management at the mine site, water chemistry, water usage classifications, environmental risk assessment and the site water balance. Ongoing work includes the management of a baseline environmental water survey which includes stream, lake, mine water and groundwater monitoring and stream sediment monitoring. Includes ongoing review, quality control and reporting. Established potable water supplies for the local community. Evaluation of the underground dewatering requirements for the proposed open pit and underground mining operations. Construction of groundwater flow models to predict discharge rates and optimise bore locations.
 - **Kwinana Nickel Refinery, WA prior 2009:** MWES provides hydrogeological advice to BHP Billitons Kwinana Nickel Refinery in Western Australia. This includes the monitoring and measurement of ammonium sulphate and nickel contamination at several sites, design and monitoring of recovery programs and investigations of impacts to neighbouring irrigation and domestic supply bores. Work involves:
 1. Ongoing annual environmental groundwater reviews for submission to the Department of Environmental Protection for both the Refinery and Baldivis sites.
 2. Mass balance and modelling studies to aid management of contaminant recovery operations at the Baldivis site. Modelling included construction of 2- and 3-dimensional, density driven, flow and solute transport model.
 3. Development of a management plans for recovery operations at the site.
 4. Bore census studies and risk assessments do determine the impact of plumes on other groundwater users.
 5. Soil, unsaturated zone and groundwater investigations at a pipeline leakage site. Recovery testing and risk analyses. (6) Annual aquifer reviews for submission to the Water and Rivers Commission (Office of Water).
 - **Harmony Gold, Mt Magnet, WA:** Strategic water exploration planning, borefield rehabilitation, tailings storage seepage studies. Hydrogeological investigation of a proposed in-pit tailings disposal site.
 - **Breakaway Resources, WA:** Contributions to the Notice of Intent (NOI) for development of the 5A Nickel Project at Spargoville.
 - **BGC Clay Products, WA:** Hydrogeological investigation of a proposed clay quarry.
- 2002 – 2003**
- **Western Power Corporation, Collie Basin, WA:** Development of strategic plans to enable groundwater licence renewals. Aquifer modelling & environmental impact assessment.

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- **Newmont Australia, Jundee & Ninary Gold Mines, WA:** Audit of groundwater monitoring at tailings storage facilities (TSF). Installation of monitoring bores at TSF and at hydrocarbon monitoring sites.
- **Black Swan Nickel, WA:** Groundwater exploration program design.
- **BGC Quarries, WA:** Mine dewatering and environmental impact assessments for quarry expansion and contributions to a Public Environmental Review. Provided expert witness on groundwater issues at a town planning appeals tribunal.
- **Department of Defence, WA:** Borefield & aquifer reviews at Exmouth and Learmonth.
- **Department of Conservation & Land Management, WA:** Hydrogeology of Lake Mears, Wheatbelt area, WA. Contributions to lake desalination and restoration projects.
- **Cockburn Cement, WA:** Aquifer reviews.
- **Strike Oil, Queensland:** Examined water treatment options for desalination of dewatering effluent from a Coal Bed Methane project in the Walloon Coal Measures, SE Queensland.
- **Harmony Gold, Mt Magnet, WA:** Review of annual report to Water & Rivers Commission. Review of water balance methodologies at the Cue Gold Mine Tailings Storage Facility.

Prior 2002
WMC
Resources Work
Experience

- Managed a team that installed the largest palaeochannel-type borefield in Western Australia and a large-scale borefield in the Great Artesian Basin in South Australia. Borefield modelling, monitoring and water resource assessment studies. Management of tenements and licences for water exploration, water supply and water discharge.
- Prepared complete minesite water balances and studied parameters that control water loss to tailings storage facilities. Mapped and modelled seepages and sourced materials for water storage structures using innovative geophysical methods.
- Surface water catchment feasibility studies.
- Studied artificial recharge and storage systems and their application to WMC.
- Environmental baseline studies and mine dewatering studied in the Philippines.
- Review of all water issues at operations and new WMC projects in Uzbekistan, Finland, Canada, USA, Cuba, Mozambique and Brazil. Work included government negotiations, environmental law, assessment of water treatment technologies, solving acid rock drainage problems and setting up baseline environmental projects.
- Mine closure studies.

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- Studied potential for Solution Mining at various WMC operations.
- Studied potential for Deep Well Injection at one WMC operation.
- Championed water conservation in WMC and audited annual water consumption statistics.
- Set up safety management and reporting systems for a WMC work group.
- Supervised the completion of WMC's world class computer water management system and installed the system in all Western Australian operations. Upgraded all WMC's water monitoring procedures and systems to world class standard. Compiled manuals and training modules.
- Exploration and development of borefields for the Leinster Nickel Operations, Emu Gold Operations, Hill50 Gold Mines, St Ives Gold Operations, Central Norseman Gold Corporation, Mt Windarra Nickel and Gold Operations, Davyhurst and Lady Bountiful gold mines and the East Karli Gold Mine in WA.
- Rehabilitation of abandoned borefields near Mt Windarra and Leinster in WA.
- Mine dewatering studies at the Bendigo Gold Mines in Victoria, and the St Ives Gold Operations, Kambalda Nickel Mines, Central Norseman Gold Corporation, Blair Nickel Mine, Hill 50 Gold Mines, Beasley Creek Gold Mine and Emu Gold Mines in WA.
- Tailings dam infiltration studies at the Perseverance Nickel Mine in WA
- Exploration and discovery of several lignite and sub-bituminous coal deposits in Victoria, South Australia and Western Australia. Notable was the discovery and evaluation of the Kingston Lignite Project in South Australia. Work included exploration resource drilling up to proven category, geotechnical drilling, hydrogeological studies, mining studies and combustion studies.
- Wireline log interpretation. Core calibration.
- Computer resource modelling.

Prior 1985
Western Mining
Coal Geology
Experience

Professional
History

- Green Rock Energy, Contact Project Manager, 2004 to 2014.
- Hardrock Mining Solutions, Contract Senior Hydrogeologist, 2004 to present.
- MWES Consulting (formerly Meyer Water & Environmental Solutions), Principal Consultant, 2001 to present.
- WMC Resources Ltd, Perth WA, Manager-Hydrology, 1994 to 2001.
- Western Mining Corporation Limited, WA, Senior Hydrogeologist, 1985 to 1994.
- Western Mining Corporation Limited, Victoria, Senior Coal Geologist and Project Geologist, 1979 to 1985.
- South Australian Department of Mines, Geologist, 1975 to 1979.

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Affiliations Member, International Association of Hydrogeologists.
Member, Australian Water Association.
Member, International Mine Water Association.

Training Supervision, management, presentation skills, financial evaluation, computing, SAP accounting, Six sigma course to green-belt level and geothermal reservoir evaluation course