

Andrew Birtles

Overview

Mr. Andy Birtles is a Mining Engineer, Professional Engineer (ECSA) and a Chartered Engineer (Engineering Council) and has specialised in the coal mining sector since 1979 and in the metalliferous and heavy minerals sector since 1999. Mr. Birtles has extensive experience in coal mine operations, planning and design (both opencast and underground), metalliferous, precious metal and precious stones mine planning and design (both surface and underground), and heavy minerals mine planning and design. He has also been involved in the valuation of mining projects and operations and exercises involving initial public offerings (IPOs) and the development of Public Reports and Technical Reports. Mr. Birtles has also been involved in coal research and development and in lecturing activities at tertiary educational facilities. He is currently employed undertaking Industrial Risk Surveys on mining operations (predominantly Poland and South Africa) and preparing reports for the insurance sector, undertaking technical studies (recently for an Indian company) and involvement in several “expert witness” programmes.

Professional Profile

An experienced, energetic and enthusiastic mining engineer, with a range of global operational, planning and consulting experience, predominantly in the coal mining sector. Experience includes most mining operational methods, and the associated issues associated with such mining methods:

- Surface (opencast, open pit): truck & shovel, dragline, in-pit sizing and conveying;
- Underground (coal): bord and pillar (conventional and mechanised), longwall, shortwall, pillar extraction;
- Underground (metalliferous, precious metals, precious stones): room and pillar (conventional and mechanised), stoping, cut and fill.

Able to perform and manage mine design and mine planning exercises, feasibility studies, due diligence exercises, reporting of Coal Reserves, compilation of public and technical reports, evaluation of mining projects, review of mining project technical issues, improvements of operational practices, assistance with operational improvement practices (water management, spontaneous combustion remediation, productivity improvements, labour practices, health, safety, risk and environmental issues), estimation of the effects of subsidence as a result of mining activities.

Possesses excellent interpersonal, communication project management and reporting skills and the ability to develop and maintain mutually beneficial client and professional relationships. Enjoys being part of, as well as managing, motivating and training, a successful and productive team, and can perform well in highly pressurised and challenging working requirements. Is constantly looking to improve methods of undertaking the mining design and planning approaches, the presentation of results of the exercises required, and ways of presenting risks and opportunities for the exercise presented.

Has also been involved in coal research and development and in lecturing activities at tertiary educational facilities.

He is currently a member of the Leadership Team of the Mining Technology Group of the Institute of Materials, Minerals and Mining (IOM3), a Strategic Advisor to the Technical Communities Board of the IOM3, a representative of the IOM3 for the Global Minerals Professional Alliance, and Deputy Chairman of the Pan

Career Summary

Fourteen years consulting from the UK, for global mining consultancy companies and junior and major mining companies. Involved with, and managed, a number of coal and metalliferous feasibility studies, operational reviews (including safety, health and environment reviews) and several due diligence exercises and reviews, as well as compiling a number of Public and Technical Reports. For the past five years this has included Insurance Risk Surveys on mining operations in South Africa, southern Africa, Poland, various other countries in Europe, Kazakhstan, Canada and Brazil, and being engaged as “expert witness” for several litigations and inquest processes.

Thirteen years consulting in South Africa, for a global mining consultancy company. Developed a Coal Services Division. Involved with, and managed numerous feasibility studies, operational reviews, due diligence exercises and evaluation exercises, compilation of public and technical reports predominantly for coal projects but also for occasional minerals projects.

Eight years operational, planning and managerial experience in the South African coal industry, underground (bord and pillar; conventional, longwall, shortwall, pillar extraction) and surface (opencast, dragline, truck and shovel; openpit, truck and shovel, in-pit sizing and conveying, augur mining, surface miners).

Eight years operational and managerial roles in the UK coal industry, predominantly underground and with the longwall mining method.

Selected project and operational experience are presented in Appendix 1.

Experience Summary

2014 – Present	ANB Mining Ltd. UK	Director and Principal Mining Engineer
2012 - 2014	Tetra Tech WEI Inc UK	Divisional Manager Mining - Europe and Africa
2011 - 2012	Wardell Armstrong International UK	Director of Mining
2005 - 2011	SRK Consulting RSA	Mining Department Partner
1997 - 2005	SRK Consulting RSA	Mine Planning Department Principal Mining Engineer
1996 - 1997	New Denmark Colliery RSA	Underground Coal Production Manager
1996	New Denmark Colliery RSA	Underground Coal Section Manager
1994 - 1996	New Vaal Colliery RSA	Opencast Coal Section Manager (Planning)
1993 - 1994	Kleinkopje Colliery RSA	Opencast Coal Drill & Blast Mine Captain
1992	Kleinkopje Colliery RSA	Opencast Coal Production Mine Captain
1991	SA Coal Estates RSA	Opencast Coal Planning Mine Captain

1989	New Denmark Colliery RSA	Underground Coal Technical Assistant
1987 - 1989	Annesley Colliery UK	Underground Coal Assistant Under Manager
1986 - 1987	Bentinck Colliery UK	Underground Coal Assistant Under Manager
1984 - 1986	Welbeck Colliery UK	Underground Coal Technical Assistant
1982 – 1984	Welbeck Colliery UK	Underground Coal Engineering Trainee

Education and Qualifications

B.Sc (Hons) Mining Engineering, Nottingham University (1982)

UK First Class Certificate of Competency (1984)

South African Mine Manager's Certificate (1990)

Professional Affiliations and Registration

Fellow of the Institute of Materials, Minerals and Mining (IOM3)	30276 12/12/2016
Member since:	27/01/1988
Member of the Leadership Team of the Mining Technology Group of the IOM3.	01/01/2016
Strategic Advisor to the IOM3 Technical Communities Board	18/03/2019
IOM3 Representative of the Global Minerals Professionals Alliance	01/04/2019
Member of SA Colliery Managers Association (SACMA)	371/MB883 03/02/1995
Member of SA Institute of Mining and Metallurgy (SAIMM)	701744 19/06/1998
International Council Member of the Fossil Fuel Foundation of Africa (FFF)	000053 29/03/2003
Chartered Engineer with Engineering Council (C.Eng.)	374407 27/01/1988
Professional Engineer (ECSA) (Pr. Eng.)	20010019 15/03/2001
Vice Chairman of the Pan European Reserves and Resources Reporting Committee (PERC)	18/06/2019
Member of the Australian Institute of Mining and Metallurgy (AusIMM)	313368 23/07/2020

IT Skills

MS Word, Excel, PowerPoint, Project, Outlook, Explorer	Advanced
MS Access	Intermediate

Visual Basic	Intermediate
Google, Google Earth, Google Earth Pro	Advanced
Planet GIS, QGIS	Intermediate
Micromine, Surpac	Intermediate
Deswik, other mining scheduling software	Beginner
Adobe	Intermediate
Apple Pages, Numbers, Keynote; Scrivener; TurboCad	Intermediate
AutoCAD/ DraftSight	Advanced
3D Solidworks	Intermediate
"Gadget" management	Intermediate

Appendix 1- Key Experience – Coal Projects

- **UltraTech Cement Limited, India** – Investigations into the geological and mining issues associated with the Arjuni East Coal Block as part of Brownlee Cale Consulting Services Limited team, resulting in the development of a practical mining approach and the compilation of a Detailed Project Report.
- **Seriti Group (Seriti Coal, Seriti Power), South Africa** – Annual assessment of the Material Damage and Business Interruption risks for the collieries in the Seriti Group for insurance brokers and underwriters.
- **Tungela, South Africa** – Assessment of the Material Damage and Business Interruption risks for their collieries in Mpumalanga Province for insurance brokers and underwriters.
- **LW Bogdanka, Poland** – Annual assessment of the Material Damage and Business Interruption risks for the colliery for insurance brokers and underwriters.
- **Tauron Group, Poland** – Assessment of the Material Damage and Business Interruption risks for the three collieries in the Tauron Group for insurance brokers and underwriters.
- **JSW Group, Poland** – Annual assessment of the Material Damage and Business Interruption risks for several collieries in the JSW Group for insurance brokers and underwriters.
- **Westmoreland Mining LLC, Canada** - Assessment of the Material Damage and Business Interruption risks for two surface coal mines in the Westmoreland Group for insurance brokers and underwriters.
- **PGG Group, Poland** – Annual assessment of the Material Damage and Business Interruption risks for eight collieries in the PGG Group for insurance brokers and underwriters.
- **KWK Węglókoks, Poland** – Annual assessment of the Material Damage Business Interruption risks for insurance brokers and underwriters.
- **PG Silesia, Poland** - Assessment of the Material Damage Business Interruption risks for insurance brokers and underwriters.
- **Russki Ugol, Russia** – Reporting of Coal Resources and Coal Reserves in order to secure a loan from a financial institution.
- **KTK, Russia** - Reporting of Coal Resources and Coal Reserves in order to secure a loan from a financial institution.
- **Seriti Coal, South Africa** - Assessment of the Business Interruption risks associated with three collieries comprising Seriti “tied” collieries (for power generation) for insurance brokers and underwriters.
- **Lublin Coal “Bogdanka” Spółka Akcyjna, Poland** - Assessment of the Business Interruption risks associated with the three areas comprising Bogdanka for insurance brokers and underwriters.
- **Balamara Resources, Poland** – Review of the conceptual, pre-feasibility study documents, and advice on the development of a feasibility study for a number of coal projects
- **Whitehaven Coking Coal Project, UK** - Supply of technical knowledge, development of mining layouts and mining schedules, development of technical economic model and performing sensitivity/project robustness analyses for West Cumbria Mining and their sponsors/investors. Assistance with the mining aspects of the Pre-feasibility Study.
- **Sharyn Gol Mine, Mongolia** – Supply of technical assistance on several occasions to the European Bank for Reconstruction and Development (EBRD) for the assessment of the status of Sharyn Gol Mine, northern Mongolia, and its potential for additional production to satisfy the immediate and projected sales forecasts, as well as the company’s ability to service its debt with EBRD.
- **Kolmar Coal Company, Russia** – Feasibility study for the development of a greenfields underground coal mine in the far east of Russia (Yakutia). This involved both longwall and bord and pillar coal mining methods.
- **Kolmar Coal Company, Russia** – Cost Benefit Analysis exercise for the development of a greenfields opencast coal mine in the far east of Russia (Yakutia). This involved both “contour” and traditional strip mining methods.
- **JCOAL, Japan** – Research and comment of a number of European and Asian countries, assessing their use of fossil fuels and the generation capacity of those countries, and the capacity to apply clean coal technologies to the current and planned generation facilities.
- **Kumba Resources, South Africa** – Assisted with the review and evaluation of the coal mining assets for the Initial Public Offering of Kumba Resources for Exxaro.
- **Exxaro Resources, South Africa** - In-Pit Crushing and conveying study.
- **Severstal Resources, Russia** – Coal Resource valuation and Pre-feasibility study for the Ulug Khem Coal Project, eastern Siberia.
- **Delta Mining, South Africa** – Technical advice to the owner’s team during the Feasibility Study for a coal mining project, near Delmas,
- **East Coal, Ukraine** – Development of a Public Report for the Canadian bourses.

- **JSW, Poland** – Development of a Public Report for the Poland and UK bourses.
- **ZE PAK, Poland** – Development of a Public Report for the Poland and UK bourses.
- **African Energy, Botswana** – Review of Coal Resources and mineral rights for the Sese Coal Project.
- **Aviva, Botswana** – Development of a scoping study for the Mmamantswe Coal Project.
- **ENRC, Mozambique** – Assistance with the estimation of Coal Resources, Estima Coal Project.
- **Debswana, Botswana** – Development of a feasibility study at Morupule Colliery.
- **Homeland Energy, South Africa** – Technical assistance, mine planning and Public Reporting for Kendal Colliery.
- **Mashala Resources, South Africa** – Due diligence and the development of a Public Report for a number of operations in the Ermelo region.
- **SUEK, Russia** – Assistance with the preparation of a Public Report.
- **Anglo Coal, South Africa** – Review and optimisation of mine planning at Kriel Colliery.
- **NAB, Mozambique** – Scoping study for the Revuboe Coal Project, Mozambique.
- **Edenville, Tanzania** – Development of Coal Resource estimate and development of preliminary mine plan.
- **Hwange, Zimbabwe** – assistance with mine planning and derivation of Coal Reserves.
- **ABSA, Nigeria** – Review for the re-establishment of a coal mining sector in several states in Nigeria.
- **BHP Billiton, Australia** – Due diligence on the Shell Coal assets for potential acquisition.
- **Beacon Hill, Mozambique** – Review of the Minas Moatize project and coal processing facilities.
- **RioZim, Zimbabwe** – Review of the Gokwe North Project for preliminary development.
- **MTI, South Africa** – Technical Assistance during the development of the Msebe Coal Project.
- **Walter Energy, UK** – Public Reporting for the Aberpergwm Colliery.
- **Sekoko, South Africa** – Technical assistance and mine planning.
- **Tuli Coal, Zimbabwe** – Coal Resource estimation and mine planning.
- **Optimum Coal, South Africa** – Due diligence and Public Reporting.
- **Petmin, South Africa** – Review of the Springlake Colliery mining and processing operations.
- **Kangra Coal, South Africa** – Due diligence on the mining assets.
- **Anker, South Africa** – Technical assistance, Coal Resource estimate review, due diligence.
- **Wescoal, South Africa** – Technical assistance, due diligence, acquisition advice.
- **Eskom, South Africa** – Assessment on long term mine planning for Kriel Colliery.
- **SACMH, South Africa** – Development of Coal Resource estimates, mine plans, Coal Reserve derivation, continuing technical assistance.
- **AEMFC, South Africa** - Development of Coal Resource estimates, mine plans, Coal Reserve derivation, continuing technical assistance.

Appendix 2- Key Experience – Coal Operational

- **Safety Officer, Welbeck, UK** – Technical assistance, due diligence, acquisition advice.
- **Shift Under Manager, Annesley-Bentinck, UK** – Assessment on long term mine planning for Kriel Colliery.
- **Shift Boss, New Denmark, South Africa** – successful shortwall installation, production and relocation
- **Planning Officer, Coal Estates, South Africa** – compilation of business plan, development of computer skills
- **Mine Captain, Kromdraai, South Africa** – Introduction of 200t rigid trucks and commencement of production, improvement of computer skills
- **Mine Captain, Kleinkopje, South Africa** – introduction of RH200, surface miner, five year forecast
- **Planning Manager, New Vaal, South Africa** – Truck Despatch, production increase, business planning
- **Production Manager, New Denmark, South Africa** – East Longwall, introduction of New equipment, longwall relocation, downtime analysis
- **Planning Manager, New Denmark, South Africa** – Liaison with farmers, reconsideration of mine plan following reduction of Coal Resource, business planning, innovative equipment introduction
- **Project Manager, New Denmark, South Africa** – Water management, capital equipment scheduling, production statistics monitoring, planning of development of new areas, satellite shaft commissioning
- **Owners' Engineer, Barakupuria Coal Mining Company Limited, Bangladesh** – Contract management for the owners, considering production performance, safety standards, future planning and adherence to the contractual obligations of the (Chinese) mining contractor

Appendix 3 - Key Experience – Metals/ Other Commodities

- **Future Energy Partners, UK** – “Expert witness” in the arbitration of the performance of a mining machine in a chrome mine in Kazakhstan. The arbitration, held in Sweden, found in favour of the Future Energy team.
- **Marathon Gold, Canada** – Construction All Risks assessment of a gold mining project in Newfoundland/ Labrador for investors, insurance brokers and underwriters.
- **Arcelor Mittal, Serbia** – Desktop assessment of the Material Damage and Business Interruption risks for their Tailings Storage Facilities for insurance brokers and underwriters.
- **Arcelor Mittal, Brazil** – Desktop assessment of the Material Damage and Business Interruption risks for their Tailings Storage Facilities for insurance brokers and underwriters.
- **Arcelor Mittal, Kazakhstan** - Assessment of the Material Damage and Business Interruption risks for their Tailings Storage Facilities for insurance brokers and underwriters.
- **ArcelorMittal, various** - Assessment of the Material Damage and Business Interruption risks for tailings storage facilities in Serbia, Kazakhstan and Ukraine for the ArcelorMittal Group for insurance brokers and underwriters.
- **Trepca, Kosovo** – Review and development of a technical –economic model with a view of increasing production from a number of underground operations, with a variety of mining environments, ranging from narrow vein to massive type orebodies.
- **Anglo American, South Africa** – Review of the health, safety and risk policies, procedures, standards and implementation strategies at the platinum mines
- **Azerbaijan Steel Production Complex, Azerbaijan** – Review of the surface mining operations and assessment of production potential, including the potential of an underground mine.
- **Western Mining, Mozambique** – Scoping and feasibility studies for the Corridor Sands Mineral Sands Project.
- **Pathfinder, Mozambique** – Preliminary investigations into a Mineral Sands Project.
- **QIT Madagascar Minerals, Madagascar** – Assistance with the development of an alternative mine plan
- **TEM, South Africa** – Review of the Xolobeni Mineral Sands Deposit.
- **Consol, South Africa** – Estimation of Sand Resources and development of a mine plan and Sand Reserves.
- **Volta Resources, Burkina Faso** – Feasibility study for an open pit gold mining project
- **Gécamines, Democratic Republic of Congo** – Due diligence exercise and “outlook” assessment for a Copper and Cobalt deposit in the south east of the Democratic Republic of Congo, near Kolwezi
- **Euromax Resources, Macedonia** – Pre-feasibility study for a copper/gold project
- **Chuquicamata, Chile** – Detailed bench design and shovel and truck allocation
- **Kumba Resources, South Africa** – Development of detailed production schedule for Sishen and Thabazimbi
- **Kumba Resources, South Africa** – Detailed bench design and production schedule - Sishen
- **Vametco, South Africa** – Review and re-design of mining approach
- **Gold Fields of South Africa** – Development of production profile, contract document compilation and adjudication for a gold project in Peru
- **Iscor, South Africa** – part of the due diligence team assessing the mining operations during the privatisation process.
- **Iron Ore Project, Algeria** – Initial assessment into viability of development

Appendix 4- Professional Development

- **SRK Consulting, South Africa** – refinement of computer skills, implementation of coal services team – which was profitable and respected within the industry, development of GIS skills within department, introduction of mining scheduling software, development of project robustness analyses, interaction with other specialists and manufacturers, embraced ISO9001 quality standard.
- **Wardell Armstrong, UK** – introduced dedicated geological and mining software, returned the mining department to profitability, introduced bi-annual team interaction meetings, interacted with regional offices, increased staffing and co-ordinated work within the two mining departments.
- **Tetra Tech, UK** – successfully delivered a number of Feasibility Studies for openpit gold mining projects, introduced appropriate communication channels among the mining departments in North America, introduced alternative approaches to project robustness and risk analyses.
- **ANB Mining Ltd., UK** – Develop 3D modelling skills, involved in several Feasibility Studies, requiring technical-economic models, review of underground mining operations resulting the development of a financial model in conjunction with a major accounting firm, established lines of communication with major equipment suppliers, attended conferences. Involvement with business insurance risk surveys for mining operations, mainly coal, and associated facilities. Development of reporting approach for the insurance market in Poland.
- **IOM3, UK** - attended and assisted in the organisation of conferences, assisted the MTD Board in developing Vision and Mission Statements, update the MTD website on a regular basis. Currently a Strategic Advisor on the Technical Communities Board, and member of the Mining Technology Group Leadership Team, part of the editorial group for the quarterly newsletter. Developing activity in promoting mining educational initiatives. Development of the Qualified for Minerals Reporting (QMR) accreditation process.
- **SAIMM, South Africa** – regularly review papers for publishing in the SAIMM Journal.
- **PERC, UK** – Vice chairman of the executive committee, and involved in the communications sub-committee. The executive is responsible for the further development of the PERC Standard and associated initiatives.