

# ENVIRONMENTAL MANAGEMENT AND STEWARDSHIP - Andy Robertson



During his career in the mining industry, Dr Andrew McGregor Robertson, (co-founder of SRK, Gemcom and Infomine) has worked tirelessly to protect the environment, communities, water quality and water supplies. Since many of mining's impacts come from sediment discharge and acid rock drainage (ARD), the management of tailing and waste rock stability and geochemistry - Robertson's background in rock-mechanics, geotechnical engineering, and his (self-taught) expertise in geochemistry has allowed him to focus his career on setting the environmental stewardship bar high for the industry and for the work products he delivers. Robertson is passionate about improving the design, construction, operation and closure of tailing dams since integrity of these dams is crucial to protecting current and future (perpetuity is a long time) generations from extreme events and 'black swans'. To make tailing dams of today and the future safer, he advocates a) ever improving technology

for the design, construction and long-term stability of tailing dams; b) -scal capability - to construct and operate tailing dams that do not leave a debt burden on our grandchildren and c) governance - so that today's designs account for the needs of succeeding generations and changes in societal expectations. With the goal of making tailing dams physically and environmentally safe, he continues to serve on multiple peer review panels and independent design review boards for some of the tallest and most challenging tailing dams in the world. He was instrumental in pioneering the use of Failure Mode and Effects Analysis (FMEA) - one of the -rst systematic techniques for failure analysis, originally developed in the 1950s to study problems that might arise from malfunctions of military systems and MAA's (Multiple Account Analyses) to engineered solutions in the mining industry. At the age of 30, Oskar Steen, Hendrik Kirsten and Andy Robertson formed Steen, Robertson & Kirsten, the -rst consulting -rm in Africa to specialise in mining geotechnics. Four years later he moved to Canada to start the -rst overseas branch of what would later become SRK Consulting. Numerous US offices were formed under his guidance and SRK maintains a focus on protecting the environment through its engineering work. From the 1980s to 2000 Robertson worked on foundational research for the testing, prediction and control of acid mine drainage. He was a contributing member of the British Columbia ARD Task Force, which published some of the industry's -rst ARD guidelines. He has written and contributed to industry technical guides on mine waste management, uranium mill waste disposal (for the National Uranium Tailings Program, Department of Energy, Mines and Resources, CANMET, 1987) and guidelines for the rehabilitation of mines for Ontario Ministry of Northern Development and Mines (1991). These guidelines established the foundation for environmental best practices in the industry. In 1982 he founded Gemcom (now GEOVIA), a company that -nanced, developed and sold the mining

industry's first PC based exploration database, ore deposit modelling and open pit mine planning software. In 1989, as part of his vision to make mining information widely available, he launched InfoMine (initially as part of SRK). Later he saw the power of the internet to allow universal access to the information and implemented a digital strategy that remains the cornerstone of the company. Under his leadership InfoMine created many valuable shoots including EduMine.com, a training resource for mining industry professionals. It offers industry and university recognised certifications and has over 6,000 registered students. In addition, InfoMine offers recruiting and a number of other database mining information sites, including a used mining equipment listing site, a suppliers directory, and an on-line mine costing tool called CostMine. He recently oversaw the creation of ConferenceMine, a technical conference division that facilitates the exchange of mining knowledge, experience and lessons learned. In 1994, he founded Robertson GeoConsultants (RGC), a highly specialised, international mining consultancy based in Vancouver BC where he continues his work on tailing and waste rock stability and geochemistry, all of which are crucial to protecting the environment. Robertson's interest in continually raising industry standards to protect the environment has been a pervasive theme in carrying out his work and in making contributions to the industry. He approaches his work with tremendous focus and enthusiasm, and takes genuine interest in his clients, colleagues, employees and projects. His education included a B.Sc. Civil Engineering, University of Witwatersrand, South Africa, 1966 and a Ph.D. Engineering (Rock Mechanics) from the University of Witwatersrand, South Africa, 1977. Specialisation:

- Geotechnical engineering
- Environmental engineering
- Pit slope engineering
- Risk analysis
- Audit and review for mines
- Expert testimony
- Tailings dam design
- Mine waste management
- Geochemical characterisation and ARD (AMD) control
- Environmental liability assessment
- Mine closure plan development

As Principal, Robertson GeoConsultants (Canada & USA) he is responsible for technical and corporate guidance and development of a mining, geotechnical and environmental engineering international practice. He is directly responsible for a wide range of mining, geotechnical and environmental engineering projects for the mining industry and government clients, including site investigations and foundation design, rock mechanics and soil slope stability for open pit mines; design of a wide variety of tailings impoundments; waste dump investigations and designs, including acid rock drainage (ARD) evaluations, control and mine closure plan development. He has performed numerous dam safety inspections and environmental liability assessments for tailings and water dams, mine waste dumps and mining properties. He served as an expert witness for a number of court cases including insurance claims. He also served as senior Arbitrator in an American Arbitration Association adjudication and has served on a number of Boards of Review, Advisory Panels, and as the Chairman of the Board of Studies for the Geological Engineering Program at the University of British Columbia (Associate Professor Status). He gave a number of courses on acid mine drainage control, mine closure and mining geotechnics to government (US EPA) and industry institutions. Projects have been undertaken in Canada, the USA, Germany, France, Sweden, Norway, the Czech Republic, Chile, Brazil, Argentina, Peru, Guatemala, Australia, Philippines, Vietnam, South Africa, Mali, Namibia and Irian Jaya. From 1977 to 1994, as Corporate Consultant, SRK (Canada) he was responsible for technical and corporate guidance and development, mainly in the field of geotechnics. He was directly responsible for site investigation and specialist foundation designs; rock mechanics and soil slope stability for open pit mines; design of tailings impoundments for uranium, gold, copper and molybdenum tailings; waste dump investigation and designs; and coordination of multiple disciplinary geotechnical projects in Canada and the United States. Dr. Robertson was the senior technical author and project principal on a number of technical guides prepared for various government and industry bodies describing the state-of-the-art practices for acid mine drainage predictions and control, mine site closure and tailings dam design for uranium tailings. From 1973 to 1977 as Principal, SRK he was responsible for Soil Mechanics Division guidance and development. He was directly responsible for numerous site investigations for township, industrial and mining developments. He specialised in foundation design including piled foundations and lateral support systems, stability analyses for slopes in soil and rock for mines and civil structures, and design and management of tailings impoundments, Soil Mechanics Division guidance as well as development. He was also directly responsible for numerous site investigations for township, industrial and mining developments. Specialised in foundation design including piled

foundations and lateral support systems, stability analyses for slopes in soil and rock for mines and civil structures, and design and management of tailings impoundments. His publications and courses include 70 technical papers on mine closure, decision analyses, mine reclamation, special foundations design, tailings impoundment design, slope stability in rock and soil, instrumentation, expansive clays, and acid rock drainage. In addition, Robertson has been involved with the preparation of several technical guides. He has given numerous courses on acid rock drainage control and mine closure in Canada, the USA, the UK, Sweden and South Africa.