Advances in Orebody Modelling and Strategic Mine Planning I — Contents

Modelling and Planning in the New World

The Global Optimiser Works – What Next?	J Whittle	3
Optimal Mining Principles	B King	7
Stochastic Mine Planning – Methods, Examples and Value in an Uncertain World	R Dimitrakopoulos	13
A Risk Analysis Based Framework for Strategic Mine Planning and Design – Method and Application	M Godoy	21
Accounting for Joint Ore Supply, Metal Price and Exchange Rate Uncertainties in Mine Design	S A Abdel Sabour and R Dimitrakopoulos	29
Production Scheduling Under Metal Uncertainty – Application of Stochastic Mathematical Programming at an Open Pit Copper Mine and Comparison to Conventional Scheduling	A Leite and R Dimitrakopoulos	35

Modelling Orebodies and Applications

Regional Three-Dimensional Modelling of Iron Ore Exploration Targets	V Osterholt, O Herod and H Arvidson	43
Conditional Simulation of Grades Controlled by Geological Indicators	C Xu and P A Dowd	51
Mining Geostatistics with the Open Source SGeMS Software and the GsTL Library	A Boucher	59
Conditional Simulation Methods to Determine Optimum Drill Hole Spacing	C Boyle	67
Transformation Methods for Multivariate Geostatistical Simulation – Minimum/Maximum Autocorrelation Factors and Alternating Columns Diagonal Centres	E M Bandarian, U A Mueller, J Fereira and S Richardson	79
Conditional Wavelet Based Simulation of Non-Stationary Geologic Fields Using Geophysical and Model Analogue Information	E Gloaguen and R Dimitrakopoulos	91

Mining Optimisation and Case Studies

Optimal Life-of-Mine Scheduling for a Bauxite Mine	M Zuckerberg, J van der Riet, W Malajczuk and P Stone	101
Coal Mining in the Hunter Valley – A Strategic Mine Planning Case Study	C Wharton	107
A New Methodology for Flexible Mine Design	B Groeneveld, E Topal and B Leenders	113
Pit Optimisation and Mine Scheduling at the Montes Claros De Goiás Nickel Laterite Deposit, Brazil	B Y Tomaselli, E A Silva, G J de Carvalho Pereira, J A Hilário, M C Botelho and P C Rodriguez	123
Technogenic Iron Ore Formations in Siberia as a Secondary Resource for Production of Ferrous, Rare, Non-Ferrous and Noble Metals	P A Filippov, S A Neverov and A A Neverov	129
Advancing Strategic Mine Planning – A Software Perspective	C Tonkin	135

Large-Scale Integrated Applications

Integrated Strategic Planning at EKATI Diamond Mine	B Coutts	143
Stochastic Long-Term Production Scheduling of Iron Ore Deposits – Integrating Joint Multi-Element Geological Uncertainty	J Benndorf and R Dimitrakopoulos	151
Overall Optimisation of Yerilla Project	T Dincer and K Reynolds	159
Investigating the Variability of Key Coal Quality Parameters in Continuous Mining Operations when Using Stockpiles	J Benndorf	167
Cut-Off Grade Estimation – Old Principles Revisited – Application to Optimisation of Net Present Value and Internal Rate of Return	J-M Rendu	173
Using Grade Uncertainty to Quantify Risk in the Ultimate Pit Design for the Sadiola Deep Sulfide Prefeasibility Project, Mali, West Africa	S Robins	179

Uncertainty Models and Recoverable Reserves

Impact of Bench Height, Cut-Off Grade and Production Spacing on Misclassification in Ore Control – Challenges Produced by High Nugget, Low Continuity Ores	W Hardtke, L Allen, B Perry and I Douglas	199
A Geology-Based Joint Conditional Simulation of a Lateritic Nickel Deposit – Quantification of Risk in Grade Tonnage Curves and Resource Categorisation	J A Lopes, C F Rosas, J B Fernandes and G A Vanzela	205
Resource/Reserve Classification with Integrated Geometric and Local Grade Variability Measures	R Dimitrakopoulos, M Godoy and C L Chou	215
Reducing the Geological Risk in Mining an Orebody by Using Borehole Radar for Strategic Mine Planning	C Kemp, P Du Pisani, A Bray and G Chitiyo	223
Optimisation is Moving Un	derground	
Strategic Optimisation of a Vertical Hoisting Shaft in the Callie Underground Mine	M G Volz, M Brazil and D A Thomas	235
Optimising Value for an Underground Project Configuration	T Elkington, R Durham and P Myers	241
Classification of Mining Methods for Deep Orebodies	V Oparin, A Tapsiev and A Freidin	249
Resource Risk Quantification for a Deep Level Gold Mining Operation	T Flitton and R Peattie	257
An Application of Genetic Algorithms to the Main Ventilation System Optimisation for Multi-Level Mine Operations – The Impact of the Fitness Function	E Acuña, S Hardcastle, L Fava, P Dunn and S Hall	263
The New World and Strategi	c Innovation	
Applying Sequence Optimisation Technology to Longwall Coal Mining	L Rocchi, P Carter and P Stone	271
Combining Optimisation and Simulation to Model a Supply Chain from Pit to Port	P Bodon, C Fricke, T Sandeman and C Stanford	277
Direct Net Present Value Open Pit Optimisation with Probabilistic Models	A Richmond	285
Pushback Design of Open Pit Mines Under Geological and Market Uncertainties	C Meagher, S A Abdel Sabour and R Dimitrakopoulos	291
Faulted Geological Model Simulation of the Resolution Porphyry Copper Deposit	G Verly, K Brisebois, W Hart and J Hammitt	299

Geologically Enhanced Simulation of Complex Mineral Deposits Through High-Order Spatial Cumulants	H Mustapha and R Dimitrakopoulos	309
Stochastic Mine Planning – Example and Value from Integrating Long- and Short-Term Mine Planning Through Simulated Grade Control, Sunrise Dam, Western Australia	A Jewbali and R Dimitrakopoulos	321
Author Index		329