## Table of Contents

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>iii</td>
<td>Australian Centre for Geomechanics and Cranfield University</td>
<td></td>
</tr>
<tr>
<td>v</td>
<td>Mine Closure at the Eden Project</td>
<td></td>
</tr>
<tr>
<td>vii</td>
<td>Organising and Advisory Committee</td>
<td></td>
</tr>
<tr>
<td>ix</td>
<td>Paper Reviewers</td>
<td></td>
</tr>
<tr>
<td>xiii</td>
<td>Preface</td>
<td></td>
</tr>
<tr>
<td>xv</td>
<td>Acknowledgements</td>
<td></td>
</tr>
</tbody>
</table>

### Planning for closure

3 Mine closure – misplaced planning priorities  
*D. Limpitlaw, Centre for Sustainability in Mining and Industry, University of the Witwatersrand, South Africa; P. Mitchell, Green Horizons Environmental Consultants Ltd, UK*

15 Taking the risk out of a risky business: a land use approach to closure planning  
*R. Hattingh, J. Bothma, Golder Associates Africa (Pty) Ltd, South Africa*

25 Mine dumpology – mine tips as a scientific and public resource  
*K. Jeffrey, Camborne School of Mines, University of Exeter, UK*

31 Case study – integrated planning to enhance closure outcomes for the Pardoo Mine in Western Australia  
*S. Mackenzie, Mine Earth Pty Ltd, Australia; T. Beattie, Atlas Iron Ltd, Australia; N. Burne, Mine Earth Pty Ltd, Australia; R. Haymont, Trajectory Pty Ltd, Australia*

41 A rigorous, systematic and integrated methodology to assess viable land use options for mine closure: a case study from Suriname  
*W.I. Stewart, SRK Consulting (South Africa) (Pty) Ltd, South Africa; C. Watt, J.V. Parshley, P. Lassiter, SRK Consulting (USA) Inc., USA; J. George, Alcoa, USA; A. Nandlal, Suralco L.L.C., Suriname; H. Van Vlaenderen, SRK Consulting (UK) Ltd, UK*

55 Defining an approach for contaminated land management in the context of mine reclamation in the historic Comstock mining district, Nevada, USA  
*R. Warrender, SRK Consulting (UK) Ltd, UK; A. Prestia, SRK Consulting (USA) Inc., USA; R.J. Bowell, SRK Consulting (UK) Ltd, UK; C. Byrns, Comstock Mining Inc., USA; B. Rakvica, McGinley & Associates, USA; J. Spidell, Kautz Environmental Consultants, Inc., USA*

69 An adaptable and dynamic management strategy for the treatment of polluted mine water from the abandoned Wheal Jane Mine, Cornwall, UK  
*L.M. Wyatt, I.A. Watson, S. Kershaw, A.M.L. Moorhouse, The Coal Authority, UK*

### Geotechnical and hydrological engineering

81 Geochemical risk assessment of mine tailings to optimise closure strategy designs  
*N.B.K. Amisah, W. Addo, I.A. Sam, AngloGold Ashanti Ltd, Ghana; M.W. Sutton, AngloGold Ashanti Ltd, South Africa; M. Williams, Schlumberger Water Services, UK*

97 Monitoring post-closure large scale surface deformation in mining areas  
*C. Banton, The Coal Authority, UK; L. Bateson, British Geological Survey, UK; H. McCormack, R. Holley, NPA Satellite Mapping, UK; I.A. Watson, The Coal Authority, UK; R. Burren, NPA Satellite Mapping, UK; D. Lawrence, F. Cigna, British Geological Survey, UK*

109 Fifteen years of design, construction and monitoring of soil covers on Wismut’s uranium mining legacy sites – a synopsis  
*U. Barnekow, Department Mine Remediation/Geotechnics, Wismut GmbH, Germany; M. Paul, Division Engineering/Radiation Protection, Wismut GmbH, Germany*

123 Leach column study of the net solute load response to installing infiltration-limiting dry cover systems over acid-forming waste piles  
*E.B. Buller, A.B. Fourie, School of Civil and Resource Engineering, The University of Western Australia, Australia*

135 Mine water management in the former Gardanne lignite mine: towards sustainable uses of the mine aquifer  
*A. Dheilly, B. Brigati, J.L. Nedellec, M. Nicolas, Mine Safety and Risk Prevention Department, BRGM, France*
Closure of uranium tailings facilities: environmental considerations, regulatory framework and conceptual options
M.R. Gunasinger, B. Andruchow, E. Becker, Golder Associates Ltd., Canada

Measurements of unsaturated soil properties of old and new mature fine tailings
L.K. Kabwe, Civil and Environmental Engineering, University of Alberta, Canada; M. Kone, Suncor Energy Inc., Canada; A. Sorta, G.W. Wilson, J.D. Scott, A.C. Ulrich, Civil and Environmental Engineering, University of Alberta, Canada

Treating mine waters in the Lorraine coal field – feedback from the La Houve treatment plant
N. Koerberl, R. Levecik, J. Kaiser, S. Heitz, BRGM/DRP/DFSM, France

Design, construction and monitoring of the final cover on Wismut’s Truenzig tailings facility
G. Merkel, Project Tailings Management Facilities, Wismut GmbH, Germany; S. Lindner, C & E Consulting and Engineering GmbH, Germany

Two-layer soil covers on selected radioactive waste rock dumps at Wismut: results of more than ten years of hydrological monitoring
A. Schramm, Department Water Management, Wismut GmbH, Germany; M. Roscher, Department Mine Remediation/Geotechnics, Wismut GmbH, Germany

Quantifying reactive waste rock distribution in a constructed rock storage facility to achieve effective closure
P.A. Scott, O’Kane Consultants Pty Ltd, Australia; P. Defferard, MMG Australia Ltd, Australia

Differences in the erodibility and hydrological response of slope forming materials from an iron ore mine, West Africa
S.J. Campbell, R.W. Simmons, R.J. Rickson, National Soil Resources Institute, Cranfield University, UK

The passive treatment of toe seepages from a reclaimed waste rock dump at Iduapriem Mine, Ghana
C. Williams, B.M. Dey, SRK Consulting (UK) Ltd, UK; C. Mutambanegwe, AngloGold Ashanti (Iduapriem) Ltd, Ghana; W. Addo, C. Bruce, AngloGold Ashanti (Iduapriem), Ltd, Ghana

Improving performance of soil covers over waste rock dump tops in dry climates
D.J. Williams, School of Civil Engineering, The University of Queensland, Australia

Mine water: management post-closure and lessons learned, risks from poor closure and mine water management

Ecosystem reconstruction and after care

An ecologist in mining – a retrospective of 40 years in mine closure and reclamation
N.J. Coppin, Independent consultant, formerly Wardell Armstrong International, UK

Planning for closure – predicting mine site post-closure water quality within a Natura 2000 protection area in northern Scandinavia
A. Barnes, S. Johnson, SRK Consulting (UK) Ltd, UK; M. Stewart, Kaya Consulting, UK

The remediation and closure of the former Garryard and Gortmore sites within the historic Silvermines district, Ireland
B.M. Dey, R. Connelly, K. Czajewski, W. Harding, A. Barnes, R.J. Bowell, SRK Consulting (UK) Ltd, UK; K. Cashen, North Tipperary County Council, Ireland

Performance of Eucalyptus species on capped arsenic-rich gold mine tailings in the Victorian Goldfields, Australia
J.T. Sanchez-Polacios, School of Botany, The University of Melbourne, Australia; A.I. Doronila, School of Chemistry, The University of Melbourne, Australia; A.J.M. Baker, I.E. Woodrow, School of Botany, The University of Melbourne, Australia

Opportunities and constraints of functional assessment of mined land rehabilitation
P.D. Erskine, A.T. Fletcher, Centre for Mined Land Rehabilitation, The University of Queensland, Australia; B. Seaborn, Salkhit Wind Farm, Leighton LLC, Mongolia
The requirement and implications of evidence-based restoration schemes in the United Kingdom
R.N. Humphries, Celtic Energy Ltd, UK

Deep ripping after topsoil return affects root proliferation and floristic diversity in a restored biodiverse forest after bauxite mining
T.D. Lardner, School of Earth and Environment, The University of Western Australia, Australia; M. Tibbett, National Soil Resources Institute, Cranfield University, UK

Response of aspen and white spruce seedlings to fertilisation on a reconstructed oil sands site in Alberta, Canada
M.R. Noabur, Department of Soil Science, University of Saskatchewan, Canada; A.A. Kimaro, World Agroforestry Centre, ICRAF Tanzania Country Program, Tanzania; J.J. Schoenau, Department of Soil Science, University of Saskatchewan, Canada; K.F. Salifu, Sustainability Division, Total E&P Canada Ltd., Canada

The use of ground based LiDAR in rehabilitation performance and landform stability monitoring
A.S. Pratt, C.M. Mangan, Soilwater Group, Australia

Metal/metalloid bioavailability considerations in addressing site risk and remediation in mine closure
S.C. Robinson, Remediation Division, Golder Associates Inc., USA

Community and social issues

From environmental liability to community asset: mined land reclamation
T.A. Comp, Office of Surface Mining, U.S. Department of the Interior, USA

Towards closure at Jabiluka: rehabilitation of the Boyweg-Almudj sacred site complex
H.D. Smith, APChem Scientific Consultants, Australia; A. Thompson, Northern Land Council, Australia

Social mine closure planning: how is it changing and why?
E.A. Adey, Wardell Armstrong International, UK; R.H. Whitbread-Aburat, Wardell Armstrong International and Eden Project, UK

Reclaimed landscapes – incorporating cultural values
C.E. Jones, M.I.A. MacLean, Stantec Consulting Ltd., Canada

Punakaiki coastal restoration project: a partnership for closure and restoration of a mineral sands project site in New Zealand
S.H. Rhodes, Rio Tinto, Australia; K. Lorenzon, Lorenzon Group, Australia; J.L. Hahner, M.H. Bowie, S. Boyer, N. Dickinson, Department of Ecology, Lincoln University, New Zealand; C. Smith, Department of Soil and Physical Sciences, Lincoln University, New Zealand; D. Sharp, Conservation Volunteers, New Zealand

Paper withdrawn

Mine closure: merging multiple discourses
H. Von Vlaenderen, SRK Consulting (UK) Ltd, UK; H. Guicherit, Culconsult, Suriname; F. Hendrik, Suralco L.L.C., Suriname; C. Watt, SRK Consulting (USA) Inc., USA; W.I. Stewart, SRK Consulting (South Africa) Pty Ltd, South Africa; A. Nandlal, Suralco L.L.C., Suriname; J. George, Alcoa, USA

Regulatory, financial and legal issues

A framework for success criteria for mine closure, reclamation and post-mining regeneration
N.J. Coppin, Independent consultant, formerly Wardell Armstrong International, UK

Adaptation of the European Union risk assessment protocol for the pre-inventory of Walloon mining waste deposits
C.C. Frippiat, N. Stéphenne, M. Veschkens, Institut Scientifique de Service Public, Belgium; D. Pacyna, Service Public de Wallonie, Belgium

Assessing and managing the long-term risks and liabilities at a closed Cornish mine used for waste disposal
S.L. Hobbs, SKM Enviros, UK
Managing organisational risk for mine closure
K.G. Mercer, Australian Centre for Geomechanics, The University of Western Australia, Australia; B. Biggs, Bill Biggs & Associates, Australia

A historical perspective on the subsidence effects of mine closure
G.R. Nelson, M. Rowton, S. Kershaw, R.A. Bust, S. Cooke, L. Tipper, The Coal Authority, UK

Risk assessment of geological environment and closure plan of Heshan coal mine, southwest China
Z.H. Tang, Faculty of Engineering, China University of Geosciences, China; H. Zhang, Faculty of Earth Sciences, China University of Geosciences, China; C.X. Zhou, School of Environmental Studies, China University of Geosciences, China; H. Zhang, Hubei Provincial Museum, China; J.W. Zhou, School of Environmental Studies, China University of Geosciences, China

Heat extraction from hypersaline mine water at the Dawdon mine water treatment site
M.T. Bailey, A.M.L. Moorhouse, I.A. Watson, The Coal Authority, UK

Reprocessing of mining waste: combining environmental management and metal recovery?
G. Bellenfant, Mine Safety and Risk Prevention Department, BRGM, France; A.G. Guezennec, F. Bodenan, P. D’Hugues, Water, Environment and Ecotechnology Division, BRGM, France; D. Cassard, Geo Resources Division, BRGM, France

Geochemical assessment of legacy mine sites: assigning value and seeking new opportunities
R.J. Bowell, B.M. Dey, SRK Consulting (UK) Ltd, UK; D. Sapsford, Cardiff University, UK; C. Williams, K.P. Williams, SRK Consulting (UK) Ltd, UK

Coal mine methane management, Nord-Pas-de-Calais, France
P. Défossez, DPSM/UPM, BRGM, France; S. Lemal, DPSM/UTAM NORD, BRGM, France; J-P. Schumacher, DPSM/UTAM CO, BRGM, France

Assessing the long-term geomorphic stability of a rehabilitated landform using the CAESAR-Lisflood landscape evolution model
J.B.C. Lowry, Department of Sustainability, Environment, Water, Populations and Communities, Australia; T.J. Coulthard, Department of Geography, University of Hull, UK; G.R. Hancock, Department of Geology, University of Newcastle, Australia

Lessons for the mining industry from non-mining landscape restoration experiences

Author Index