MineClosure

ACG AUSTRALIAN CENTRE FOR GEOMECHANICS

CSIRO | The University of Western Australia | Joint Venture

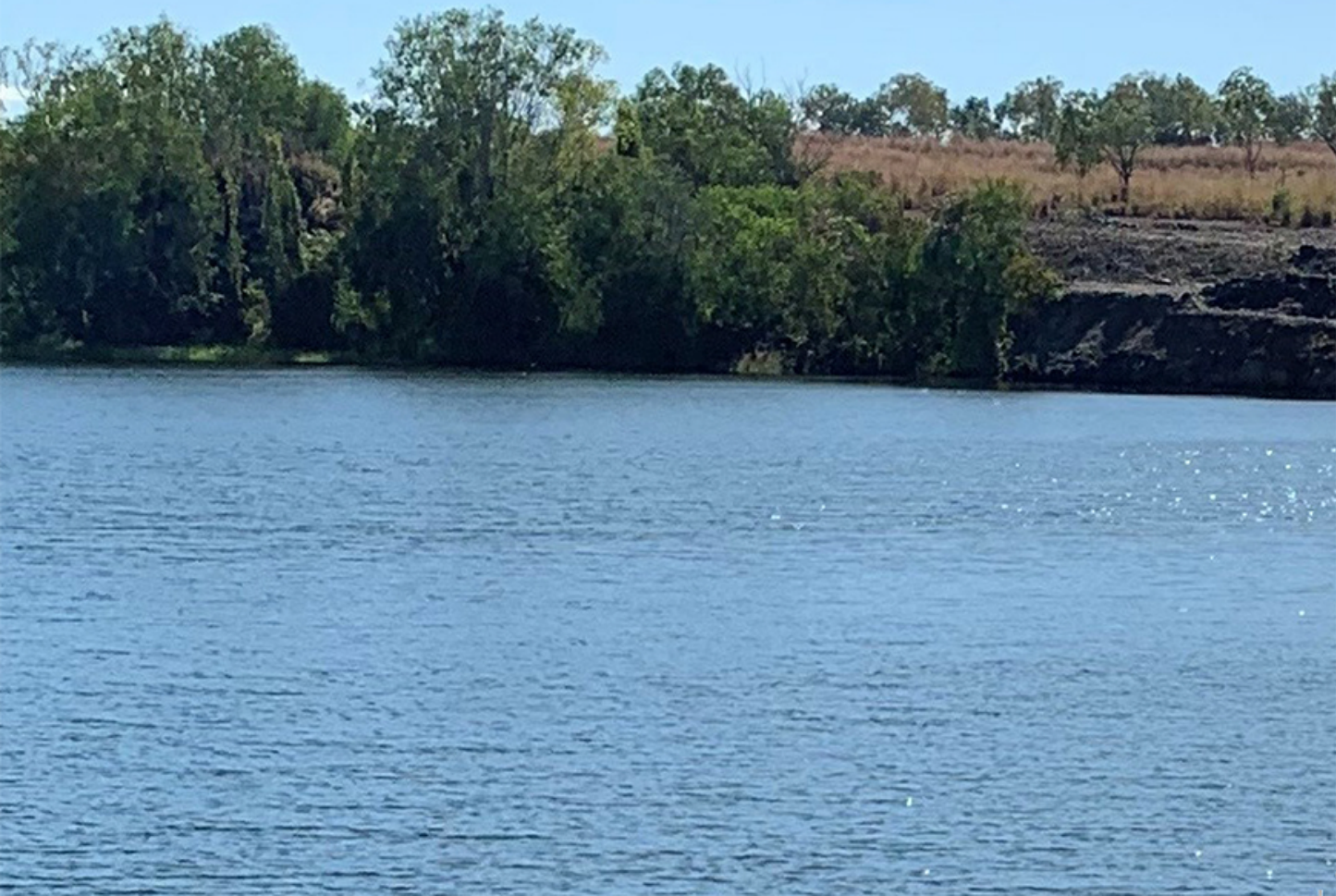
Mine Closure 2022

Proceedings of the 15th International Conference on Mine Closure

4–6 October 2022 | Brisbane, Australia

Volume Two

EDITORS Mark Tibbett, Andy Fourie & Guy Boggs



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Australian Centre for Geomechanics

The Australian Centre for Geomechanics (ACG) was formally established in 1992 as a University of Western Australia not-for-profit research centre in order to promote research excellence and continuing education in geomechanics, with particular emphasis on its application to the mineral and energy extraction sections of Australia's resources industry.

The Australian Centre for Geomechanics is an unincorporated Joint Venture involving:

- CSIRO Mineral Resources
- The University of Western Australia — Civil, Environmental and Mining Engineering

The ACG draws together staff knowledge, experiences and expertise from within the two groups forming the Centre and facilitates a multi-disciplinary approach to research and education in geomechanics. Research undertaken by the ACG attracts both national and global support and the outcomes of the projects are utilised to promote safer mining and environmental geomechanics practices, operating efficiencies and to meeting community expectations for sustainable mining practices.

With the guidance of strong industry representation on the Board of Management, and close collaboration with senior representatives of the mining industry, research, training and further education activities are tailored directly to the needs of industry. The ACG Board expects the Australian Centre for Geomechanics to be the focal point for industry on geomechanics issues and to address the needs of industry through a collaborative interdisciplinary approach.

Online Repository of Conference Proceedings

Accessing geomechanical excellence

Launched in 2017, the ACG Online Repository of Conference Proceedings provides the global mining community with open access, peer-reviewed conference papers that may assist industry practitioners to maintain and develop their skills, knowledge and capabilities. This highly interactive and searchable repository provides importable citation information in various forms, links to the paper authors' profiles on ResearchGate and LinkedIn, as well as the ability to share papers on social media.

With the recent addition of the Mine Closure 2022 papers, 578 environmental geomechanics conference papers are now freely available. Setting a high standard for technology transfer and accessibility, this valuable online resource will continue to develop and grow with future conferences.

Scan the QR to view the Mine Closure 2022 conference proceedings papers.

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Data source: ACG internal analysis September 2022

University of Reading

The University of Reading was established in 1892 and is ranked in the top 1% of universities worldwide with a world-class reputation for the quality of its research, teaching and links to business. The university's School of Agriculture, Policy and Development is ranked amongst the top 20 universities globally for agriculture and forestry and aims to provide graduates the knowledge to address the major challenges and opportunities in the sector for the 21st Century. Research within the school focuses on, and integrates aspects of, food production, the sustainability of agro-ecosystems, soil science, restoration ecology, food security, adaptation and mitigation to climate change, food chains and health, animal welfare and behaviour, poverty alleviation, international development, and consumer behaviour and choice.

Research in the area of soil and land remediation mainly takes place within the Centre for Agri-Environmental Research (CAER). CAER was founded in 2000, a move that integrated the university's strengths in agricultural and environmental research, resulting in a facility that consists of the wide ranging set of disciplines that are necessary to address issues related to sustainable agriculture.

The Centre carries out high-quality scientific research with the aim of reconciling the often conflicting demands of land use and environmental protection, as well as developing partnerships with researchers, funding agencies, industry, policy makers, users and stakeholders that enable the application of knowledge and expertise to the design of sustainable agricultural landscapes. CAER enjoys state-of-the-art facilities, with laboratories and teaching facilities in addition to the University's own farm and farm-based research sites that occupy more than 850 ha. This creates a variety of opportunities to link agricultural production and environmental research. The School's Analytical Laboratory provides facilities for a wide range of analyses of soil, plant and animal materials.

Other related work also occurs within the wider remit of the cross-faculty Soil Research Centre (SRC). The SRC is built on a long legacy of soil research at the University of Reading over the last 100 years. Our expertise includes land rehabilitation, biogeochemistry, ecology, hydrology, plant sciences, microbiology, palaeoecology, archaeology, geography, earth observation, modelling, economics and social sciences. This diversity reflects the multiple challenges of understanding the dynamic processes within the Earth's critical zone. Soil is part of Earth's natural capital, where interactions between climate, geology, plants, organisms, water and humans control the supply of ecosystem goods and services, such as food, water and climate regulation, which make human life possible.

The University of Reading has a diverse and thriving postgraduate community in a wide range of environmental topics, including land remediation and ecosystem services and offers an MSc in Environmental Pollution and BSc and MSc in Environmental Management.

http://www.reading.ac.uk/apd

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The dedicated efforts of the peer reviewers have resulted in the high quality of the technical program and the papers compiled for this publication. The editor thanks the following people who contributed their time and expertise as reviewers of manuscripts for the proceedings of the 15th International Conference on Mine Closure. A technical and critical review of each paper was undertaken by a minimum of two reviewers for the production of these proceedings.

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Preface

The 15th International Conference on Mine Closure returns to Brisbane, Australia where it was previously held in 2012. It is also the first face-to-face version of the Mine Closure conference series since 2019, when it was held in Perth, Australia. In 2020 there was no Mine Closure conference due to the COVID pandemic, and 2021 featured an online, virtual experience, organised by QMC LLC, Mongolia, who produced a fantastic event, particularly given the onerous conditions under which the conference was run.

Clearly the prospect of meeting face-to-face once again to share experiences with closure projects has been well received, with almost 150 abstracts originally received for consideration for presentation at the conference.

The variety of papers presented at the 2022 conference, and the differences in topics from earlier years provides an interesting insight into how closure considerations and challenges have evolved. Whereas earlier versions of this conference series (which began in 2006 in Perth) had a large number of papers dealing with planning aspects of closure, and many of these papers as well as those on other topics, were largely aspirational in nature, the papers in the 2022 proceedings contain many papers describing specific case studies, often in substantial detail. An example is the session dealing with landform design and rehabilitation. Another is provided by some of the papers in the ecosystem reconstruction sessions. In what is probably a first for the Mine Closure conference series, there are two sessions devoted to closure of uranium mines, perhaps a harbinger of things to come as society grapples with the need for alternative sources of reliable base-load power?

An entire session is devoted to stakeholders and communities, whereas in earlier incarnations of the conference, there were at best one or two papers on this topic. The Global Industry Standard on Tailings Management (GISTM), produced as a response to the tragic tailings storage facility failure in Brazil in January 2019, is likely to further drive activity in this area. There are 15 over-arching principles described in the GISTM: the first of these, Principle 1, stating, “Respect the rights of *project-affected people* and *meaningfully engage* them at all phases of the *tailings facility lifecycle*, including closure”. The italics are those of the authors of the GISTM.

Although our community of closure specialists has successfully addressed many of the technical closure issues, many remain and will doubtless be discussed at length by conference attendees. Addressing not only technical issues, but also social issues related to mine closure will rightly become an increasing focus of this conference series, which prides itself on providing a forum where people with a range of expertise come together to discuss pervasive mine closure challenges.

These proceedings are also freely available from the ACG Online Repository of Conference Proceedings courtesy of Open Access Sponsors, Mine Earth Pty Ltd.

Professor Andy Fourie, The University of Western Australia, Australia
Mine Closure 2022 Co-editor and Conference Co-chair

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