Environmental Guidelines for Mine Waste Landforms, Design, Closure and Rehabilitation
## Background

Adjunct Associate Professor Ken Mercer, together with leading industry experts, seeks industry support and financial backing to produce guidelines entitled, “Environmental Guidelines for Mine Waste Landforms, Design and Rehabilitation”.

The increasing focus on mine closure as a result of new and improved regulations, public awareness, education, as well as historical ‘disasters’ has provided impetus for the improved management of the mining landscape to facilitate economical and robust final closure. It is the ACG’s intent to document the latest industry advances, practices and methodologies and provide owners, operators and designers with a valuable reference for mine landforms and their management through their lifecycle.

The objectives of the guidelines are:

- To share knowledge across industry and to address the creation and closure of the mining landscape and its subsequent many and varied landform types.
- To support industry’s increasing emphasis on improvement and best practice mine management, as it strives toward sustainable proactive management of the mining landscapes for both pre- and post-mining.
- To integrate both the engineering with the environmental management of landforms to create the most effective/efficient use of resources and provide the most optimum mining and closure solutions.
- To integrate themes such as designing for closure, risk management, water management, financial provisioning, carbon emissions and the establishment of a closure plan throughout the entire landform lifecycle.
- To minimise the environmental and physical risks, as well as maintenance costs of today’s mining wastes, for both ourselves and future generations who will need to care from them in the millennia to come.
- To promote the development of a truly sustainable society that can utilise resources without continuously degrading the Earth’s biosphere.

The guidelines are applicable to all types of mining located in all climates with the exception of polar, sub-polar regions and those containing permafrost.

The ACG intends to produce guidelines that will be a highly valued and relevant reference for all those working in the mining industry having responsibilities for these facilities. The book is a guidance and advice manual aimed at providing industry personnel with the information that will assist them in managing these work areas and to relate to and brief their design consultants. It is expected that the guidelines will be of significant value to those involved in mining operations, consulting, research and teaching bodies.

## Readership

The expected readers are all practitioners involved with the design, operation and closure (including rehabilitation) of mine waste facilities. These would broadly include hydrologists, hydrogeologists, geotechnical engineers, ecologists, soil scientists, environmentalists, mine planners, risk managers and general managers. The level would be from graduates through to experienced professionals.

## About the Lead Editor

**Adjunct Associate Professor Ken Mercer**  
*Adjunct Associate Professor Environmental and Mining Geomechanics, The University of Western, Australia*

Ken has more than 26 years of experience in the civil engineering and mining industries as a geotechnical engineer, researcher and consultant. Ken’s areas of expertise include both soil mechanics and rock engineering in the fields of paste and thickened tailings, waste dumps and open pit mining.

Ken is overseeing the development of the guide. His role includes the collection of input from a pool of authors, writing some sections and editing the final manuscript, to be produced by the ACG. Emphasis will be placed on minimising duplication of material and on linking sections wherever possible.

Ken worked at the Australian centre for Geomechanics from 2012 to July 2015.
Guidelines Content and Format

The basis for the guidelines is the establishment and integration of key mine site management themes and plans that form the framework for development and operation, and continue until mine site relinquishment. All themes are premised on the critical aspect of design for closure from which site specific material management and rehabilitation guidelines are developed. Based on these, the remainder of the key themes are developed and integrated. These are: mine closure and water management plans, financial provisioning for closure, the management of organisational and quantitative risk and air quality management. During individual landform development the requirements of each theme is taken into consideration and site plans updated as landforms continuously develop and evolve.

In preparation for closure, rehabilitation designs are undertaken and ecosystem reconstruction planned. Considerations for the risks of landforms in perpetuity are considered. Engineering requirements for achieving final closure is implemented and rehabilitation undertaken. All landforms are then monitored and managed until they have reached a self-sustaining state before relinquishment. The guidelines are also intended to address sites that are in care and maintenance and have been abandoned. The guidelines do not “reinvent the wheel” and where other guidelines address aspects of landform management, these have been cross-referenced. This framework described above is illustrated in Figure 1.

Volume One

• Designing for closure
  Adjunct Associate Professor Ken Mercer
  The University of Western, Australia

• Landforms (design, construction and operation)
  Adjunct Associate Professor Ken Mercer
  The University of Western, Australia

• Financial provision for closure
  Malcolm Sutton
  South Africa

• Risk management
  Adjunct Associate Professor Ken Mercer
  The University of Western Australia, Australia

• Environmental geochemistry
  Associate Professor Ron Watkins
  The University of Western Australia, Australia

• Mine water management
  Winthrop Professor Carolyn Oldham
  The University of Western Australia, Australia

• Investigations and baseline studies
  Sonia Finucane
  Bioscope Environmental Consulting, Australia

• Stakeholder engagement
  David Tongway
  CSIRO Ecosystem Sciences, Australia

• Case studies
  Donna Pershke
  URS Australia Pty Ltd, Australia

Proposed volume two content:
• Landform rehabilitation design
• Terrestrial ecosystem reconstruction
• Aquatic ecosystem reconstruction

Proposed volume three content:
• Engineering for final closure and implementation
• Management to self sustaining state
Figure 1  Environmental Guidelines for Mine Waste Landforms, Design, Closure and Rehabilitation

1. Introduction
2. Designing for Closure
3. Stakeholder Engagement
4. Baseline Studies
5. Geochemistry
6. Individual Landform Development
7. Site Water Management
8. Financial Provisioning for Closure
9. Risk Management
10. Develop Mine Closure Plan
11. Air Quality

Mine Site Development

Ongoing Landform Development

Volume One

Volume Two

Volume Three

Themes:
- Site specific material management and rehab guideline
- Water Management Plan
- Mine Closure Plan
- Financial Provisioning for Closure Plan
- Management of Organisational Risk
- Air Quality

Case Studies

Environmental Guidelines for Mine Waste Landforms, Design, Closure and Rehabilitation

Terrestrial landform rehabilitation design
- Terrestrial eco-system reconstruction
Aquatic landform rehabilitation design
- Aquatic eco-system reconstruction
Designing for landform risk in perpetuity
Engineering for final closure and implementation
Managing (monitoring) to a self sustainable state
Guidelines Promotion

The ACG will undertake a niche marketing and promotional campaign to promote the guidelines to mining professionals via:

- Internet marketing – promoted from the ACG website and relevant event websites.
- Promotion of the upcoming publication in the ACG newsletter that is distributed to more than 7,000 mining professionals worldwide.
- Regular email updates to the ACG’s mailing list.
- Industry association – endorsement from leading organisations and universities such as CSIRO and UWA.
- Direct mail campaign – publication specific flyers.
- Media support and coverage from International Mining and other reputable industry journals, magazines and newsletters.
- Ongoing international exposure through ACG international mining events.
- A specific marketing campaign to worldwide universities and further education organisers such as InfoMine.

Qualification

The ACG is a not-for-profit University of Western Australia (UWA) research centre. It is controlled by a Board of Management, including Joint Venture Partner representatives, industry representatives and is headed by an industry chairman. All proceeds of its operations in excess of operating expenses are returned to research and training activities.

ACG Publication History

The ACG has a proven record in developing, producing and publishing specialised, unique industry guides, including:

  - More than 650 units sold to date.

  - More than 570 units sold to date.

  - On sale now.

The ACG has a dedicated publication team that produces peer-reviewed proceedings for our symposia and conferences. For more than a decade, this work is undertaken in-house where we can ensure that the high standard of the publication is maintained. Our team works in close collaboration with the proceedings editors, organising committees, paper authors and reviewers, and printers.
# Sponsorship Packages

The sponsorship packages have been designed for companies to provide their endorsement of excellent waste rock, heap leach pads and stockpile management, and commitment to reducing the impact of the mining industry on the environment. We believe that industry’s adoption of best practice principles outlined in these new guidelines will be enhanced by your support and trust that your association with the publication will be of benefit to your company.

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<td>(one) AUD $16,500* &lt;br&gt; <strong>Sponsorship entitlements:</strong>&lt;br&gt;• Company logo to appear on the front cover of the “Environmental Guidelines for Mine Waste Landforms, Design, Closure and Rehabilitation” as “Principal Sponsor”.&lt;br&gt;• First, full page colour advert in front of the guidelines.&lt;br&gt;• Ten complimentary copies of <em>Environmental Guidelines for Mine Waste Landforms, Design, Closure and Rehabilitation</em>.&lt;br&gt;• Company name and logo to appear on all supporting promotional material as Principal Sponsor, e.g. order form, potential poster sessions at the Mine Closure Conferences, articles, PowerPoint presentation slide etc.&lt;br&gt;• Company name and logo included as Principal Sponsor on the <em>Environmental Guidelines for Mine Waste Landforms, Design, Closure and Rehabilitation</em> promotional webpage.&lt;br&gt;• The sponsor is invited to forward a 500 word company overview for inclusion, including a minesite/company photo. Opportunity for hyperlink to company’s web page.&lt;br&gt;• Invitation to contribute an article to the ACG newsletter (distributed to 7,000 mining professionals worldwide).&lt;br&gt;• Two complimentary registrations to attend an ACG workshop to accompany Mine Closure 2016 Conference.</td>
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* Australian Goods & Services Tax (GST) inclusive.

## Queries

Your sponsorship for this application is sought. For further details, please contact Josephine Ruddle.

**Josephine Ruddle**  
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Sponsor Application Form

To secure your Environmental Guidelines for Mine Waste Landforms, Design, Closure and Rehabilitation sponsorship, please complete the sponsor application form.

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**Mine Closure publications**

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10th International Conference on Mine Closure Electronic Proceedings (USB)

Environmental Sampling and Modelling for the Prediction of Long-Term Water Quality of Mine Pit Lakes

Mine Pit Lakes: Closure and Management

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