

2012 MINE CLOSURE CONFERENCE
6th INTERNATIONAL CONFERENCE ON MINE CLOSURE
Connecting Mine Closure Practitioners Around the World

SEPTEMBER 18 - 21 | CHATEAU LAKE LOUISE | LAKE LOUISE, ALBERTA, CANADA

Rio Tinto

A global view of integrated closure planning as a component of sustainable development

Dr Bruce Kelley
 Global Practice Leader Environment

Goldier Associates | SUNCOR | Cranfield University | IACG

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Acknowledgements

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A changing business climate

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- The business climate is changing
 - Climate change driving public awareness
 - Economic development and population pressure
 - Shifts in regulation
- The concept of SD is driving a more holistic and longer term perspective of our operations and their role in social and economic development
- Focus on mine closure is shifting
 - from biophysical aspects (demolition of plant, pollution remediation, land rehabilitation)
 - to encompassing broader issues such as the social consequences of closure on communities
 - joining the business dots to drive for more sustainable outcomes

Effective mine closure = sustainable development in action

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Business case for closure planning

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- Significant threat associated with poor closure planning
 - Closure costs financial liability (total provisions as at 31 December 2010 amounted to US\$8,602 million)
 - Legal requirements are increasingly rigorous (bonds)
 - Social expectations less accepting of negative outcomes
 - Long lead times on many closure solutions

but

Significant opportunities arise from well integrated planning

- Legacy after closure is an indicator of sustainability
- Stakeholder buy-in (communities, staff)
- Reputation - license to operate



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Our approach – the Closure programme

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- Key components of the Rio Tinto Closure programme include:
 - Mandated Group Closure standard and guidance notes
 - The governance role of the Closure Steering Committee, supported by a Closure Working Group
 - Assurance processes including a closure management plan review programme and financial reporting, and
 - Closure planning support and knowledge sharing



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Closure programme - Closure standard

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- Group closure standard addresses all relevant aspects and impacts of closure in an integrated and multi-disciplinary way
- Provides a fully scoped and accurate cost of closure to the company that is documented and auditable.
- Requirements of the standard include:
 - mandatory for all managed operations
 - development projects to submit Closure Plans as part of investment approvals
 - closure planning integrated into operational activities as early as possible
 - closure plans and cost estimates reviewed and updated on a regular basis
 - five years from predicted closure a detailed decommissioning plan must be prepared


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Closure programme - Governance

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- Multi-disciplinary Closure Steering Committee established in 2005 to oversee the closure management programme
- Accountability
 - ensure closure programme drives improved closure planning throughout the Group
 - development of financial provisions
- Supported by Closure Working Group
 - multi-disciplinary
 - provides technical support
 - coordinates the closure management plan review programme, and
 - develops closure guidance
- Businesses retain accountability for implementing closure standard



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Closure programme - Assurance

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- Closure plan review programme
 - identifies improvement opportunities
 - provides assurance that closure cost estimates are based on a comprehensive scope of activities
- Closure management plans reviewed at least every seven years throughout the life of the operation, regardless of time to predicted closure
- Multi disciplinary review teams - community relations, human resources, environmental management, finance and engineering
- Reviews ensure that closure plans address key risks and are aligned with stakeholders' expectations for sustainable development objectives
- Review findings presented to the steering committee and review reports signed off by the Chair

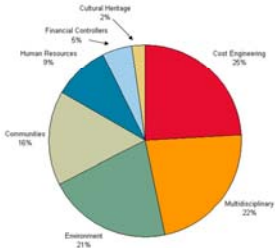
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Closure review - Findings

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- More than 80 per cent of closure review findings are related to four disciplines: Cost engineering, Multidisciplinary, Environment and Communities.



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Closure programme - Knowledge sharing

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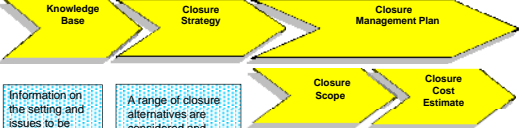
- Closure planning guidance is shared throughout Rio Tinto to improve performance (eg framework for closure plans, cost estimation, communities, social legacy planning, cultural heritage etc)
- Closure Diagnostic Tool – facilitated status assessment and action planning workshop
- Corporate support is available to businesses for the development of closure plans
- Rio Tinto also engages with external bodies for the development of closure planning guidance for the industry
 - ICMM
 - Eden (Post Mining Alliance)

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Framework for closure planning

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Information on the setting and issues to be faced derived from a range of sources.

A range of closure alternatives are considered and evaluated both technically and financially resulting in the selection of a preferred closure strategy

Closure strategy used to develop the technical and financial information to prepare scope of work for the closure management plan

Application of cost estimation principles to the scope of work to prepare the closure cost estimate


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Framework - Knowledge Base

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- Baseline studies of the biophysical, socio-economic and cultural environments
- Awareness of legal requirements and existing agreements
- Assessments of issues and risks across the range of closure disciplines
- Outcomes of technical investigations and research programmes
- Performance with routine monitoring and specific field trials
- Stakeholder mapping and engagement to understand expectations




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MINE CLOSURE CONFERENCE **2012** **Framework - Closure Strategy**

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- Determining a long-term vision that describes the site and its surrounds after operations have finished
- Setting closure objectives for the natural and social environment consistent with the closure vision
- Identifying alternative closure options, evaluating them and selecting the preferred options
- Gaining stakeholder input and endorsement for preferred options
- Ensuring alignment with business plans including mine plans




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MINE CLOSURE CONFERENCE **2012** **Framework – Implementing Closure Plan**

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- Implementing rigorous planning and project management processes
- Developing solutions to mitigate potential liabilities
- Undertaking technical and socio-economic work programmes to better understand risk and reduce uncertainty
- Undertaking progressive rehabilitation of disturbed mining areas
- Maintaining consultation and communication with government, community, employees and other interested parties
- Regular updating of planning requirements as circumstances change or knowledge improves; feeding changes back into strategy review
- Monitoring performance against agreed objectives and success criteria



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MINE CLOSURE CONFERENCE **2012** **Sustainable development and closure - Life cycle planning**


Life Cycle Stage	Closure activities
Project development (Exploration, Prefeasibility, Feasibility)	Closure plan at feasibility stage for funding approval Identify closure risks and develop plan Design mine or operation to minimise impacts Understand stakeholder expectations
Active operations	Review plan every five or seven years Annual update of provisions Progressive rehabilitation and remediation Ongoing stakeholder consultation (vision and strategy)
Decommissioning	Plan developed five years before closure Detailed scope Stakeholder endorsement
Post Closure	Monitoring to deliver objectives Stakeholder engagement for relinquishment
Legacy Management (long term impacts, orphan sites etc)	If required, management of long term impacts Establish partnerships with stakeholders and communities where possible

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MINE CLOSURE CONFERENCE **2012** **Project development**

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- Simandou, Olu Tolgoi, Bunder etc
- Early consideration of closure aspects and impacts – vision for closure
- Research knowledge base (social, environmental etc)
- Stakeholder engagement



Stakeholders are requiring an increasing level of detail in closure plans for new projects

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MINE CLOSURE CONFERENCE **2012** **Closure planning during active operations**

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- Closure planning is integrated into operational activities on an ongoing basis, including progressive rehabilitation of disturbed vegetation and remediation of contaminated areas, rather than waiting until eventual closure to start this work



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MINE CLOSURE CONFERENCE **2012** **Integrated closure planning**

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- Build waste dumps to final landforms to avoid rework at closure
- Regular interaction between mine planners and environment teams to integrate landform designs






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Closure planning during modernisation

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- Kitimat modernisation
 - Closure of old technology smelter and construction of new smelter at the same location
 - Maintain socio-economic input into the region
 - Improve environmental performance
 - Maximise use of hydro-power


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Closure and Legacy management

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- The legacy remaining after closure, (environmental, social and economic) is a fundamental indicator of the sustainability of a mining or minerals operation
- Team of specialists manages our legacy sites to ensure our closure standard and sustainable development principles are applied
- Operations integrated into the Group through acquisition are required to progressively develop or update closure management plans to meet the requirements of our Closure Standard within fixed timeframes





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Westland Ilmenite

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- Pilot scale dredge mining acquired in 2000
- 80 ha of freehold land - east coast of New Zealand's south island
- Vision - rehabilitate land and transfer to Department of Conservation to preserve biodiversity and coastal vegetation
- Rich biodiversity
 - only nesting ground of the vulnerable Westland Black Petrel
 - natural habitat of the Blue Penguin and sand plain forests
- Partnership between Department of Conservation and Rio Tinto
- Local community engaged in ongoing conservation of the area.
- Rehabilitation staged over a 10 year period


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Anglesey

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- Closure of the Anglesey Aluminium Metal Limited smelter in Wales was implemented in 2009 following constraints on access to power
- Employee obligations were important considerations when assessing closure options
- Management of waste during the life of the operation minimised on site contamination and remediation required at closure
- A Regional Industrial Development process was applied to identify sustainable development initiatives
- A re-melt business employing 90 people has continued
- Alternative use of deep port facility (trailing cruise ships with flow-on economic benefits for the region)




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Barney's Canyon - Oxide Dumps

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Oxide dumps in 2000 under construction



Oxide dumps today – full vegetation cover, low metals in vegetation tissue, neutral pH and low total dissolved solids and metals in seepage




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Barney's Canyon sulphide repository

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Sulphide repository under construction



Repository following rehabilitation




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Flambeau Mine

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180 acre site



Backfilling the entire pit to ground level with lime treated waste rock.

Ongoing focus on monitoring and maintenance.

Establishment of wildlife habitat with woodland grasslands and wetlands.




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Ridgeway Mine

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Ridgeway completed operations in November 1999, focusing on reclamation of the tailings impoundment, two pit lakes and wetland systems



Partnership set up to establish an environmental education and research centre at the site

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Summary

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- Key elements for sustainable life of mine planning
 - A strong corporate culture that promotes sustainability and social responsibility
 - Closure seen as a core business function
 - Equitable integration of environmental, social and economic factors
 - Early closure planning –the earlier the better
 - Stakeholder consultation throughout the closure planning process
 - Closure strategy is best developed from top down
 - The long term viability of post closure options use must be assured (eg climate change compatibility etc)
 - Regular comprehensive and objective review of closure plans is necessary
 - Sharing of knowledge and experience

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Summary

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- Environmental and social risk in constant state of change
- Achieving sustainable outcomes in mining requires
 - A strategic approach
 - Willingness to engage and work with all stakeholders
 - Flexibility in working collaboratively across multi-disciplinary boundaries
- Effective mine closure demands all of the above
- We don't close mines all that often – but when we do, what we leave behind shapes not only our reputation as an industry, but also impacts our future license to operate

Mine closure is truly sustainable development in action

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