



Developments in Mine Closure and Integration with Operations in Australia

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MWH Global

Wyoming Reclamation - ASMR

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Introduction

- Brief history of mining and closure in Australia
- Guidelines legislation and change
- Status of mine closure planning in Australian mining operations and current standards for mine closure.
- Building the business case in the mining business for future mitigation of risk
- Impediments and challenges
- Improvement in mine closure - the future

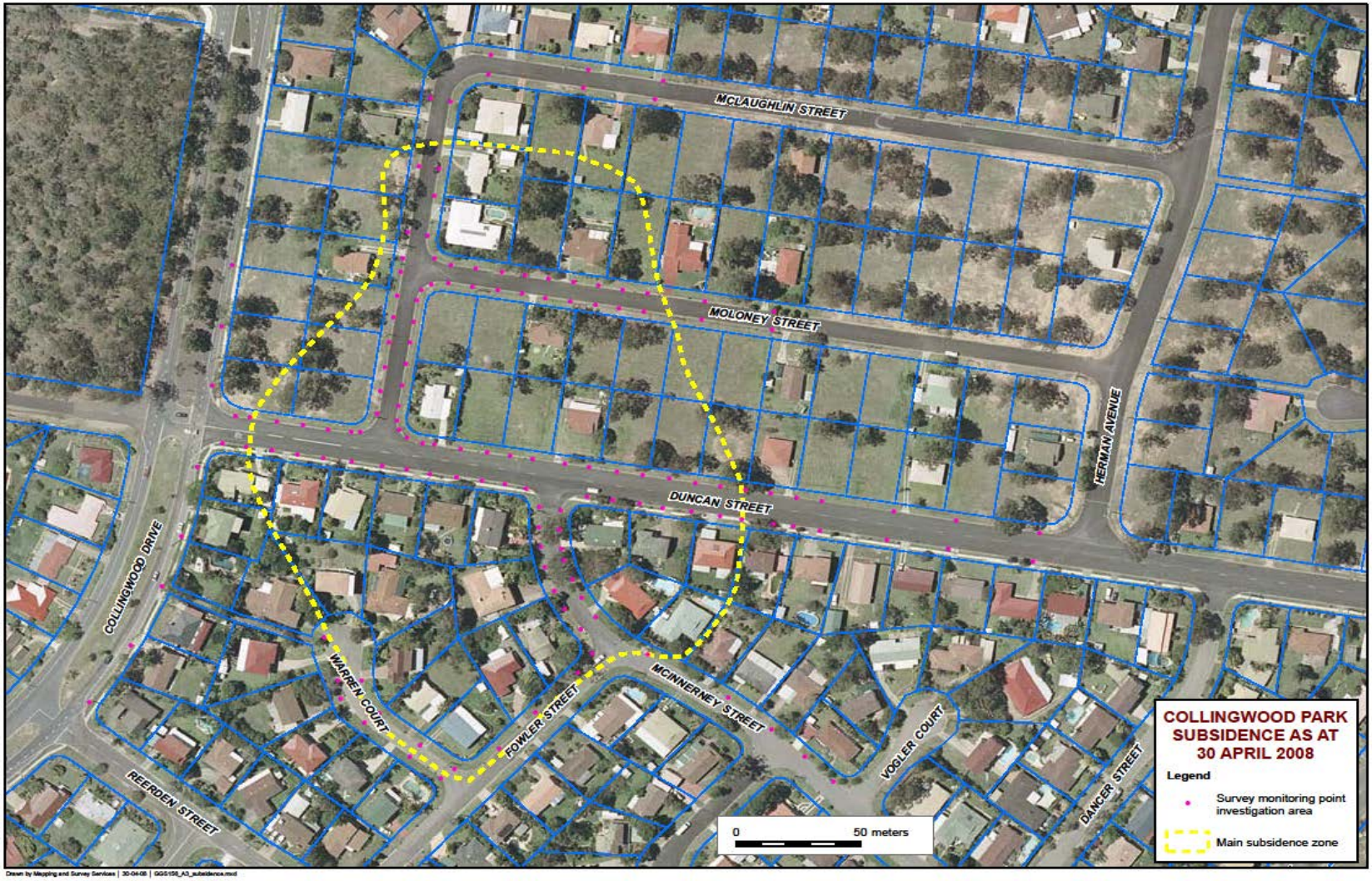
History

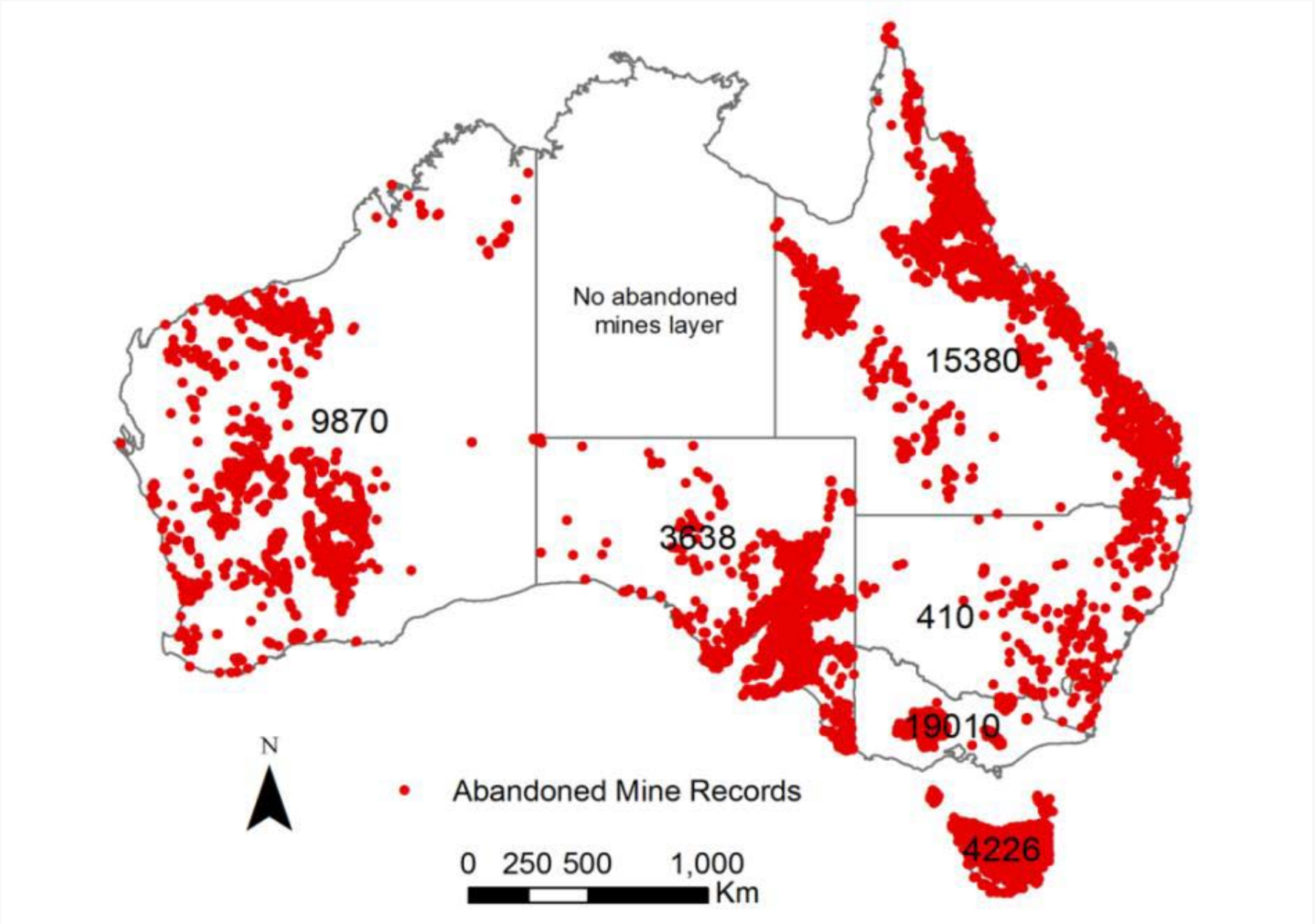
- History: Mining advanced with Agriculture
- Development: nodes at large/small mineral deposits
- 2010-11, Mine Sector export rose to a record A$190 billion. (*ABS 2010-11).*
- the world's largest reserves of brown coal, mineral sands (rutile and zircon), nickel, lead, uranium, iron ore and zinc
- the world's second largest reserves of bauxite and tantalum
- the world's third largest reserves of copper and gold, and fourth of silver, fifth of black coal – USA Num 1

Closure Legacy

Collingwood

Subsidence 2008 Ipswich





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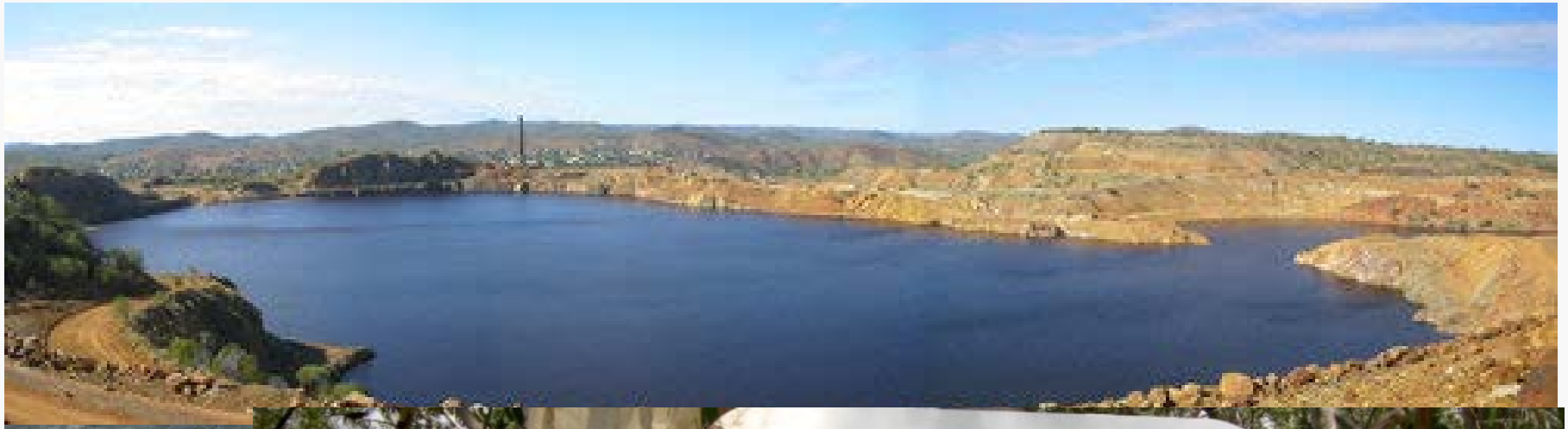
Abandoned Mines in Aust

- ~50,000 Sites Identified
- Qld has a specific Abandoned Mines Unit for ~7 mines, Mt Morgan's – in the news this year (700mm).
- *Queensland's Dee River reveals toxic national mine waste problem*
- Pit overflowed for the first time in its history in Feb 2013, is still spilling acid and heavy metals into the Dee River is an unnatural shade of blue-green for a lot of its length, and birds and fish are dying,
- White sediment - aluminium hydroxide up to 55 km downstream [from the mine].




NO SWIMMING
NO DRINKING
Water in this river is acidic and may cause skin irritation and is unsuitable for drinking
Queensland Government
For further information contact Queensland Mines and Energy on (07) 4938 4187

Guidelines

Legislation

Regulation

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Drivers for Change

- Heightened focus on mine closure, the development of a considerable body of Guidelines, Legislation and Regulation
- 70% of all closures are unplanned (Laurence Uni NSW).
- Ramifications of alternative legislative mechanisms within Australia and other parts of the world
- Increased closure planning during the approvals and operational phases of the mining life cycle.
- May translate into effective mine closure implementation – time will tell?

Guides – Legislation - Regulation

- Historical (Broken Hill – Tailing sands Pb–Zn-Ag)
- Industry (Chamber of Mines -WA) 1980-90
- Regulator Guides in most Australian States
- ANZMEC (ANZ Minerals and Energy Council -Minerals Council of Australia) Closure Guide 2000
- ICMM (Council on Mining and Metals)
- DITR Federal Gvt. (Guidelines Manuals)

DMP-EPA Closure Guideline 2011 WA

From the Past - Looking Forward

- Bruntland SD principals: Minerals Council toward International Council on Mining and Metals (ICCM)
- “Good business practice”
- “Costly remedial earthworks”
- “Without unacceptable liability to state”
- Risk based approach – “management mitigation”
- “Socio-economic impacts”
- 16 references to “progressive” in the guide

Regulatory Guides 2011 QLD

- Describe general techniques and program for “progressive rehabilitation”
- “incorporation of progressive rehabilitation works”
- administering authority must encourage the proponent to undertake progressive rehabilitation
- provided a discounting system to industry
- financial assurance required for mining projects
- EP. Acts. maximum total rehabilitation cost…may vary on an annual basis due to progressive rehabilitation
- Progressive certification and sign off against final rehabilitation

Increasing Legislation Influences

- OSM: Mine Damage and Reclamation Funds – Coal 1977/8. ~ $3 Billion spent to 2006 at abandoned sites (GAO2011)
- CERCLA (1980) **“the last man standing law”** (Sec 107) ‘Potential Responsible Parties’
- Further legislation: as ~500,000 abandoned mines not covered by CERCLA.
- Worst 350,000 of these sites ~$32 - 72 Billion (Earthworks, NGO)
- Hardrock Mining and Reclamation Act (US Congress 2007/2009 H.R. 699); Future and Existing Mines.
- The General Rule (Sec 307) sets standards (closure standards) that require restoration of lands to a condition capable of “returning to Previous or Enhanced Use”.

Increased Closure Planning by Companies Linked To Mine Life Cycle

TERMS

- Environment and Land Use Expectations
- Starting with the End in Mind
- Demonstration of Post Closure Land Use
- Progressive Rehabilitation
- Systematic Operational and Mine Planning
- Systemizing Mine Closure Planning

Stages of Mining – The Business is "Mining"
Closure Planning is inherently today part of the Business

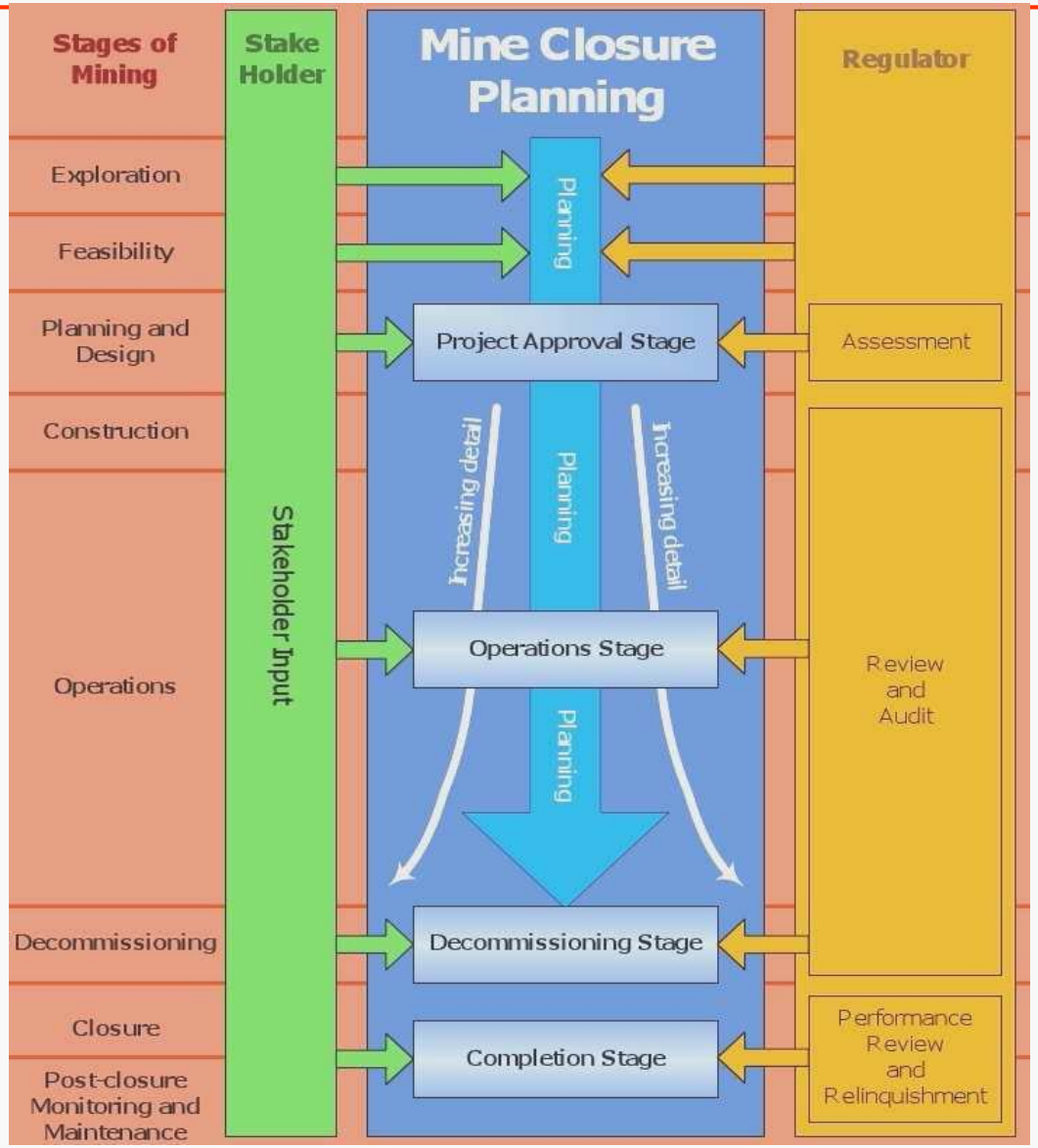

Figure 1: Integrating Stages of Mining and Mine Closure Planning (adopted from DITR 2006a, ICMM 2006)

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Teams

Newmont Closure and Reclamation 2005-2011

- Understanding of what an effective closure process requires
- Capacity, time, corporate funding and budgets to focus on quality work
- Think strategically and responsively, made the key difference
- Effective mine closure required broad engagement and participation across a broad range of stakeholders.
- Facilitating this engagement requires great leadership – relationships based on good faith dealings.
- Only an effective and dynamic interaction of the team maintaining the various parts of the closure process makes a whole project successful (Haymont, Clements and Lacy, 2008).

Planning

- The desire for active closure planning is clear in many large company policy and guides
- Cost Awareness is driving the process
- Closure amounts accrued in accordance with International Accounting Principals - ASX
- Accounting for Asset Retirement Obligations
- *2008: $594 million,*
- *2009: $698 million,*
- *2010: $904 million,*
- *2012 $1341 million* (Newmont 2012).
- Closure Planning knowledge is driving this - these are discounted

Corporate Miners - Anglo American

- 2008 developed and launched its “Mine Closure Toolbox”, to implement Anglo’s Closure Performance Standard
- “sustainable” development planning, risk assessment and project evaluation
- set of requirements for mine closure, ensuring that mines are planned, evaluated and designed with closure in mind.
- 25 Anglo American and De Beers operations in South America, Europe and Africa, at the end of 2011, 84% of mines had formal closure plans in place. (AA 2008).

Corporate Miners - Rio Tinto.

- Rio Tinto describe “Mine life planning” as planning for “mine closure”
- Developed by a multidisciplinary team including mine planners, engineers and specialists in the areas of finance, environment, cultural heritage, community relations and human resources
- >20 years 7 year updates, <20 years 5 year updates
- **Knowledge Base** – the collection and review of existing information relevant to closure.
- **Closure Strategy** – The desired closure and post closure options, evaluated, documented with preferred option chosen.
- **Closure Management Plan Scope** – the vision for closure with preferred closure option as developed from the strategy.
- **Detailed Cost Estimate** (Rio Tinto 2008)

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Building the business case for future mitigation of risk

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Key Closure Planning Considerations

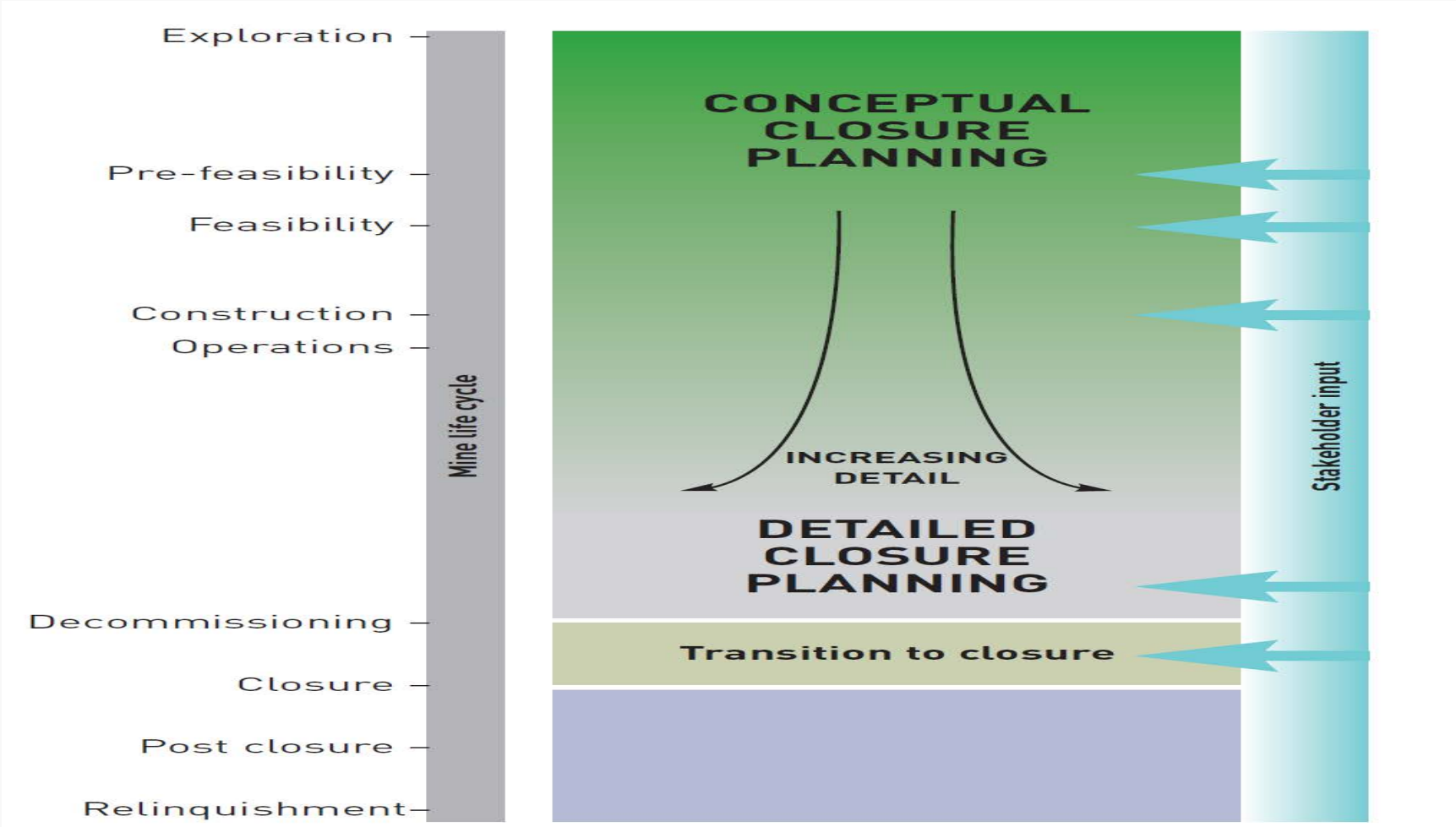
BHP

Stated: recently "*BHP Billiton embedded closure planning into its business systems by integrating closure engineering and planning into its Life of Asset planning process".*

Five principle closure planning drivers:

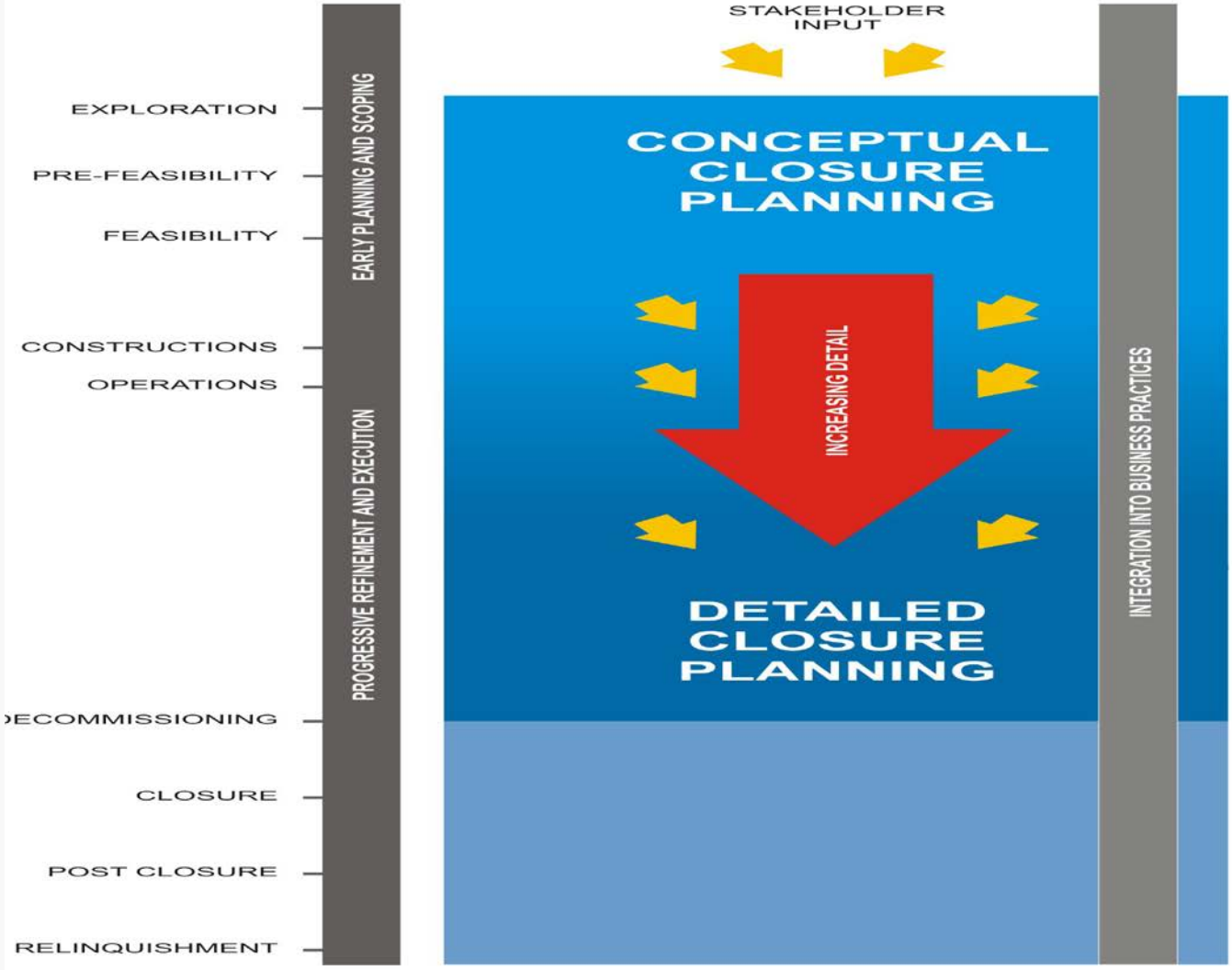
- Closure planning fundamentals.
- Risk management.
- Engineering, execution and project management.
- Cost estimation.
- Management to mitigate closure risk during operations.
- Developed a check-list of 28 key closure planning considerations. (Bentel 2009)

Figure 1. Closure Planning - Key Stages of Closure Planning Integration into Business Practice (ICCM 2008 Figure 1)



Business is about Risk Management

(Integration and Business Practices)



ICCM **Draft**
Figure 1:
Key Stages of Closure Planning

INTEGRATION INTO BUSINESS PRACTICES

STAKEHOLDER INPUTS AND OWNERSHIP

Business Risk Management

- The Board
- Land Access and LTO
- Equator Principals
- World Bank
- Sarbanes-Oxley, FAS 143. ASX
- Shareholders
- Share market response, capital reduced and capital available.

Is Effective Mine Closure Planning Compelling for the Mining Business?

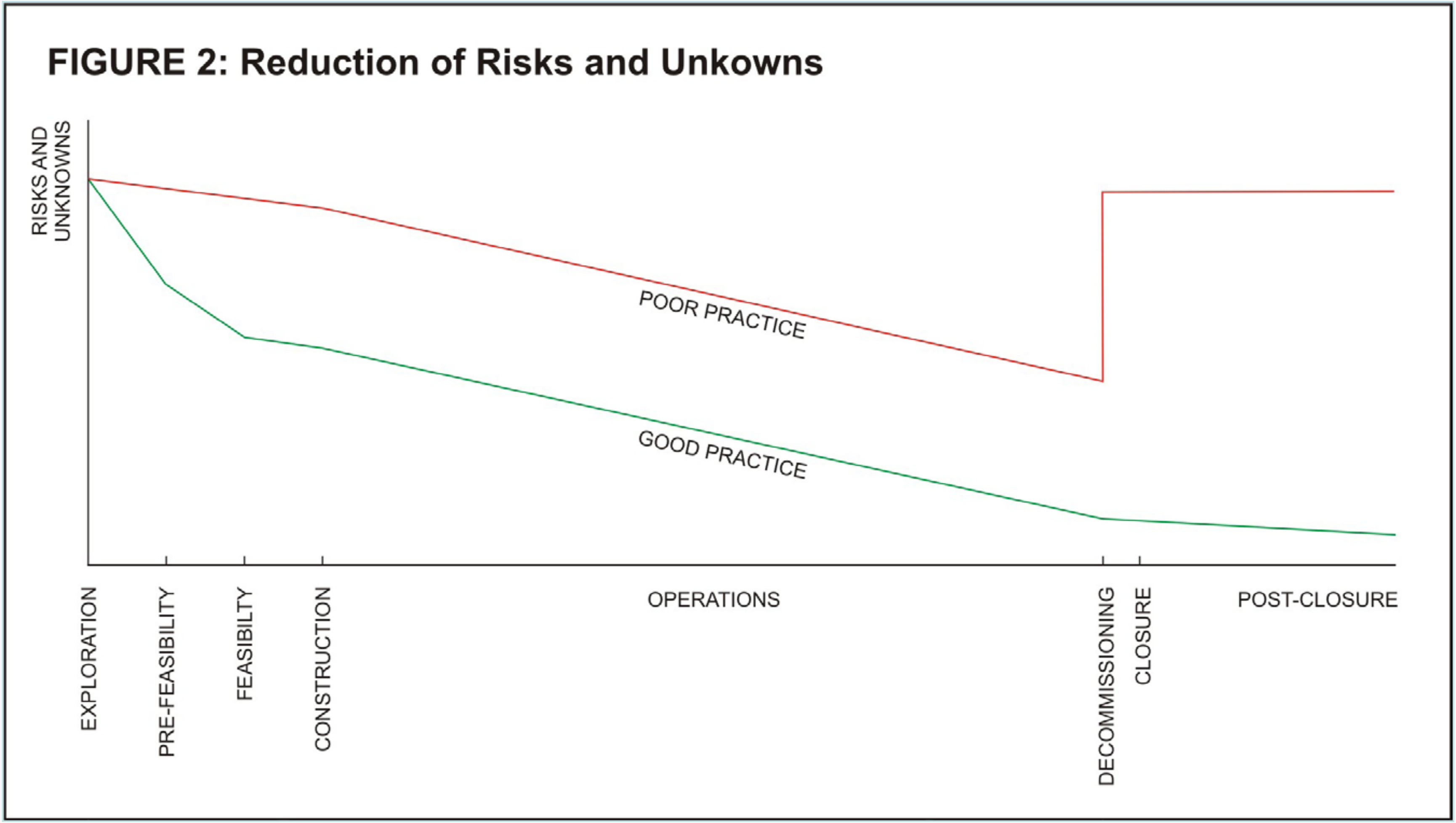
- The business world competes for capital for development and operations.

Objectives 2004 Closure Standard (BHPB)

- "ensure shareholder value is protected"
- "consideration of financial consequences of closure – including tax implications"
- "investment decisions - include consideration of closure"
- Early and Unplanned Closure – Impacts Value

Business is about Risk Management

ICCM Figure 2:
(ICMM Toolkit 2006)



Equator Principals "10" (Version 3 -June 2013)

- Project Financing; Banks and Institutions.
- The Equator Principles (EPs) is a credit risk management framework for determining, assessing and managing environmental and social risk in Project Finance transactions
- 2003 10 leading Banks – now 79 signatories
- Nigerian, Spanish, Brazilian, German, Peruvian, Mauritian, Russian (open bank) joined in last 12 months.
- *Principal 8 Covenants: The borrower will covenant in financing documentation:*
- d) **to decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan**.

Impediments and Challenges

- Progressive closure implementation and planning – in the hands of the least empowered
- Production: Market and KPI imperatives driving Mine Owners and Managers, to place Systematic Closure last in the queue of priorities.
- Business case vs pragmatic mine practice
- Serious lack of overarching federal mine decommissioning and abandoned mine legislation in Aust.

Effective Mine Closure Planning

- Advancing systems driven by global parent companies and planning within Australian operations will inevitable improve mine closure outcomes.
- Planning hence costing, called to account the need
- Financial provisions and instruments, regulation to match need
- There are many compelling, policy, society drivers
- Miners as price takers, ROI, Negative externalities
- Compelling and SMART regulation needed

To Sum Up

- Australia has a mining history that's evolving like that of USA, effective change is only ~20-30 years
- Guidelines for closure and decommissioning are fairly prolific; evolving and changing
- Systematic framework is evolving “mining toward closure” but barriers to integration are considerable
- There is a business case, but older entrenched habits in the mining business hard to shift / change
- Federal regulation, that is smart and applicable (sharing abandoned mine burden) is missing
- Closure planning will be systemised eventually

“Just a part of the mining business”

Thanks to the ASMR

and

Wyoming Group

for the opportunity

to address you

Today

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