

**MINE REHABILITATION AND CLOSURE IN QUEENSLAND:
Report of a 'Hackathon'
20 April 2017**

Purpose of this paper

This paper summarises a structured brainstorming event co-sponsored by the Sustainable Minerals Institute of the University of Queensland (SMI) and the TJ Ryan Foundation and facilitated by members of the Royal Society of Queensland. The event was held at Sustainable Minerals Institute on 20 April 2017 engaging more than 35 participants.

Rationale and process

In recent months, the topic of rehabilitation of legacy mine sites has gained considerable media exposure as well as rehabilitation progress at active mines. Discussion amongst a number of independent experts during 2016/early 2017 revealed doubt as to whether a sustainable model of policy, regulation and financial capacity of mine sites exists in Queensland. The primary objective of the brainstorming session was to tackle an entrenched problem from new perspectives. The event was structured to explore solutions across sectoral and disciplinary silos, with no preconceived solutions tabled or taken for granted.

An open invitation was extended to all those with an interest in the policy and practice of mine rehabilitation. Representatives of government, academic, scientific, business and community sectors were invited and attended. The event focused not on the technical (scientific and engineering) aspects of mine rehabilitation, but rather on the governance, policy and financial aspects; and this was announced in advance.

The event operated under Chatham House rule: although the outcomes will in due course be made public and conveyed to leaders in a position to influence outcomes, no contributor will be identified by name without their specific consent.

After the official welcome and some plenary discussion, and an explanation of process as outlined in the presentation slides, the meeting divided into two sessions (business model canvas and behavioural economics). It later resumed in plenary for some closing comments and thanks to all who organised and participated.

Thanks were extended to the co-sponsors, to Scott Losee and Ramola Yardi and all those who assisted. Particular thanks were extended to Anita Whybrow, Executive Assistant at SMI, for arranging the logistics and Prof. Neville Plint, Director of the Institute for hosting.

Subsequent observation

A few days after the hackathon, the Queensland Government released a *Review of Financial Assurance Framework* and Discussion Paper *Better Mine Rehabilitation for Queensland*, with invitation to comment on the Discussion Paper by 15 June. Queensland Treasury is the lead agent for this consultation.

[Subsequent note: the public announcement

<https://www.getinvolved.qld.gov.au/pi/consultation/3851/view.html> indicates that consultation has closed]. These notes do not include a critique of the Discussion Paper, but they do provide a foundation for a submission.

Scene-setting

Professor David Mulligan, Director of Environment Centres, Sustainable Minerals Institute welcomed guests. Prof Roger Scott, Executive Director of the TJ Ryan Foundation, did likewise and thanked the Institute for sponsoring the event.

Dr Geoff Edwards, Honorary Research Associate of the Foundation, introduce the concept of “feasible path.” To discharge a function, five capacities are required at one locus of activity:

- Coordination* (champion mandate);
- Legislation* (statutory mandate);
- Knowledge* (data, translated information);
- Skilled personnel* (in key relevant positions); and
- Budget* (operational capacity).

All capacities are semi-independent: adequacy in one does not guarantee adequacy in any other, except for the coordinating power, which can muster other capacities. He argued that at present, coordination of mine rehabilitation is deficient: there is no champion in sight able to steer closure from tenure investigation right through to surrender. Some of the other capacities are available, but are patchy and scattered through different institutions.

He identified the challenges as:

- Identify a champion/coordinating agent on the government side
- Identify a champion/coordinating agent on the business side
- Instruct those agents to assign accountability
- Fund the agents adequately on a continuing – not project – basis.

Definitions of terms: Subsequent note

Current usage of terms is ambiguous. To minimise confusion, the following definitions are proposed:

'Rehabilitation' relates to physical and agronomic activities applied to mine voids and spoil to return the area to a stable, non-polluting and useful landform. It is the sum of 'regrading', the physical reshaping of spoil land forms, forming drainage lines / structures and replacement of topsoil (if available); and 'revegetation', the agronomic planting of seed or seedlings or re-spreading of topsoil and tending the area to re-establish vegetative cover.

'Reclamation' relates to the physical and chemical treatments applied to contaminated areas to limit further pollution of land or water. It applies particularly to treatment activities which are required under the contaminated land legislation.

'Regeneration' would not usually be applied to mine sites. It has the implication of 'restoring life' and so should have a narrow application to activities applied to damaged vegetation, say following fire or cyclonic winds to return the vegetation of the area to a form similar to that which existed prior to the disturbance.

Consistent with the 2016 *National Standards for the Practice of Ecological Restoration in Australia*, (<http://www.seraustralasia.com/standards/NationalRestorationStandards-RestorationEcologyWithCaseStudies.pdf>) ecological 'restoration' is the process of assisting the recovery of an ecosystem that has been degraded, damaged or destroyed. This parallels the use of the term in built heritage terminology.

For a generic term to embrace rehabilitation of land surface and vegetation, reclamation of polluted areas, preparation for a stable post-mining land use and promotion of socio-economic stability, the term 'remediation' is proposed.

Findings

The following is a summary of the main themes raised in both plenary session and the breakout sessions. A record of open comments from the floor is provided in Appendix II. Transcripts of the whiteboard notes are included as Appendix III (some versions). The record of comments and the transcripts have additional valuable information available for all those practising in this field.

Priority

1. The greatest priority at present is to move operating mines to satisfactory closure. The abandoned mines will remain to be tackled but we need to ensure that the number of them doesn't accumulate.

Champion required – government

2. The current system is deficient at several levels, from the accounting standards that allow companies to evade making financial provision for the cost of rehabilitation, through to enforcement action at the end of life. The Queensland Government has the primary responsibility for establishing the statutory and administrative framework for a better model.
3. It is not lack of technical knowledge in natural sciences or geo engineering that is hindering progress, but socio-political and economic structures that through incentives and disincentives are uncondusive to leaving mining companies to self-manage the problems away.
4. There is manifestly a lack of technical and regulatory capacity within the two main departments administering leases. Slowness in assessing applications and overly cautious conditions are a sign of inadequately resourced regulators.
5. The inadequacy of funds to remediate abandoned mines is a proximate driver of our present predicament, but the absence of an appropriate model of governance that properly allocates responsibility; and absence of capacity within government to enforce accountability, are more fundamental causes.
6. The partition of responsibilities between the two departments (Environment and Heritage Protection; and Natural Resources and Mines) has had both advantages and disadvantages. The separation requires a strong coordinating champion supra to the two departments. At present, this is missing.
7. There is an inherent tendency of companies to prioritise generating profit where opportunities are available to defer liability for rehabilitation, such as by transitioning to "care and maintenance". Only government can rein in this tendency which is inherent in the contemporary model of corporate structure.

Champions required – industry

8. Companies' temptation to sell liabilities to underpowered operators requires the industry to stop this practice as State governments cannot easily monitor shareholdings within companies.

9. Companies should structure their executives' performance indicators to embrace responsible remediation practice. Again, industry must take the lead in this improvement.
10. There is a need for an industry representative body vocal in championing best practice as part of its role in advocating on behalf of the industry, beyond the more publicised view of lobbying for favourable treatment and criticising organisations not aligned with the industries such as some environmental groups and farmers.

Industry needs to know what is expected of it

11. Industry clearly wants more certainty in clarifying government's expectations. It is not automatically obvious in each case what standard of finish is required or what post-closure land use is to be achieved.
12. A closure plan must be built into the statutory operating conditions of every operating mine. A legislative amendment to help enforce this may be desirable, but arguably the current legislation provides a sufficient statutory mandate and in any case, some improvements to current practice need not await legislative review.

Departmental incapacity

13. Treasury, sensitised to the long-term fiscal liability, should fund the two departments' deliberative and technical capacity generously.

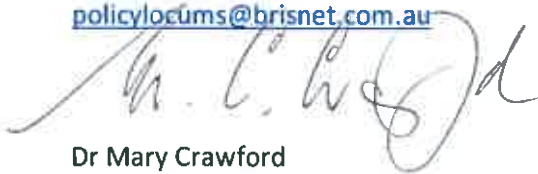
Involve communities

14. Local communities which can be severely affected by mine abandonment should be more involved in framing conditions and determining long-term land use – and in contributing towards remediation.
15. Communities expect industry to fulfil their contractual obligations set out in tenure and environmental licence conditions. Antagonism arises if the contractual obligations in the conditions are inadequately described at the outset or key stakeholders are omitted from involvement.

Cross sectoral forum

16. There does not appear to be any ongoing coordinating forum that crosses sectors and disciplines and allows frank dialogue leading to solutions to what are common problems.
17. There would be value in getting this group together again to facilitate ongoing transfer of information and to make sure that Queensland is not lagging behind best practice. (Subsequent note: the publication of the Discussion Paper and the contemporary Senate inquiry both offer triggers for another meeting).

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14 July 2017
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A handwritten signature in blue ink, appearing to read 'M. Crawford', is written over the typed name and contact information.

Dr Mary Crawford
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BACKGROUND NOTES ACCOMPANYING INVITATION

Policy hack on Mine Rehabilitation and Closure in Queensland

Scott Losee (Losee Consulting) and Ramola Yardi (Acacia Consulting) with review by Fred Tromp and professional associates. 20 Dec. 2016

Background

There are differences between community expectations for mine rehabilitation and closure in Queensland and compliance requirements for mining (*Rhetoric v Reality*, Lock the Gate, 2016; *Dodging Clean Up Costs*, Environmental Justice Australia, 2016) . There is also a financial gap between provisions that mining companies have made for remediation and the likely cost (Queensland Audit Office, 2014). Existing policies and their implementation in many instances are falling short of recognised ‘good practice’ and community expectations.

An initial internal discussion paper by Royal Society of Queensland members concluded that a range of vulnerabilities was leading to these outcomes, such as potentially inadequate technical expertise within the regulatory authorities and insensitivity of the regulatory regime to evidence of persistent lapses.

Arguably these are symptoms of underlying causes such as:

- Insufficient data held by governments to inform good policy and to provide effective monitoring and evaluation tools so that cumulative impacts and liabilities are understood (QAO, 2014)
- Inappropriate economic incentives for companies to design for closure and maximise progressive rehabilitation, through the current financial assurance policy framework and tool (DEHP 2014, White et al 2012)
- Limited, if any, strategic funding allocated by governments for public-good research to inform mine rehab and closure policies and regulation; (research funded by industry eg. Australian Coal Association Research Program ACARP and AMIRA has different objectives and is insufficient to also address the needs of governments regulating mining)
- Lack of clarity in regulatory frameworks and consequently hazy regulatory focus between the concepts of rehabilitation and closure
- Inadequate policy regulatory frameworks which do not track and hold companies to account on closure plans and implementation strategies as conceptualised during the Environmental Impact Assessment stage
- Systemic conflicts-of-interest for the State government among its responsibilities to regulate to protect the environment; promote economic development; and secure revenue (through royalties) to fund services
- A temporal and spatial imbalance between those who make the decisions and those who live with the consequences
- Power imbalances between farming and environmental advocates compared with mining business interests
- An economic system that considers environmental values and services as ‘external’ to its logic, manifested in public statements by conservative commentators as a false ‘jobs versus environment’ perceived dualism
- Remoteness of mine sites from the voting public (i.e. ‘out of sight, out of mind’).

Mainstream policy development and implementation occurs within this set of circumstances. If the prevailing political, institutional, legal, economic and professional frameworks have contributed to an impasse where the gap between the rate of land disturbance for mining and the rate of rehabilitation is widening, then it is reasonable to conclude that solutions must either address these limitations, or by default remedies will become the responsibility of future generations. This is in direct conflict with the concept of intergenerational equity as a core element of the *National Strategy for Ecologically Sustainable Development* (endorsed by the Queensland Government in 1992. Also see the Brundtland Commission on Sustainable Development, 1987).

It seems clear that it is not lack of technical knowledge in natural sciences or geo engineering that is retarding progress in this field, but socio-political and economic structures that are uncondusive to self-managing the problems away.

Rationale for new action

A number of concerned independent professionals with knowledge of the field have joined to advance the cause of responsible mine closure and rehabilitation. They doubt whether a sustainable model of policy, regulation and financial capacity exists. The primary objective of the proposed hackathon is to tackle an entrenched problem from new perspectives, taking no current perspective for granted. The method is based on involving people from all relevant sectors in a facilitated exercise that crosses disciplinary and jurisdictional silos.

What is a 'hack'?

The notion of hacking originated from the practice of gaining unauthorised access to and/or control of computer systems. However, its meaning has grown. The policy hack concept uses the definition of a 'hack' as 'a clever solution to a tricky problem'. Group hacking, then, is a form of collective problem solving. In our view, hacking has several attributes

- Not formally sponsored by or affiliated or aligned with parties that have vested interests
- Creativity is fed by crossing boundaries (e.g. disciplines, ages, gender, politics, bureaucratic silos)
- It is extra-curricular and participation is free and voluntary (and hence, should be social and fun)
- It is undogmatic and seeks meritorious solutions which are not necessarily constrained by the existing landscape of the problem domain
- It is egalitarian—all participants have equal status
- Generating an implementable outcome is not its only criterion of success
- Its products' origins are anonymous (interpreted here as an option for participants to choose to remain anonymous).

How could a policy hack on mine rehabilitation and closure be structured?

- Standalone event, as a precursor to a later event with a higher public profile
- Deliberate invitation or encouragement of participation that crosses boundaries
- 'Chatham House Rules' and ground rules for identifying or not identifying participants in any outcomes
- Prior selection of method for facilitation e.g.—
 - business model canvas; for example, if you were a business 'selling' good practice in mine rehab and closure to mining companies or government – how would you pitch it? How would your product create value or benefit, what problems would you reduce for your proposed customers?
 - behavioural economics; for example, starting from the assumption that people want to do the right thing - who are the individuals in mining companies (or government) that

avoid / procrastinate / renege on action? How can we overcome systemic or psychological obstacles to help them make better decisions? What is the human element in all this?

- Free participation and provision of refreshments
- Introduction of the 'policy problem' and 'impasse on solutions' and 'ideal outcome'
- Two de-identified case studies (drawing on real examples) that can be 'hacked' using new frameworks
- Many hacks end with a prize acknowledging the best solution by the best team. This policy hack would instead document a suite of solutions and key insights and next steps as agreed with the participants
- Evening session from 5:30-8:30pm with pizza and softdrinks (or potentially some healthy options) hosted at the Sustainable Minerals Institute, University of Queensland
- Facilitated by Scott Losee and Ramola Yardi on behalf of the TJ Ryan Foundation
- Brief scene setting presentations by relevant experts, including expert members of the Royal Society of Queensland acting in an individual professional capacity.

Next Steps

- Secure formal confirmation by the Sustainable Minerals Institute of their willingness to host (supply legitimacy, venue and refreshments)
- Identify the key stakeholders – pre-engagement
- Compile invitation list (approx. 30) – recommend 'by invite list' - limiting to stakeholders currently or previously involved or interested in the issue of mine rehab in Qld. This will include government, industry, non-government, academic, consultants, scientists
- Select two site case studies that demonstrate breadth of issues for mine rehab in Qld
- Secure date for Feb 2017
- Prepare background briefing notes to be sent to all invitees in advance (drawing upon this present outline)
- Develop program in workshop style format for the 3 hour session involving:
 - Introduction by facilitators, brief scene setting by experts
 - Two parallel break out groups facilitated by Scott and Ramola
 - Each breakout group applies either business model canvas or behavioural economics to the two case studies to 'hack' new solutions
- Preliminary planning meeting with David Mulligan of the Sustainable Minerals Institute to confirm format, list of invitees and briefing notes
- Sound-out the proposed policy hack with key invitees and secure their interest and involvement and endorsement
- Clarify how the output from the policy hack will be used – partly determined by participants.

ends

DEHP. March 2014. *EHP Financial Assurance Calculator: User Guide*. Department of Environment and Heritage Protection. State of Queensland.

White, Ben, Graeme J. Doole, David J. Pannell and Veronique Florec. 2012. "Optimal environmental policy design for mine rehabilitation and pollution with a risk of non-compliance owing to firm insolvency". *The Australian Journal of Agricultural and Resource Economics* Vol. 56, pp. 280–301.

APPENDIX II

COMMENTS FROM PARTICIPANTS

This Appendix records notable comments raised during open discussion by participants including discussion during plenary and break-out sessions. These comments supplement the transcripts of the whiteboard notes in Appendix III.

Eleven years have passed since progressive rehabilitation was introduced into the legislation, and fewer than 600 ha have subsequently been remediated. Better records of how much rehabilitation is being done are required as self-reporting is inadequate.

Practitioners need more clarity as to precisely what is required. 'Best practice' can be rubbery. There is no clear image in the minds of the regulator or the companies as to what is to be achieved: no clear objective. But no jurisdiction in the world does this well.

Conditions for closure will not be universal. The basic universal objective is to achieve a satisfactory post-mining land use. However, there is no one solution that fits the range of: abandoned mines with no owner; mines under regulated processes; and currently operating mines.

The mining sector is not the only pollutant of rivers and mine environments.

'Rehabilitation' is only part of the total procedure required: 'regeneration' is a more all-encompassing word (but see later "Subsequent note" in the summary above).

The procedure for mining approvals largely excludes sectors of the community such as unions and civil society groups from involvement. Typically, environmental impact studies of several thousand pages are published with a window for submissions of only a couple of weeks. There must be a better model, such as the Regional Forest Agreement.

It is difficult to make a decision even on whether a mine can close. There is a need for a long-term funding model and not just at the expense of industry which now provides most of the money.

A risk-based approach can avoid being overly prescriptive. But there is no 'risk tool'. There is no such thing as a 'closure risk specialist'. The view that there must be no risk is not feasible as mining is part of society. Risk assessment requires a multi-disciplinary team.

Queensland does not have a 'life of mine closure policy'. There is no consistently applied carrot or stick. There is no legal requirement for a closure plan so it doesn't happen.

At present, no one is available to receive a closed mine. In three cited cases, the companies want to close but are in limbo as to who is responsible and what money is to be invested. The regulator in these cases doesn't know how to close off the mine. A case in New South Wales was mentioned: the farmer is willing to take on responsibility but the regulator doesn't wish to release the company because of the risk of subsidence. Reference was made to the Subsidence Board in New South Wales.

Present departmental abandoned mines staff are focused on mine safety.

Some mines that have closed have had retrofitted conditions. One can't change goalposts halfway as this bankrupts companies. There should be a communications plan. The biggest risk for companies is changes in the goalposts.

Is there a scalable model? There are 6000 mines in a condition like Mount Morgan around the world, costing typically \$100 million each to remediate. There are some 220 big mines in Queensland with current leases and potentially funded to have closure plans. The larger companies have good documentation to allow closure even when the vigour of the enterprise is declining. The larger mines all have closure processes. Unions and the workforce will generally be aware of the likely life of the mine.

There is no need for any mine to be deemed abandoned unless there is a regulatory failure or the company goes bankrupt. Financial assurance is the best method of securing the funds, but the regulator needs to be skilled at assessing what is required.

“Provisions” as commonly mentioned in accounting documents are a book value, not a real cost of rehabilitation. Net present value is discounted out for the life of the mine or 30 years. Under stock exchange ASX rules, rehabilitation is offset against the asset. This won’t change unless rehabilitation is cut from the bottom line. AASB accounting standards tend to focus on making the accounts look good and justify deferring rehabilitation as long as possible. Australian Accounting Standards should be amended to bring liability for rehabilitation forward as a current expense, as is the case with the expenditure on occupational health and safety, which is considered to be a current cost.

The mine site manager is focused on production and cost control.

Behavioural economics is available to improve traditional economic approaches. The federal Department of Prime Minister and Cabinet has established a BETA initiative, Behavioural Economics Team of the Australian Government, <https://www.pmc.gov.au/domestic-policy/behavioural-economics>.

The government doesn’t get involved in share transfers within companies so doesn’t know whether a company with capacity is being hollowed out.

When prices are good, the companies tend to put efforts into production rather than rehabilitation. When prices are low, money for rehabilitation dries up