



ABANDONED MINES IN QUEENSLAND

Toxic Time-Bomb or Employment Opportunity?



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EXECUTIVE SUMMARY

- ◇ Queensland has 15,300 abandoned mines¹. 317 of these are classified as giant, very large or large, and many are having serious environmental and human health impacts locally. The number of abandoned mines continues to grow.
- ◇ The estimated cost of their rehabilitation ranges between \$1 billion and \$10 billion plus, the latter based on the current known costs of mine rehabilitation. The State Government has allocated \$6 million per year to abandoned mines but has recently announced an additional \$40 million over 5 years.
- ◇ The three case studies included here – Mt Oxide, Mary Kathleen and Mt Morgan - illustrate that the current Queensland Abandoned Mines Program is seriously underfunded and lacks both the capability and the necessary strategic framework to seriously address this multi-billion dollar problem.
- ◇ Based on conservative estimates, up to 6000 direct and indirect jobs could be created in regional Queensland based on a “rolling site rehabilitation program” focused on remediating a cohort of 30 high risk abandoned mine sites at any one time continuously over 25 years.

RECOMMENDATIONS

- ◇ The current Abandoned Mines Land Program should be replaced by a new, independent authority with the legislative powers and resources to establish a long-term systematic approach to rehabilitating Queensland’s abandoned mines.
- ◇ The new abandoned mines program should be funded by either a modest mining industry levy or from the interest on a new cash bond deposit system designed to replace the current ineffective mine rehabilitation financial assurance system.

INTRODUCTION

Queensland now has some 15,300² registered abandoned mines.

While many are very small and low impact there are:

- ◇ 120 to 130 medium sized abandoned mine sites most likely to have infrastructure, such as tailings dams³, and
- ◇ 317 giant, very large, large or medium sized abandoned mines⁴.

The cost of repairing these abandoned mines currently falls on the Queensland taxpayer. The Queensland Auditor General estimated cost of their rehabilitation in excess of \$1 billion⁵. Given the cost of closing and rehabilitating large mines regularly exceeds \$500 million, \$1 billion would seem to be a gross underestimate.

A more realistic figure would put the bill in excess of \$10 billion based on an assumed and highly conservative allocation of \$50 million for each of the 317 giant, very large or medium-sized abandoned mines. As a benchmark, the estimated cost of rehabilitating the Ranger Uranium Mine in the Northern Territory is estimated at \$600 million⁶ and Queensland's Century Mine between \$400 million and \$500million⁷.

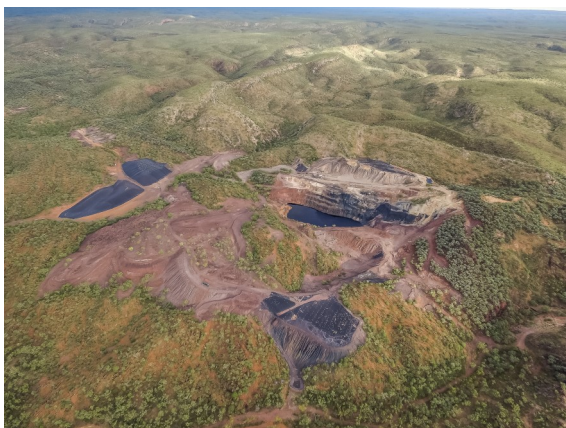
CASE STUDIES

The Lock the Gate Alliance has recently conducted site visits to Mount Morgan, Mary Kathleen and Mt Oxide mines in Central Queensland.

Mount Oxide

Mount Oxide was discovered by Ernest Henry in 1882. Owing to the remote location, little production took place until the 1920s. The main mining periods were 1927 to 1943 and 1955 to 1960, when the higher grade ore was worked by underground methods with access via a tunnel adit and 1967 to 1971, when the lower-grade envelope and remnants of high-grade ore were bulk mined in an open-cut.

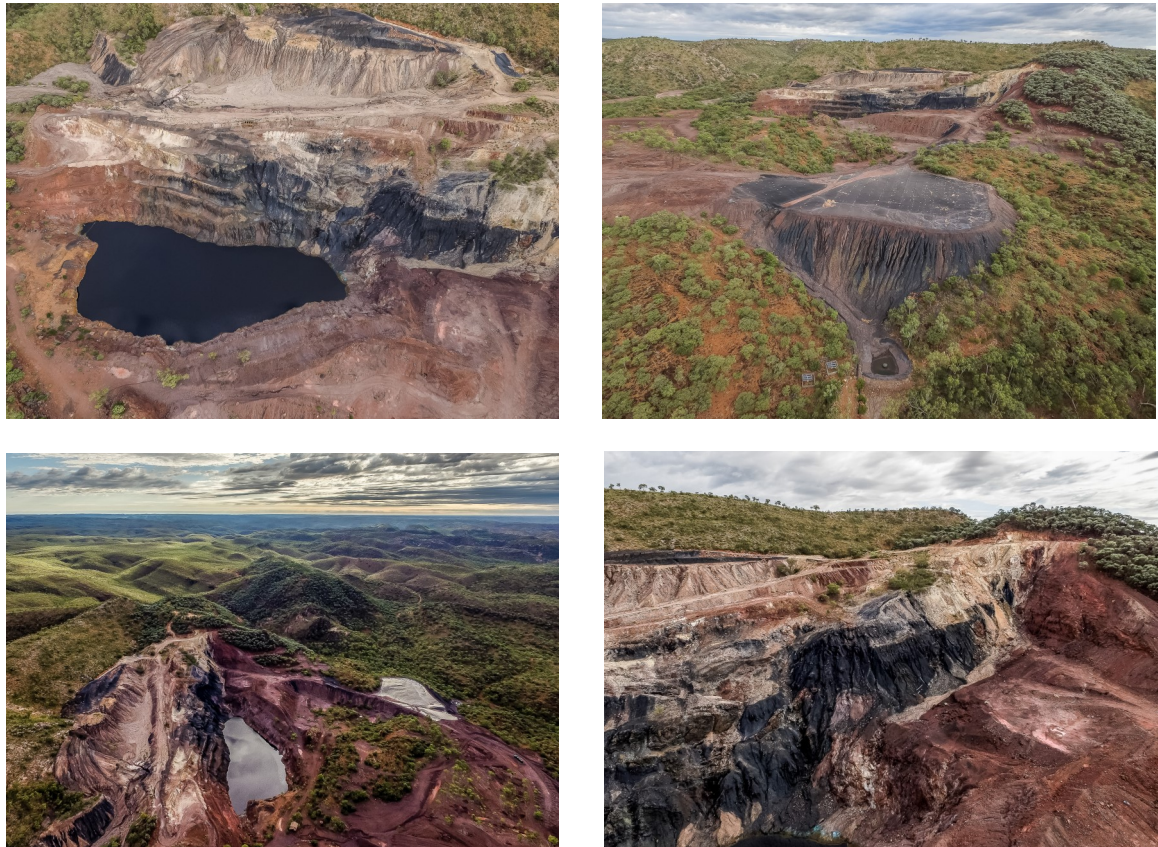
Since its abandonment in 1971, various attempts have been made to manage the impacts of acid rock drainage from over burden and ore stock piles by covering them with plastic, constructing holding dams and using electric fences to prevent stock from accessing polluted creeks. All these band-aid solutions have failed.



Mount Oxide

The pit remains open and after significant rain fall events, acidic water escapes into surrounding creeks. With a pH of 2 according to the local grazier⁸, the water quality in the pit is similar to battery acid. The site has been leaking acidic water laced with heavy metals into the environment since the 1960s and the situation continues with no genuine attempt to rehabilitate the site.

CASE STUDY



The owners of Chidna Station continue to suffer the impacts of the mine and the consequences of the State Government's inaction. After major rain fall events, local creeks can run turquoise for up to 7 km due to acid and heavy metal pollution.

The solution is likely to be relatively simple – backfill the pit with the acid forming waste material and cap the site with a fit for purpose cover. However, a combination of lack of funds and the desire to keep the site open in case a future buyer is found, means the site continues to contaminate the environment.

On any measure the Mt Oxide deposit is a marginal deposit and unable to support capital investment in crushing and processing plant. After 40 years of mismanagement, the State Government should foreshadow that it will not renew the exploration licence covering the site and complete its closure and rehabilitation.

Mary Kathleen

The now abandoned Mary Kathleen Uranium site paints a similar picture. With all contracts filled by late 1982, the township, mine and mill were dismantled and the tailings rehabilitated by the end of 1984. Mary Kathleen became the site of Australia's first major rehabilitation project of a uranium mine, which was completed at the end of 1985 at a cost of some A\$19 million. In 1986 this work won an award from the Institution of Engineers Australia for environmental excellence. Following rehabilitation, the mine was relinquished by CRA (pre-cursor to today's Rio Tinto) with the State Government assuming all future liabilities

Since 1986, the tailings repository at the Mary Kathleen site has been subject to seepage of radioactive waters from both the toe of the dam and the surface at rates much higher than initially predicted.

CASE STUDY



Mary Kathleen

According to a James Cook University (JCU) paper in 2003⁹ rehabilitation of the mine, mill and waste disposal sites commenced in 1982. The aim was to “leave the site in a safe and satisfactory condition consistent with future land use in the area (cattle grazing) requiring no foreseeable on-going maintenance and minimum precautionary monitoring”¹⁰.

CASE STUDY



However the rehabilitation of the site has not achieved this goal. According to the JCU study, “the flow rate of surface seepage from the tailings storage facility occurs at a much higher rate than predicted. Also the neutralizing potential and the absorption capacity of the tailings and underlying aquifer were over stated at the time of mine closure. Acid mine drainage has developed mobilizing metals, metalloids, rare earth elements, alkalis, radionuclides and sulphate from the waste repository into surface water seepages”¹¹.

According to the owners of Rosebud Station which encompasses the Mary Kathleen site the downstream water course is unusable and the entire area is avoided where possible due to contamination concerns¹².

Mount Morgan

Mining began at Mount Morgan in 1882 and continued until 1981. The mine was once the largest gold mine in the world. From October 1886, the Mount Morgan Gold Mining Company operated using underground mining methods until 1927 when fire destroyed underground workings. The company deliberately flooded its underground workings in response to the fire and went into liquidation. By 1905, the gold ore was declining in grade and reserves were not as easily found and mined.

However, beneath the gold ore cap of the famous 'Ironstone Mountain' was an even larger deposit of gold-copper ore. The wealth continued to flow and pollution problems were ignored. By 1907 the mine had produced \$60,000,000 worth of gold, making it one of the most productive in the world.



The Mount Morgan Mine was re-established using open-cut mining methods in 1928, operating as Mount Morgan Limited. Mount Morgan Limited became a subsidiary of Peko Wallsend Limited in 1968 and continued operations until 1974, when Mount Morgan Limited began to reach the end of its ore body. Mount Morgan Limited progressively scaled back its workforce and operations until it reached the end of its ore body in 1981.

From 1982 to 1990, Mount Morgan Limited began processing tailings of its previous operations at the Mount Morgan mine site. In parallel, Mount Morgan mine facilities were used to process materials from other Peko Wallsend operations. At the end of both such operations in 1990, the Queensland Government began negotiating with Mount Morgan Limited regarding terms of closure.

Mount Morgan

The Queensland Government began administration of the site in 1992. Since 2007 the mine and mining leases have been owned by Norton Gold Fields. An agreement has been renewed with the Department of Natural Resources and Mining regarding the responsibility between the organisations for rehabilitation.



The Department of Natural Resources and Mines reported that it is costing the Queensland Government \$2.6 million per year to run the water treatment plant at Mt Morgan to prevent the open pit (which is filled with water with a pH of 3.2) from overflowing and impacting the Dee River¹³.

As noted on the Queensland Government abandoned mines website¹⁴, the legacy from the Mt Morgan mine includes the large waste rock and tailings dumps left over from mining and mineral processing, as well as the impacts occurring from ongoing generation of acid and metalliferous drainage and seepage of low-quality water into the adjacent Dee River.

SHORTCOMINGS OF THE ABANDONED MINE LANDS PROGRAM

Queensland currently has an Abandoned Mine Lands Program (AMLP), administered by the Department of Natural Resources and Mines, which progressively assesses abandoned mine sites, to reduce significant public health and safety risks. It does not address the long-term environmental impacts from abandoned mines including acid mine drainage, radioactive leakage, heavy metal contamination or salinity.

The program is seriously under-resourced and is focused on managing public health and safety risks at a very limited number of sites including those at Mt Morgan, Horn Island, Croyden, Herberton, Charters Towers, Gympie and Mt Oxide amongst others¹⁵. There is no evidence to suggest that the Queensland Government - both present and past - have undertaken a systematic review of the risks and costs associated with abandoned mines and there appears no political will to seriously address the problem.

Recent site visits to Mount Morgan, Mary Kathleen and Mt Oxide illustrate that the AMLP in its current form is manifestly inadequate. The program is only able to deliver inadequate and ineffective band-aid “solutions” to a limited number of sites that barely address the tip of the abandoned mine iceberg.

The mining industry for its part continues to avoid the question of abandoned mines. While recognizing that failed or inadequate mine rehabilitation will impact the industry’s reputation “their (abandoned mines) presence undermines public confidence in the ability of the industry to manage its environmental impacts in the long-term”¹⁶, its social licence and ultimately its access to land the industry has repeatedly failed to demonstrate any consistent leadership in regards to abandoned mines, the associated legacies and the impact on the industry’s reputation.

SHORTCOMINGS OF THE ABANDONED MINE LANDS PROGRAM

Having said this, the Mineral Council of Australia does support a national inventory of derelict mines and their prioritisation, the use of existing royalties to fund abandoned mine rehabilitation and the investigation of “models for collaboration between Industry, Government, Volunteer and Community Organisations”¹⁸. However the MCA has chosen not to follow through with any serious intent to see the problem seriously addressed. Mines continue to be abandoned and MCA members continue the practice of on-selling their rehabilitation liabilities to junior miners as the profitability of aging assets declines creating the prospects of further mine abandonment as these juniors have neither the financial capacity nor the capability to adequately rehabilitate these mines.

The first and only national attempt to address abandoned mines resulted in the publication of “A Strategic Framework for Managing Abandoned Mines in the Minerals Industry”¹⁹ in 2010. This strategy was produced jointly by the Ministerial Council on Mineral and Petroleum Resources (MCMPR) and the Minerals Council of Australia (MCA). The MCMPR no longer exists but at the time included the Australian Government Minister for Resources, Energy and Tourism, and state and territory ministers with responsibility for minerals and petroleum.

The Strategic Framework addressed a number of issues relating to data collection and information sharing, risk assessment and management, and resourcing and partnerships. The question of how to fund rehabilitation of abandoned mines on a scale commensurate with the impacts and risks was side-stepped. Equally the questions of institutional reform, liability and governance were side-stepped as the strategy deferred to the status quo. There is currently no political will to progress with development of an Implementation Plan for the Strategic Framework within the new governance arrangements, the Standing Committee on Energy and Resources under the Coalition of Australian Governments (COAG).

The size, scope and capacity of the Queensland program illustrates that little progress has been made since 2010 and that the situation continues to worsen with the addition of the Texas silver mine, the Collingwood tin mine and the Mount Chalmers gold mine to the abandoned mines list over the last 2 years. In response the Queensland AMLP received \$6 million in the 2014/15 State budget²⁰ with no plans to expand the program.

RECOMMENDATIONS

Based on a high level analysis of what is regarded as World's Best Practice, the Queensland Government would be advised to consider adopting the following strategic framework to address abandoned mines:

1. **Establish an independent lead agency.** There is a need to clarify which part of Government has legal jurisdiction over abandoned mines in Queensland. To ensure rehabilitation is carried out successfully, efficiently and cost effectively, a new independent authority should be established to oversee the program. It should be advised by independent industry professionals in regards to the technical aspects of rehabilitation and the costings involved.
2. **Funding and Resources.** The new abandoned mines program should be funded by either a modest mining industry levy or from the interest on a new cash bond deposit system designed to replace the current ineffective mine rehabilitation financial assurance system. It is envisaged that the current amount of financial assurance held by the Queensland Government, reported to be \$5.38 billion would substantially increase under this new format. The interest from doubling of the mine rehabilitation bonds to \$10 billion even with progressive rehabilitation draw-downs is likely to be in the \$200 to 300 million per annum range which would make a material difference over time to the State's huge accumulated liabilities.
3. **Regulatory structure.** New legislation would need to be passed to create the new statutory authority, its operational parameters, governance and the funding mechanism, to replace the current AMLP.

RECOMMENDATIONS

4. **A new operational policy for the abandoned mines authority would be set.**

It would be risk based and reflect world's best practice mine site rehabilitation. A new set of "first order principles" would guide its investment and be the framework for abandoned mine closure plans. These principles would include the following:

- i. rehabilitate mined land to a condition capable of supporting the uses prior to mining, or to "higher or better" uses;
- ii. restore the approximate original contour of the land by backfilling, grading, and compacting;
- iii. minimize disturbances to ground and surface water systems by preventing acid mine drainage and ensuring the effective management of salts, toxic substances and sediments so that no creeks, rivers or other water bodies are impacted from mining based on pre-mining baselines and establish a permanent vegetative cover in the affected area commensurate with its use prior to mining.

These new principles would set a new benchmark in regards to mine rehabilitation in Queensland beyond addressing abandoned mines replacing the redundant and ineffective principles of "safe, stable and sustainable" which have seen the State's liabilities grow to unsustainable levels.

BENEFITS OF ABANDONED MINE REHABILITATION

The end of the “once in a generation” mining boom and the return to the long-term average/status quo in regards to commodity process and investment has seen the loss of thousands of direct and indirect mining jobs in regional Queensland. It is unlikely that we will ever see the coal industry, for instance, return to the investment and employment levels enjoyed during the boom.

While not overstating the potential, it is likely that the proposal to address abandoned mines in Queensland could create several thousand direct jobs in the abandoned mine rehabilitation sector. It is extremely difficult to estimate the number of jobs that may be created. However, as an indicator we are assuming the following;

- ◇ There are 317 mega, large and medium mines cited by the 2011 Floods Commission of Inquiry that are likely to include most of the high risk sites.

Assuming a conservative average of 400 workers per operating mine across these categories and assuming 15% of the operating workforce to rehabilitate each mine and that at any one time there are 30 abandoned mine projects being undertaken then approximately 1800 direct jobs would be created. Factor in the Minerals Council of Australia’s multiplier of 6.5 for indirect jobs and there are potentially 14,000 jobs to be created from an abandoned mines program (11,700 indirect jobs). Using a more conservative and perhaps more credible multiplier of 2.4 a strategic, well funded abandoned mines program could generate 4,300 indirect jobs or a total of about 6000 in rural and regional Queensland.

Assuming it would take 20 to 25 years to work through the 317 priority mines then this is a material investment. The potential for the balance of the 15,000 abandoned mines to sustain jobs in rural and regional Queensland needs to be assessed. Within this broader opportunity, there is the potential to create hundreds of jobs in Indigenous communities.

The Queensland abandoned mines program could be linked to the successful Indigenous Rangers program whereby long-term maintenance, monitoring and management of rehabilitated mine sites could be handed over to existing and expanded regional Indigenous ranger programs.

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