

Submission on the Inquiry into the rehabilitation of mining and resources projects as it relates to Commonwealth responsibilities

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Doctors for the Environment Australia (DEA) is an independent voluntary organisation of medical doctors and students who work to address the adverse health effects of environmental damage, pollution and anthropogenic global warming in a broad public health context. Our members work across all specialities in community, hospital and private practices.

DEA welcomes the opportunity to comment on the rehabilitation of mining and resources projects as it relates to Commonwealth responsibilities.

Recommendations

- 1 That in the absence of a national Environmental Protection Authority, the Commonwealth recognises the need to recommend and influence the adoption of uniform and effective measures be taken by all states and territories to protect human health and the environment.
- 2 More research is required as a matter of urgency, to ensure current rehabilitation practices are safeguarding health. Baseline values, ongoing monitoring and health studies are required to make meaningful decisions about the impacts of rehabilitated and abandoned mine sites on human health.
- 3 That Commonwealth responsibilities for rehabilitation of mines be extended to the care and maintenance phase of mine closure, as examples of negative health impacts have occurred after mining has stopped but before rehabilitation has commenced.
- 4 Improve practices, monitoring and ongoing assessment of management of acid mine drainage from workings or tailings of mines in all stages of closure.
- 5 Any plans for the use of pit lakes for recreational activities be accompanied by regular and ongoing monitoring of water quality, with full disclosure. This is particularly important if the lake is used for recreational fishing, as pit lakes may contain harmful substances that can enter the food chain and impact human health.
- 6 More research is required before groundwater sources are compromised by the filling of pit lakes. Threats to aquifers by depressurising, depletion or by contamination by saline or pollutants will have health impacts on residents reliant on groundwater, and on nearby agricultural land and stock.

- 7 Rehabilitated mining areas require ongoing safety monitoring for the stability of landforms, including walls of pit lakes, for a period of decades if not millennia.
- 8 That adequate funds are available for the monitoring, assessment and rehabilitation of abandoned mines.

Mining incurs a range of environmental impacts that persist after the production phase of the mine has ended. There are changes in vegetation and landscape, exposure and potential ignition of fossil fuels, the pollution of air, soils and water, the introduction of aquatic sediments into water sources and land subsidence. Any of these can result in loss of productive land, loss or degradation of groundwater, pollution of surface water and air pollution from dust or toxic gases, with subsequent negative impacts on human health.

TOR – b. the adequacy of existing regulatory, policy and institutional arrangements to ensure adequate and timely rehabilitation

In the absence of a national Environmental Protection Authority, there is a lack of uniform and effective measures taken by all states and territories to protect human health and the environment by the adequate and timely rehabilitation of mines. The Commonwealth is in the position to recommend and influence the adoption of such measures.

TOR – d. The effectiveness of current Australian rehabilitation practices in safeguarding human health and repairing and avoiding environmental damage.

Lack of research and monitoring

There is a paucity of data on aspects of mine rehabilitation such as base line studies, long term monitoring, Health Impact Assessments or community consultation, and if any such data has been collected, it is not publicly available. DEA could not find any health statistics on people working or living near mines in the care and maintenance phase, or mines that have been rehabilitated or abandoned.

Care and maintenance phase

Many mines in Australia are in the care and maintenance phase, during

which production is stopped. The site is required to be managed to ensure it remains in a safe and stable condition, but there is no requirement for rehabilitation. For example, in New South Wales (NSW), 123 mines are in the care and maintenance phase, and 112 are considered abandoned. Only one mine in NSW has been fully rehabilitated and relinquished in the past 10 years.²

While this enquiry asks for comments on the rehabilitation of mining and resources projects, adverse health impacts are arising during the care and maintenance phase and before the rehabilitation phase of the mine has begun. Two examples of failures of management during the care and maintenance phase have occurred with severe impacts on human health.

The first example is the 2014 fire at the Morwell coal mine in the Latrobe Valley. An old part of the mine no longer in operation had not been adequately protected from fire hazard, unlike active sections of the mine. The open and unprotected coal face was set alight by burning embers from a nearby bushfire. The resultant fire on the coal face burnt for 45 days and affected thousands of nearby residents. The severe air pollution from the fire, which included particulate matter (PM₁₀ and PM_{2.5}), CO, and other airborne pollutants and toxins was implicated in short-term negative health impacts such as respiratory illnesses, increased risk of heart attack and stroke. Long-term health impacts similar to those found from exposure to air pollution are expected.³⁴

The Hazelwood Mine Fire Enquiry determined that; *"There was a gap in regulation of the Hazelwood mine in respect of fire risks with the potential to impact on Morwell and surrounding communities. The Hazelwood mine fire was a foreseeable risk that slipped through the cracks between regulatory agencies. This reality must be confronted if similar incidents are to be avoided in the future."*⁵

The second example of health impacts during the care and maintenance phase of an inoperative mine is Linc Energy's In Situ Coal Gasification (ISCG) project at Hopeland, near Chinchilla in Queensland. The project, which ceased in 2013, is alleged to have contaminated 314 km² of farming lands in the surrounding area, and farmers have been banned from digging deeper than 2 metres into the soil because of a flammability risk.⁶

The Queensland government, last year banned any further ISCG projects in the state^{7,8,9}; Linc Energy executives have been charged with environmental offences and the company is now in liquidation. There is no information about ongoing health impacts on local residents.

DEA believes that the experience of the Linc Energy ISCG project and resultant legislation in Queensland should be considered for any future ISCG projects in Australia. Commonwealth responsibilities should extend to preventing any long-term and unmanageable environmental events from

happening anywhere in Australia.

Acid mine drainage (AMD)

The process of mining exposes buried rock, and exposure of sulphide minerals to air and humidity causes oxidation and sulphuric acid formation, which in turn can solubilise heavy metals (aluminium, arsenic, cadmium, copper, lead, nickel and zinc) carrying them into rivers and streams. Similarly, dissolved pollutants may include sulphates, nitrates, radionuclides, mercury, and in gold mines, cyanide. Once in waterways or dispersed by dust, bioaccumulation in fish or animals used for human consumption and contamination of drinking water with potentially negative impacts on human health. These substances are all very long lived and will remain in the environment for hundreds of years. Changes to water flow or subsidence can cause AMD to occur long after the mine has closed.¹⁰

Current Australian rehabilitation practices are not adequate to prevent AMD contamination of the environment by chemicals harmful to human health. For example, there is seepage from the tailings storage facility at the Mary Kathleen uranium mine in northwest Queensland that was not predicted at the time of mine closure. The seepage is occurring despite the rehabilitation of the storage facility and installation of a multi-barrier dry cover. Seepage of saline, radioactive water, uranium, iron, manganese, nickel, zinc and other substances is occurring into ephemeral creek systems with deterioration of water quality. Of concern in an arid environment is evaporation of watercourses and more widespread distribution of desiccated pollutants via dust and wind.^{11,12}

Another example of contamination of waterways is the Clarence Colliery on the Wollangambe River, which runs into the World Heritage Area. Since the 1980's, the operators of the underground coal mine, Centennial Coal, have been allowed to discharge mine waste into the river under its environmental licence. High levels of salt, nickel and zinc have been detected downstream of the mine with loss of invertebrate life.¹³

Pit lakes and impacts on security of local groundwater

Pit lakes are sometimes proposed to fill the void left by large mines, but local groundwater sources can be impacted if used to fill pit lakes. Predictions of water dynamics in final landforms are dependent on modelling of local hydrogeology and subject to considerable uncertainty due to the paucity of data available.

In NSW, it is thought that final voids of coalmines will permanently depressurise both local aquifers and productive alluvial aquifers some distance from the mine site. Modelling of impacts is difficult because of

conjecture in prescribing strata hydraulic properties and other parameters. Depletion of aquifers will impact on water security for residents, stock and farmlands in surrounding areas.^{14,15}

There is potential for many pit lakes in Western Australia to become point sources of hyper-saline water, and impact on the surrounding groundwater resources as well as the broader natural environment.¹⁶

Water quality in the pit lakes

Pit lakes are likely to have a high salt content and may contain substances known to be harmful to human health. Salinity may increase over time (over hundreds of years) with evaporative concentration of saline water. Spoil leachate with dissolved pollutants can progressively decrease water quality, and chemical evolution via evaporation will be ongoing for decades or longer. Flooding and overflowing of the lake pit would release water containing salt and toxins to aquifers, watercourses or adjacent land.¹⁷

Pollutants within pit lakes may present a threat to human health as a result of planned or unplanned fisheries. Toxic contaminants such as mercury, selenium, cadmium and other heavy metals may accumulate in aquatic ecosystems, and many contaminants are subject to bio-concentration.¹⁸

In 2013, Barramundi were released into the 55Ha Hazelwood Pondage lake system, with a warning that human consumption of recreationally caught fish be limited to 300-450 gms/week. In April 2017, the EPA revised their consumption guidelines downwards on advice from the Commonwealth Department of Health that related to the presence of PFAS (per- and poly-fluoralkyl substances) that are bioaccumulative and can cause health problems in animals.^{19 20}

There is inadequate research on the long-term health effects of PFAS exposure in humans. Despite this, Fisheries Victoria is committed to developing Hazelwood Pondage as a recreational fishery.²¹

TOF – e. The effectiveness of existing abandoned mines programs, with regard to repairing environmental damage and safeguarding human health.

NSW Auditor General's reports on abandoned mines

In 2011, the NSW Auditor-General found that there are "*many thousands of hectares of degraded and contaminated lands*", and that "*that the few*

*million dollars allocated annually to this program are substantially inadequate". The Auditor-General concludes that: "the Derelict Mine Program may represent the largest category of contamination liability for the New South Wales Government."*²²

A further audit in 2014 by the NSW Auditor-General estimated that there were 112 derelict mine sites on Crown Land and: *"Amongst the 38 high risk sites, [Department of Industry] is aware that seven large scale derelict mines on Crown land are potentially high risk to the environment and public health, and may be need to be notified to the EPA."*²³

Similar situations in other states are either known to exist^{24,25}, or are not documented and we recommend a nationwide extension of reports, and assessment and implementation of rehabilitation needs.

Stability of final landforms of abandoned mine sites

The long-term safety of the final landform of an abandoned mine with or without a pit lake has impacts on human health. The final high wall of an open cut mine is potentially hundreds of metres tall, and potentially unstable over a period of decades or possibly millennia, with landslips endangering people and structures. The nature of the overbearing rocks and soil is such that it can weather rapidly with ongoing instability.

For example, the high wall at Yancoal's Moolarben open-cut coal mine wall adjacent to a public road collapsed in 2015. Stabilisation of high walls and associated fencing is expensive and would require ongoing maintenance and monitoring.²⁶

TOF – h. The potential social, economic and environmental benefits of adequate rehabilitation, including job opportunities in communities affected by job losses in the mining and resources sector.

Rehabilitation of mines is an opportunity to employ skilled workers once the mine has closed. Rehabilitation is best done immediately after the mining process has stopped, as equipment is available, finances are in place and workers are on site.

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