The Senate

Environment and Communications References Committee

Rehabilitation of mining and resources projects and power station ash dams as it relates to Commonwealth responsibilities

March 2019

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Chapter 1

Introduction

Referral and conduct of the inquiry

1.1 On 8 February 2017, the Senate referred the following matters to the Environment and Communications References Committee for inquiry and report by 23 August 2017:

> The rehabilitation of mining and resources projects as it relates to Commonwealth responsibilities, for example under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), with regard to:
>
> (a) the cost of outstanding rehabilitation obligations of currently operating projects;
>
> (b) the adequacy of existing regulatory, policy and institutional arrangements to ensure adequate and timely rehabilitation;
>
> (c) the adequacy and transparency of financial mechanisms, including assurances, bonds and funds, to ensure that mining and resources projects are rehabilitated without placing a burden on public finances;
>
> (d) the effectiveness of current Australian rehabilitation practices in safeguarding human health and repairing and avoiding environmental damage;
>
> (e) the effectiveness of existing abandoned mines programs, with regard to repairing environmental damage and safeguarding human health;
>
> (f) whether any mining or resources companies have engaged in conduct designed to avoid fulfilling their rehabilitation obligations;
>
> (g) the potential social, economic and environmental impacts, including on matters of national environmental significance under the EPBC Act, of inadequate rehabilitation;
>
> (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 sectors;
>
> (i) international examples of effective rehabilitation policy and practice;
>
> (j) proposals for reform of rehabilitation of mining and resources projects; and
>
> (k) any other related matters.[1]

1.2 In accordance with its usual practice, the committee advertised the inquiry on its website, and wrote to relevant individuals and organisations inviting submissions by 10 April 2017.

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1 *Journals of the Senate*, No. 25, 8 February 2017, p. 852.

Expansion of the inquiry's terms of reference

1.3 On 27 March 2018, the Senate resolved to vary the terms of reference to expand the inquiry to include consideration of the rehabilitation of power station ash dams.[2] The revised terms of reference are as follows:

> The rehabilitation of mining and resources projects and power station ash dams as it relates to Commonwealth responsibilities, for example under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), with regard to:
>
> (a) the cost of outstanding rehabilitation obligations of currently operating projects;
>
> (b) the adequacy of existing regulatory, policy and institutional arrangements to ensure adequate and timely rehabilitation;
>
> (c) the adequacy and transparency of financial mechanisms, including assurances, bonds and funds, to ensure that mining and resources projects and power station ash dams are rehabilitated without placing a burden on public finances;
>
> (d) the effectiveness of current Australian rehabilitation practices in safeguarding human health and repairing and avoiding environmental damage;
>
> (e) the effectiveness of existing abandoned mines programs, with regard to repairing environmental damage and safeguarding human health;
>
> (ea) the effectiveness of existing and past power station ash dams with regard to repairing environmental damage and safeguarding human health;
>
> (f) whether any mining, resources or electricity generation companies have engaged in conduct designed to avoid fulfilling their rehabilitation obligations;
>
> (g) the potential social, economic and environmental impacts, including on matters of national environmental significance under the EPBC Act, of inadequate rehabilitation;
>
> (h) the potential social, economic and environmental benefits of adequate rehabilitation, including job opportunities in communities affected by job losses in the mining, resources and electricity generation sectors;
>
> (i) international examples of effective rehabilitation policy and practice;
>
> (j) proposals for reform of rehabilitation of mining and resources projects and power station ash dams; and
>
> (k) any other related matters.

2 *Journals of the Senate*, No. 93, 27 March 2018, p. 2949.

1.4 The Senate granted several extensions of time for the committee to provide its report.[3] On 28 November 2018, the committee tabled a short progress report, requesting a further extension of time to provide its final report by the first sitting Wednesday of 2019 (13 February 2019).[4]

Submissions, public hearings and site visits

1.5 The committee received 93 submissions from organisations and individuals, which are listed at Appendix 1. The committee also received short statements from 1446 individuals which were based on the same pro forma template. An example of this 'form letter' was published on the committee's website.

1.6 The committee held 7 public hearings, in the following locations:

- Brisbane, QLD (12 July 2017);
- Burnie, TAS (12 October 2017);
- Darwin, NT (30 October 2017);
- Borroloola, NT (31 October 2017);
- Canberra, ACT (14 February 2018);
- Perth, WA (7 March 2018); and
- Port Augusta, SA (3 September 2018).

1.7 The list of witnesses who participated in the public hearings is at Appendix 2.

1.8 The public submissions and *Hansard* transcript of the public hearings are available on the committee's website at www.aph.gov.au/senate_ec.

1.9 The committee also conducted ten site visits to mine and power station operations across Australia, in order to gain a first-hand view of how various companies are approaching rehabilitation issues. These site visits were as follows:

- Mt Lyell Copper Mine (at Queenstown, TAS on 11 October);
- Savage River Mine (at Savage River, TAS on 11 October 2017);
- McArthur River Mine (at McArthur River, NT on 31 October 2017);
- Ranger Uranium Mine (near Jabiru, NT on 1 November 2017);
- Huntly bauxite mine (near Dwellingup, WA on 6 March 2018);
- Maxwell Infrastructure (formerly Drayton Mine), (Hunter Valley, NSW, 14 March 2018);
- Mangoola Coal Mine (Hunter Valley, NSW, 14 March 2018);
- BHP Yarrie and Shay Gap mine sites (Pilbara, WA on 10 July 2018);

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3 See: *Journals of the Senate*, No. 42, 13 June 2017, p. 1383; *Journals of the Senate*, No. 61, 12 September 2017, p. 1958; *Journals of the Senate*, No. 92, 26 March 2018, p. 2921; *Journals of the Senate*, No. 102, 25 June 2018, p. 3271.

4 *Journals of the Senate*, No. 132, 28 November 2018, p. 4302.

- Rio Tinto Yandicoogina iron ore mine (Pilbara, WA on 11 July 2018); and
- Augusta Power Stations (Port Augusta, SA on 3 September 2018).

1.10 A summary of these site visits is included at Appendix 3.

Purpose and structure of this report

1.11 The bulk of this report deals with issues relating to the rehabilitation of mining and resources projects in Australia. Issues relating to the rehabilitation of power station ash dams, examined under the inquiry's expanded terms of reference, are dealt with in a standalone chapter of the report.

1.12 This report is comprised of 10 chapters. Subsequent chapters cover the following issues:

- Chapter 2 provides an overview of the mining rehabilitation process;
- Chapter 3 outlines the current regulatory framework governing mine closure and rehabilitation in Australia, and examines how regulation can support industry in achieving better practice;
- Chapter 4 explores the minerals industry's current performance in Australia in relation to site rehabilitation;
- Chapter 5 considers the issue of abandoned mines in Australia and how these sites can be best managed and rehabilitated;
- Chapter 6 discusses issues relating to the costs of mining rehabilitation, and the regulatory tools used by governments to mitigate the risk of rehabilitation liabilities being forced onto taxpayers;
- Chapter 7 examines Indigenous Australians' engagement with mine closure planning and rehabilitation processes, as well as discussing potential employment and community benefits of increased mine rehabilitation activity;
- Chapter 8 provides a summary of additional reform proposals raised by stakeholders relating to mine site rehabilitation that could be implemented by the Commonwealth;
- Chapter 9 covers issues relating to the rehabilitation of power station ash dams in Australia; and
- Chapter 10 outlines the approach taken to committee views in this report.

Acknowledgments

1.13 The committee thanks the organisations and witnesses who provided evidence to the inquiry. In particular, the committee extends particular thanks to the people of Borroloola who hosted the committee and provided valuable input at the committee's public hearing there. The committee would also like to thank the companies that facilitated committee site visits of their operations. These visits provided the committee with a vital on-the-ground perspective about the different approaches and challenges associated with mine operations and rehabilitation.

Chapter 2

Overview of mining rehabilitation process

2.1 This chapter provides an overview of the mining rehabilitation process and current thinking around what constitutes best practice in this area, as articulated by stakeholders to the inquiry and by leading practice guidelines developed for the industry in Australia and globally. The chapter concludes by noting the level and type of information available about mine rehabilitation and closure in Australia.

What is mining rehabilitation?

2.2 Mine rehabilitation is the process by which a mine site is prepared for a post-mining land use once minerals extraction ceases and the site is closed. The long term environmental and social legacy of a mining operation will be determined by how this rehabilitation and closure process is managed.

2.3 According to Geoscience Australia, there are approximately 400 operating mines, producing 19 minerals, in Australia.[1] At some point, these mines will be required to undergo rehabilitation, either during the operation of the mine or afterwards in accordance with environmental approvals.

2.4 A leading practice handbook produced by the Departments of Industry, and Foreign Affairs and Trade, *Mine Rehabilitation: Leading Practice Sustainable Development Program for the Mining Industry* (the Mine Rehabilitation Handbook), defines mine site rehabilitation as comprising 'the design and construction of landforms as well as the establishment of sustainable ecosystems or alternative vegetation, depending upon desired post-operational land use'.[2]

2.5 Rehabilitation is a costly process and therefore needs to be carefully planned and implemented.[3] The costs associated with mine site rehabilitation are discussed further in Chapter 6.

2.6 In addition to currently operating mines, there are approximately 50 000 abandoned mines across Australia, most of which ceased operations prior to the introduction of environmental approvals, which require rehabilitation to varying degrees.[4] These sites vary from small abandoned quarries and mine shafts to large

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1 Geoscience Australia, *Minerals Basics*, http://www.ga.gov.au/scientific-topics/minerals/basics, (accessed 9 January 2018).

2 Department of Industry & Department of Foreign Affairs and Trade, *Mine Rehabilitation: Leading Practice Sustainable Development Program for the Mining Industry*, September 2016, p. 3.

3 Department of Industry and Department of Foreign Affairs Trade, *Mine Rehabilitation: Leading Practice Sustainable Development Program for the Mining Industry*, September 2016, p. 7.

4 C. Unger, A.M. Lechner, V.Glenn, M. Edraki, D.R. Mulligan, 'Mapping and prioritising rehabilitation of abandoned mines in Australia', *Life-of-Mine Conference 2012*, p. 7.

mines which have major environmental impacts. Abandoned mines occur when mining leases or titles no longer exist, and responsibility for rehabilitation cannot be allocated to an individual, company or organisation responsible for the original mining activities.[5] Because of this, responsibility for any remedial works that are required to rectify environmental problems on these sites general falls directly to government, and, ultimately, Australian taxpayers.

Risks of incomplete or poor mine site rehabilitation

2.7 The Mine Rehabilitation Handbook provides context for the role of rehabilitation during the lifecycle of mining projects, as follows:

> Mining has the potential to affect the environment and communities throughout the life cycle of a project. Those impacts, whether direct, indirect or cumulative, make many project developments potentially sensitive for regulators, local communities, investors, non-government organisations…and employees. Obtaining access to land for the purposes of mineral extraction is therefore becoming increasingly difficult and has developed into a key risk for the industry. To ensure continued access, Australian mining companies must demonstrate their commitment to sustainable development to regulators and their various stakeholders. Although mine-site rehabilitation is a legal obligation for all mining projects in Australia, it is also an activity in which the industry can clearly demonstrate its sustainable development commitment to its key stakeholders.[6]

2.8 Incomplete or inadequate mine site rehabilitation can lead to serious long term environmental and social costs. The Environmental Defenders Offices of Australia listed some of the potential costs as follows:

- permanent impacts on surface and groundwater pathways and availability;
- changes to water quality including:
  - increased salinity, particularly in final voids but also as groundwater recovers within the post-mining landscape;
  - increased acidity and toxicity through Acid Mine Drainage, where the weathering of sulphide minerals increases the acidity in the water, potentially dissolving toxic heavy metals; and
  - flooding of final voids;
- failure to restore pre-existing and/or productive landscapes creating biodiversity and agricultural impacts;

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5 Department of Industry, Innovation and Science, *Legacy Mines*, https://industry.gov.au/resource/Mining/Pages/Legacy-Mines.aspx, (accessed 29 May 2017).

6 Department of Industry & Department of Foreign Affairs and Trade, *Mine Rehabilitation: Leading Practice Sustainable Development Program for the Mining Industry*, September 2016, p. 1.

- safety risks of high walls in mines which are usually surrounded by fences requiring ongoing maintenance creating a perpetual burden on future landowners; and
- societal costs associated with disrupted communities and a legacy of environmental impacts.[7]

2.9 Doctors for the Environment Australia submitted that mining has a range of environmental impacts that continue after the productive phase of the mine has ceased. For example:

> 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.[8]

2.10 Professor David Mulligan of the Centre for Mined Land Rehabilitation at the University of Queensland noted in his submission that the environmental impacts on fauna as a result of inadequate or failed rehabilitation processes include:

> …the loss of habitat that may have pre-existed prior to mining, a loss of connectivity across the landscape for fauna movements, a loss of appropriate structural and functional diversity in the vegetation and hence risk of species exclusion or loss, and a loss of clean water bodies.[9]

2.11 Professor Mulligan stated that the entry of chemical and physical contaminants into adjacent waterways as a consequence of poor site rehabilitation 'poses a risk to the ecosystem and environmental values of aquatic and riparian zones downstream'.[10]

2.12 Various examples were cited where historical mining activities in Australia have resulted in ongoing negative impacts, including:

- Captains Flat in NSW, where heavy metal leachates from the former mine drained into Lake Burley Griffin in Canberra;
- Rum Jungle in the Northern Territory, where copper and uranium polluted downstream waters;
- Mt Lyell in Tasmania, where untreated tailings were dumped into local rivers causing severe pollution and where aerial pollution from the smelter led to extensive vegetation loss in the surrounding mountains; and

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7 *Submission 24*, p. 3. See also: Public Health Association of Australia, *Submission 5*, pp. 4–5; Australian Conservation Foundation, *Submission 27*, p. 1.

8 *Submission 8*, p. 3.

9 *Submission 40*, p. 6.

10 *Submission 40*, p. 6.

- Mt Morgan in Queensland, where acid mine drainage and water from the open cut pit pollutes the Dee River system, which flows eventually into the Fitzroy River and on into the Great Barrier Reef System.[11]

2.13 The committee saw some of the impacts of these operations first hand during this inquiry, particularly during its site visit to Mt Lyell, where acid mine drainage from historical waste rock dumps is still causing significant contamination to the Queen and King river systems.

2.14 The committee also heard directly from landholders who stated their properties (and in some cases, livelihoods) had been negatively impacted by poor rehabilitation of mine sites in Australia,[12] as well as from residents living in the vicinity of mines concerned about the impact of inadequate site remediation.[13]

Overview of site rehabilitation process

2.15 Significant guidance on mine site rehabilitation in Australia has been developed through the Leading Practice Sustainable Development Program for the Mining Industry, managed by the Department of Industry, Innovation and Science and co-funded by the Department of Foreign Affairs and Trade. This program includes the development of several leading practice handbooks, including the aforementioned Mine Rehabilitation Handbook, which was updated in 2016 by a working group of experts, industry, and government and non-government representatives.

2.16 As noted above, the definition of mine site rehabilitation adopted by the Mine Rehabilitation Handbook is 'the design and construction of landforms as well as the establishment of sustainable ecosystems or alternative vegetation, depending upon desired post-operational land use'.[14] This definition notes that rehabilitation efforts should be designed to meet three key objectives:

- the long-term stability and sustainability of the landforms, soils and hydrology of the site;
- the partial or full repair of ecosystem capacity to provide habitats for biota and services for people; and

11 Environmental Defenders Offices of Australia, *Submission 24*, p. 10 (citing Lamb, Erskine, and Fletcher, 'Widening gap between expectations and practice in Australian minesite rehabilitation', *Ecological Management & Restoration*, vol. 16, no. 3, 2015); Mr Peter McCallum, Coordinator, Mackay Conservation Group, *Committee Hansard*, 12 July 2017, p. 19; Mr Michael McCabe, Coordinator, Capricorn Conservation Council, *Committee Hansard*, 12 July 2017, pp. 58–59.

12 See, for example: Ms Georgie Spreadborough, *Committee Hansard*, 12 July 2017, pp. 25–31; Mr Peter Coggins, *Submission 69*; Mr Wayne Hamilton, *Submission 73*.

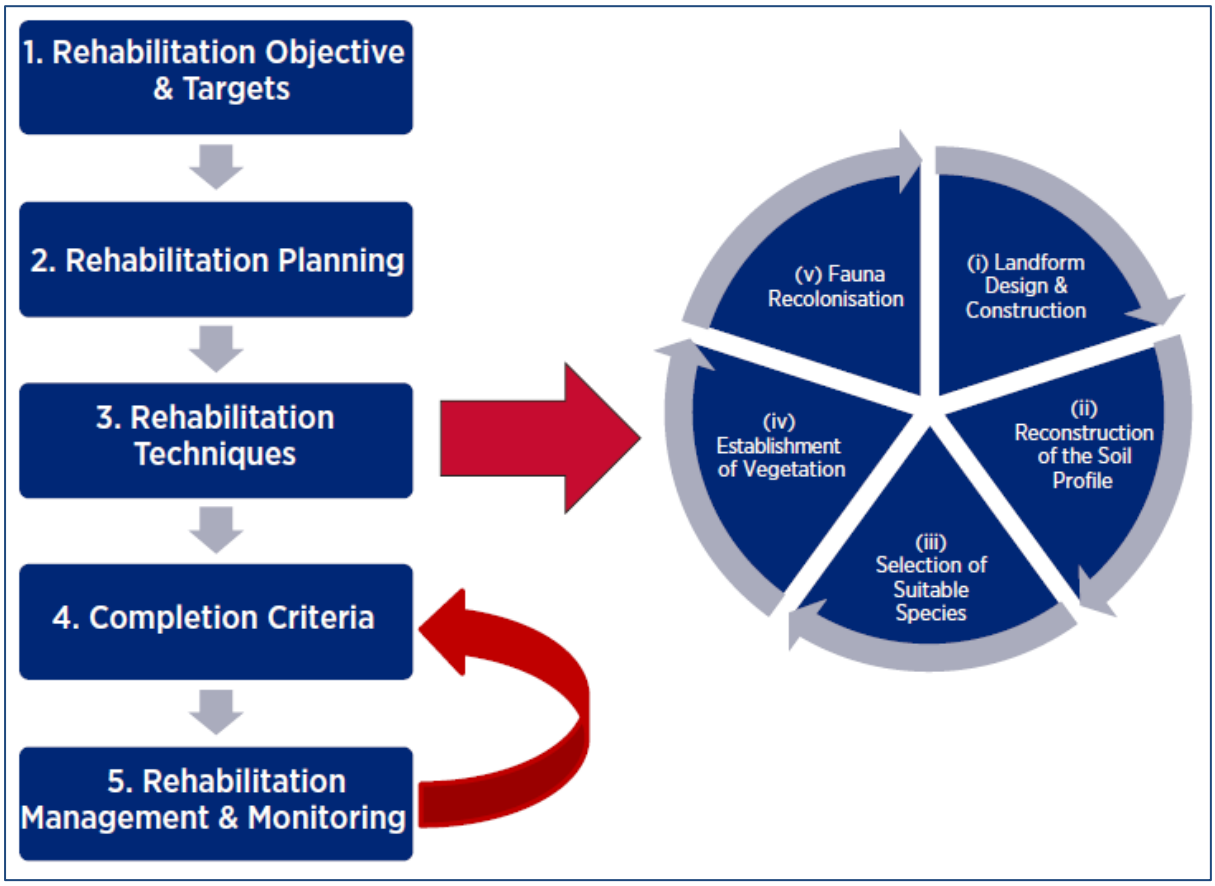
13 See, for example: Ms Vanessa Richardson, *Submission 60*; Mr Jack Green and Mr Gadrian Hoosan, *Submission 41*, p. 1.

14 Department of Industry & Department of Foreign Affairs and Trade, *Mine Rehabilitation: Leading Practice Sustainable Development Program for the Mining Industry*, September 2016, p. 3.

- the prevention of pollution of the surrounding environment.[15]

2.17 The Mine Rehabilitation Handbook provides an overview of the steps that are required in order for mine rehabilitation to be successful, as shown in Figure 2.1. These involve detailed planning based on specific rehabilitation objectives, with the outcomes of the rehabilitation techniques used measured against specific completion criteria and subject to ongoing management and monitoring.

Figure 2.1 Stages of rehabilitation planning and implementation

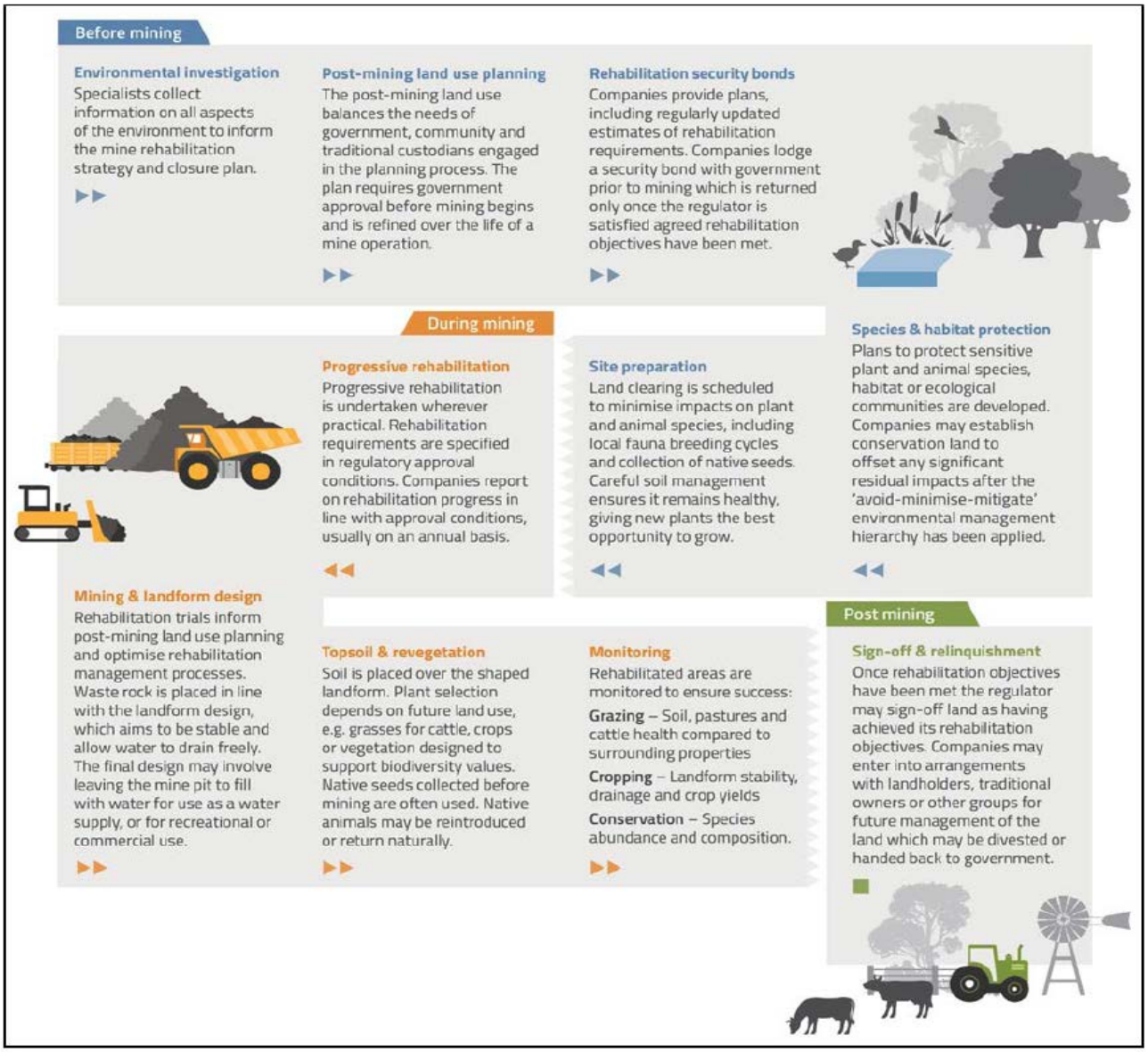


Source: Australian Government, *Mine Rehabilitation: Leading Practice Sustainable Development Program for the Mining Industry*, September 2016, p. 7

2.18 The Minerals Council of Australia provided a diagram (Figure 2.2) with a simplified outline of the ideal rehabilitation process through the mine life, noting that rehabilitation planning should commence from the beginning of the mine life cycle.

15 Australian Government, *Mine Rehabilitation: Leading Practice Sustainable Development Program for the Mining Industry*, September 2016, p. 3.

Figure 2.2: Rehabilitation process over the mine life



Source: Minerals Council of Australia, *Submission 50*, p. 19.

2.19 The rehabilitation requirements of any given site will depend on a variety of factors, including the nature of the pre-mining landscape and species composition, the type of mining operation undertaken, and the planned post-mining landform and land use.

2.20 Some of these factors were clear even among the small sample of Australian mine sites the committee was able to visit during this inquiry. For example, operations at the Huntley Bauxite Mine in southern Western Australia involve mining in discreet areas of land at a depth of 4–6m, which allows site rehabilitation to be undertaken progressively during mining operations, with relatively low earth-moving costs compared to mines that operate at a deeper pit depth.

2.21 Similarly, at Glencore's Mangoola coal mine in the NSW Hunter Valley, the shallow coal seams and mining technique employed enable rehabilitation work to commence almost contiguous to the site's current mining operations. For mines

operating with larger open cut pits at greater depths, rehabilitation of the pit voids usually cannot commence until mining operations have ceased.

2.22 The regulatory requirements and mining approvals necessary in a given mine's jurisdiction can also have a significant impact on what rehabilitation outcomes are agreed to and delivered.

2.23 For example, the Ranger Uranium Mine in the Northern Territory was established subject to an extensive regime of environmental conditions and monitoring, with overarching rehabilitation requirements including: that the Ranger project area be returned to a state which would allow it to be incorporated into Kakadu National Park; that all tailings be returned to the mined out pits; and that contaminants arising from the buried tailings be isolated from the environment for 10 000 years. At the time of the committee's visit to the Ranger Mine, backfilling of the two mine pits was underway, with final landform planning and other rehabilitation work well advanced.

2.24 In contrast to this approach, many open cut mine operations in Australia are subject to regulatory conditions that enable them to leave large open pits as part of their final approved landforms. The issue of final pit voids is discussed further in Chapter 4.

Guidance to aid industry with mine closure and rehabilitation planning

2.25 In addition to the Mine Rehabilitation Handbook developed by industry and government in Australia, there are several other guidelines and leading practice documents cited by submitters that can assist companies to plan mining rehabilitation activities.

International industry guidance

2.26 Submitters noted that the International Council on Mining and Metals (ICCM), a global peak body organisation that includes all the major Australian minerals companies in its membership, has developed a set of principles for sustainable development in the minerals industry.[16] Additionally, the ICCM has developed guidance around mine closure and land rehabilitation, including a detailed toolkit for industry participants, *Planning for Integrated Mine Closure*.[17]

Australian industry guidance

2.27 The Minerals Council of Australia (MCA) noted that its member companies are signatories to a framework it has developed based on the ICCM principles, *Enduring Value – The Australian Minerals Industry Framework for Sustainable Development*. This framework requires members to continually seek improvements in environmental performance, including:

16 International Council on Mining and Metals, 'ICCM 10 Principles', https://www.icmm.com/en-gb/about-us/member-commitments/icmm-10-principles (accessed 11 January 2018).

17 International Council on Mining and Metals, *Planning for Integrated Mine Closure: Toolkit*, 2008, available at https://www.icmm.com/en-gb/publications/mine-closure/planning-for-integrated-mine-closure-toolkit (accessed 11 January 2018).

- Element 6.3 – Rehabilitate land disturbed or occupied by operations in accordance with appropriate post-mining land uses; and
- Element 6.5 – Design and plan all operations so that adequate resources are available to meet the closure requirements of all operations.[18]

2.28 Further, the MCA's Land Stewardship Policy, released in October 2012, states the industry's goal of ensuring that mined land 'is available for subsequent economic activities, conservation and/or community use'.[19] The MCA highlighted the following aspects of this policy in its submission:

- mining activities will aim to minimise disturbance, and provide for ongoing progressive rehabilitation, directed at achieving an agreed post-mining land use that is both stable and self-sustaining;
- the post-mining land use should be considered at the mine design stage and refined through an ongoing consultation process with regulators and relevant stakeholders; and
- closure design should aim to facilitate beneficial post-mining land use—this may include future economic activity, conservation or community use.[20]

2.29 Chris McCombe, Senior Advisor Environment at the MCA, commented on the role of the leading practice guidelines at the committee's Brisbane public hearing:

> [L]eading practice is all about ensuring that there's a fit-for-purpose response to the circumstances facing an individual operation. What the leading practice guidebooks or handbooks include, usually, is an overarching framework on the approach the company should take to the specific issue at hand. That might be rehabilitation or a whole range of other environmental matters. It's something the industry could use as a reference... They don't provide you with a ready solution for every given situation. They provide a framework to guide your processes to achieve, obviously, a positive outcome.[21]

Standards to which mine sites are to be rehabilitated

2.30 Much discussion in the context of mining rehabilitation centres on what level of rehabilitation and final landform use is acceptable for a given mine site.

2.31 In this context, the Mine Rehabilitation Handbook provides a broad distinction between site *rehabilitation* and site *restoration*, as follows:

- *Rehabilitation* aims to reinstate ecosystem functionality and land productivity, although it will probably assume a different land-use and species composition

18 *Submission 50*, p. 9.

19 *Submission 50*, p. 9; Minerals Council of Australia, *Land Stewardship Policy*, October 2012, http://www.minerals.org.au/policy_focus/land_use/ (accessed 11 January 2018).

20 *Submission 50*, p. 9.

21 Chris McCombe, Senior Advisor Environment, Minerals Council of Australia, *Committee Hansard*, 12 July 2017, p. 73.

from the original ecosystem. The new ecosystem may be simpler in structure than the original but more productive, such as when a woodland is replaced with a plantation or grazing land. Alternatively, the new ecosystem can be simpler but less productive in the form of a hybrid or novel ecosystem, such as planted eucalypts over a weed-grass understorey.

- *Restoration* has the more ambitious aim of re-establishing ecosystem structure and function to an image of its state before disturbance, or of replicating a desired reference ecosystem. Restoration aims to re-establish an ecosystem that develops along a successional pathway so that it assumes a similar, but not necessarily identical, structure, function and composition to the original ecosystem.[22]

2.32 The Minerals Council of Australia commented as follows on the level of site rehabilitation aimed for by the minerals industry:

> While some previously mined areas are rehabilitated to pre-existing condition or better, other mined areas result in transformation of the landscape and alternate post mining uses. At a minimum, companies are required to rehabilitate land to ensure it is safe, stable and non-polluting. However, it is the industry's goal to move beyond minimum regulation to ensure previously mined land is available for subsequent environmental, social or economic uses.[23]

2.33 The ARC Centre for Mine Restoration noted that a lack of clarity about these matters can cause significant issues in mining practice:

> A central constraint to both the planning and implementation of projects ensuring mining and resource ventures meet their regulatory requirements is the widespread confusion surrounding the restoration expectations. Simplistic and often vague regulatory conditions are commonly included in Ministerial Statements (e.g., 'restored using best practice', 'flora and vegetation are re-established with not less than 70 percent species composition'), which implies that there is insufficient knowledge available to adequately plan for restoration. This has in turn led to uncertainty throughout industry in exactly what they should aspire to in successful mine closure.[24]

2.34 Several submitters and witnesses noted that the Society for Ecological Restoration Australasia has recently developed standards for restoration of degraded

22 Australian Government, *Mine Rehabilitation: Leading Practice Sustainable Development Program for the Mining Industry*, September 2016, p. 4.

23 *Submission 50*, p. 24.

24 *Submission 64*, p. 1.

land in Australia, the *National Standards for the Practice of Ecological Restoration in Australia*.[25] The ARC Centre for Mine Site Restoration commented in its submission:

> These Standards outline world-leading best practice for ecological restoration based on six key guiding principles – these are the very principles that should guide post-mine rehabilitation... These documents are being adopted as the basis for regulatory expectations in the mining industry with industry comfortable that a detailed, unambiguous and auditable process is now available to guide the expectations of the community, regulators and industry.[26]

Link between rehabilitation standards and rehabilitation techniques

2.35 In an academic paper provided to the committee discussing the rehabilitation and decommissioning efforts of Alcoa's bauxite mines in south-west Western Australia, Carl Grant and John Koch succinctly describe the interrelationship between the setting of site rehabilitation standards and the development of techniques to enable better rehabilitation:

> There is a two-way relationship between evolving standards and evolving techniques – and both are informed by interactions between research and practice. That is, high targets could not be devised unless feasible techniques could be developed. Similarly, improved techniques could not be driven without high targets. An example is the development of a tissue culture laboratory [by Alcoa at its bauxite sites] that produces over 100 000 plants each year for the purpose of meeting the target of 100% species richness, including the 20% of species that are 'recalcitrant'. High targets and advanced techniques are therefore synergistic and creatively interact, enabled by strong links between research and practice.[27]

Providing certainty around closure requirements

2.36 The Minerals Council of Australia noted that a mine life can span several decades or more, over which time community expectations and environmental standards may change. It argued that certainty in the rehabilitation standard for each mine site is required in order for industry to plan its operations properly, and that changes to rehabilitation standards should not operate retrospectively:

> It is appropriate to expect modern mining operations to meet contemporary criteria; however it is inappropriate to apply these criteria retrospectively to sites that have been previously approved and are working in good faith to meet the legal obligations associated with those approvals.

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25 Greenpeace Australia Pacific, *Submission 25*, p. 6; ARC Centre for Mine Site Restoration, *Submission 64*, p. 1; Dr Peter Erskine, Private Capacity, *Committee Hansard*, 12 July 2017, p. 15. The second edition of these standards was launched in November 2017, and is available at http://seraustralasia.com/pages/standards.html (accessed 21 February 2018).

26 *Submission 64*, p. 1.

27 Carl Grant and John Koch, 'Decommissioning Western Australia's First Bauxite Mine: Co-evolving vegetation restoration techniques and targets', *Ecological Management & Restoration*, vol. 8, no. 2, August 2007, p. 96.

> There will always be improvement from older to new areas of a mine site – reflecting changes in practice. However it would be both impractical and cost-prohibitive to continuously upgrade previously rehabilitated areas or the agreed land-form to meet contemporary rehabilitation criteria, unless needed to ensure the post mining land form is safe, stable and non-polluting. Furthermore, these criteria may again change before mining finishes, although, an operator may voluntarily choose to revisit mine rehabilitation and closure planning for an individual site, if viable.
>
> Moving goal posts that define rehabilitation 'success' provides certainty for neither government or the mine operator, making it difficult to progressively rehabilitate land, generating perverse outcomes and making it impossible to relinquish or divest land.[28]

2.37 Other submitters and witnesses expressed similar sentiments regarding the need to ensure that closure and rehabilitation requirements were not constantly being changed, with the effect of undermining certainty and business planning in the industry.[29]

'Care and maintenance' status and its relationship to rehabilitation work

2.38 Mine operations where production has been suspended (for example, due to changes in commodity prices or technical problems) are referred to as being in a state of 'care and maintenance', where the site is maintained and kept safe until production recommences or the mine is closed.[30] The use of care and maintenance can impact on the status and timeliness of rehabilitation work undertaken at a site. This issue is discussed further in Chapter 4.

Information available about mine rehabilitation and closure in Australia

2.39 Several submitters and witnesses commented on the haphazard nature of many mine closures in Australia, and the lack of consistent information available about rehabilitation and closure statistics.

2.40 The Australian Conservation Foundation observed that most mine closures in Australia 'are unplanned and a result of economic and market factors'.[31] The Mineral Policy Institute noted a study examining the reasons for closure of 1000 mines in Australia, which found that between 1981 and 2009 only 25 per cent of the mine closures examined were planned. The remaining 75 per cent of mine closures 'were

28 *Submission 50*, p. 29.

29 See, for example: Mr Peter Walker, General Manager Care and Maintenance, Copper Mines of Tasmania, *Committee Hansard*, 12 October 2017, p. 14; Glencore, *Submission 57*, p. 6; BHP Billiton, *Submission 54*, p. 6.

30 The Australia Institute, *Submission 13*, Attachment 1, p. 8.

31 *Submission 27*, p. 1. See also: Mr David Morris, Private Capacity, *Committee Hansard*, 30 October 2017, p. 2.

either premature or unplanned closures resulting in unsatisfactory closures, mines left in care and maintenance or simply abandoned with no attempt at formal closure'.[32]

Data on frequency of mine closure, rehabilitation and relinquishment

2.41 The Australia Institute noted in its submission that information about the number of mines in each jurisdiction in Australia at each stage of mine life is incomplete and difficult to obtain. After attempting to collect comprehensive data on these issues from state and territory governments, the Australia Institute concluded:

> [G]overnment agencies are not collecting or publishing adequate data on mine site rehabilitation. Seemingly simple questions are very difficult to answer. Most state government agencies do not publish simple data on how many mines are operating in their state. Information on how many mines have been abandoned, how many are being closed, how many have suspended operations is hard to obtain.[33]

Number of mines in final closure and relinquishment phase

2.42 The Australia Institute noted in its submission that little data is currently available on how many mines in Australia are currently undergoing the concluding stages of rehabilitation and closure and rehabilitation, with few examples identified by various state and territory government departments.[34]

2.43 The final stage of the mine life is relinquishment, where all agreed rehabilitation and other closure criteria have been met and the mining lease is handed back to the state or territory government, or a future landholder. Based on data provided by state and territory governments, the Australia Institute found that lease relinquishment following full site rehabilitation is very uncommon in Australia:

> [R]elinquishments of mine sites that are fully rehabilitated and suitable for alternative further use are extremely rare. No examples or statistics could be found of relinquishment of major mine sites in the big mining states of Western Australia or Queensland. One relatively small underground coal mine has been relinquished in NSW and an old sand quarry is now a botanical garden near Melbourne in Victoria.
>
> South Australia has 18 mines listed as rehabilitated, although only 14 are mineral mines. Eight of those were barite mines; of the remaining six, most are from the 19th Century and one is only "partially rehabilitated".[35]

2.44 The Australia Institute commented:

> This should be of major concern to governments, communities and the mining industry. There is no single example of a rehabilitated and relinquished large, open cut mine in Australia. Given the number of such

32 Mineral Policy Institute, *Ground Truths: Taking Responsibility for Australia's Mining Legacies*, 2016, p. 6, included with *Submission 43*.

33 *Submission 13*, p. 1.

34 *Submission 13*, Attachment 1, p. 9.

35 *Submission 13*, Attachment 1, p. 10.

> mines currently operating or in care and maintenance, serious attention should be given to whether rehabilitation is possible and ensuring it can be paid for by mine operators.[36]

Number of mines in 'care and maintenance' in Australia

2.45 No centralised national data is published on the number of mines in 'care and maintenance' in Australia. According to information collated from state and territory governments, estimates of how many mines are in care and maintenance across Australia vary significantly across jurisdictions, with estimates of the number nationwide ranging from just over 200 to more than 970.[37]

36 *Submission 13*, Attachment 1, p. 10.

37 See: The Australia Institute, *Submission 13*, Attachment 1, p. 8.

Chapter 3

Regulatory arrangements governing mine rehabilitation

3.1 This chapter provides an overview of the current regulatory arrangements governing mine closure and rehabilitation in Australia, as well as outlining evidence presented to the committee on what constitutes regulatory best practice in this area.

Commonwealth responsibilities relating to mine rehabilitation

3.2 Regulation of mining and resources projects in Australia is primarily undertaken at the state and territory level. Nevertheless, the Commonwealth Government does have power to legislate in relation to environmental matters. In practice this often occurs in cooperative arrangements with the states and territories, as explained by Sangeetha Pillai and Professor George Williams:

> Despite statements that Commonwealth power is very broad in scope, many federal policies relating to environmental management have not been pursued by unilateral action, but by adopting a cooperative approach with the States. These typically involve intergovernmental agreements under which the Commonwealth and the States undertake to adopt a joint approach to a topic of environmental regulation. Examples include the 1992 Intergovernmental Agreement on the Environment (implemented in the *Environmental Protection and Biodiversity Conservation Act [1999]*) and the Murray-Darling Basin Plan, made under the *Water Act [2007]*.[1]

3.3 The Department of the Environment and Energy provided an overview of current regulatory arrangements in relation to mining and resources projects as follows:

> State and territory governments are the primary regulator for most mining and resource projects, including rehabilitation requirements. Approvals under state and territory legislation incorporate requirements for the entire project lifecycle and cover the whole of environment, rather than the more narrow set of nationally protected matters.[2]

3.4 The Department of Industry, Innovation and Science noted similarly:

> Rehabilitation of mine sites is a state and territory responsibility and all state and territory governments have policies, regulations and legislation in place to set rehabilitation requirements and to ensure miners fulfil their rehabilitation requirements before relinquishing mining leases.[3]

3.5 There are several areas in which the Commonwealth takes a specific regulatory role in relation to mine rehabilitation, which are discussed in turn below.

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1 Sangeetha Pillai and George Williams, 'Commonwealth power and environmental management: Constitutional questions revisited' (2015) 32 EPLJ 395, p. 408.

2 Department of the Environment and Energy, *Submission 1*, p. 3.

3 Department of Industry, Innovation and Science, *Submission 55*, p. 4.

Environment Protection and Biodiversity Conservation Act

3.6 Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), the Commonwealth manages the assessment and approval process for proposals that potentially have a significant impact on a matter of national environmental significance. Proposals cannot be undertaken without approval from the Commonwealth Minister for the Environment and Energy. There are nine matters of national environmental significance prescribed under Part 3 of the EPBC Act. These are:

- world heritage properties;
- national heritage places;
- wetlands of international importance;
- nationally threatened species and ecological communities;
- migratory species;
- Commonwealth marine areas;
- the Great Barrier Reef Marine Park;
- nuclear actions (including uranium mining);[4] and
- a water resource, in relation to coal seam gas development and large coal mining development.[5]

Water resources under the EPBC Act

3.7 The inclusion of water resources as one of the nine matters of national environmental significance (also referred to as the water trigger) provides the Commonwealth with some environmental responsibility for coal seam gas and large coal mining developments. The water trigger relates to a development's likely impact on a water resource, and not the size of the proposed activity.[6]

3.8 Section 528 of the EPBC Act defines both 'large coal mining development' and 'coal seam gas development' as any activity that:

> …has, or is likely to have, a significant impact on water resources (including any impacts of associated salt production and/or salinity):

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4 Department of the Environment, *Matters of National Environmental Significance: Significant impact guidelines 1.1*, 2013, p. 2.

5 This was inserted following an amendment to the EPBC Act passed by the 43rd Parliament on 19 June 2013. See Department of the Environment, *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources*, December 2013, p. 4.

6 Department of the Environment, *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources*, December 2013, http://www.environment.gov.au/system/files/resources/d078caf3-3923-4416-a743-0988ac3f1ee1/files/sig-water-resources.pdf (accessed 27 February 2017), p. 7.
A water resource relates to ground water and surface water, and includes organisms and ecosystems that contribute to the physical state and environmental value of the water resource.

(a) in its own right; or

(b) when considered with other developments, whether past, present or reasonably foreseeable developments.[7]

3.9 These definitions are not limited to just commercial operations but also include actions involved in exploration, appraisal and pilot developments.[8]

Assessment and approval process under the EPBC Act

3.10 Where a proposal has the potential to have a significant impact on a matter of national environmental significance, the proposal must be assessed under the EPBC Act. The Department of Environment and Energy explains the process:

> When a person (a 'proponent') wants an action (often called a 'proposal' or 'project') assessed for environmental impacts under the EPBC Act, he or she must refer the project to the [Department of the Environment and Energy]. This 'referral' is then released to the public, as well as relevant state, territory and Commonwealth ministers, for comment on whether the project is likely to have a significant impact on matters of national environmental significance.
>
> The minister or the ministers' delegate will then decide whether the likely environmental impacts of the project are such that it should be assessed under the EPBC Act. Any relevant public comments are taken into consideration in making that decision.[9]

3.11 Following receipt of the referral, there are three conclusions available to the Minister (or their delegate) in making a decision about whether the action is likely to have a significant impact on a matter of national environmental significance:

- if the action is likely to have a significant impact on a matter of national environmental significance, then the action requires approval under the EPBC Act (it is a controlled action). The Minister has 20 business days to decide whether to approve the action and what conditions (if any) to impose.
- if the action is not likely to have a significant impact on a matter of national environmental significance, then the action does not require approval under the EPBC Act (it is not a controlled action).
- if the action would have clearly unacceptable impacts on a matter of national environmental significance, then the action will be refused.

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7 *Environment Protection and Biodiversity Conservation Act 1999*, s. 528.

8 Department of the Environment, *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources*, December 2013, http://www.environment.gov.au/system/files/resources/d078caf3-3923-4416-a743-0988ac3f1ee1/files/sig-water-resources.pdf (accessed 27 February 2017) p. 4.

9 Department of the Environment and Energy, *EPBC Act – Frequently asked questions*, 2013, http://www.environment.gov.au/epbc/publications/factsheet-epbc-act-frequently-asked-questions (accessed 27 February 2017).

3.12 If an action under the water trigger requires approval, then an environmental assessment of the action must be carried out, and the advice of the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) sought and considered.[10]

3.13 The Commonwealth has negotiated assessment bilateral agreements with all states and territories. For this reason, state and territory regulators now also consider EPBC Act regulatory responsibilities as part of their environmental assessment processes for a proposed project. The state-based assessment and recommendations relating to a project are then considered by the Commonwealth Department of the Environment and Energy, to check whether any gaps exist between conditions imposed to meet state requirements and what would be required to meet national standards under the EPBC Act. Where such gaps exist, the Commonwealth can impose additional conditions on a project.[11]

Current EPBC Act approvals relating to mine rehabilitation

3.14 Since implementation of the EPBC Act in 2000, there have been 118 mining and resource projects approved with conditions relating to rehabilitation, and 41 mining and resource projects approved with conditions relating to financial assurance mechanisms.[12]

3.15 Mr Bruce Edwards, Assistant Secretary at the Department of the Environment and Energy, informed the committee that Commonwealth conditions relating to rehabilitation relate to a particular impact on a matter of national environmental significance from a project, rather than a general condition around rehabilitation activities at a site:

> We wouldn't normally have a general condition around a rehabilitation activity per se, but if, for example, a species is being impacted and through an improvement through the rehabilitation process—they may recover an area, they improve the habitat—that could be potentially counted as an offset in terms of some improvement for the species over the longer term. They're the types of cases generally there where we'd have a condition relating specifically to that rehabilitation instance.[13]

3.16 Mr Edwards noted further that the Commonwealth may impose broader conditions relating to rehabilitation activities at a site if the project occurs on Commonwealth land, or if the project involves a nuclear action (e.g. uranium mining):

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10 Department of the Environment, *Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources*, December 2013, http://www.environment.gov.au/system/files/resources/d078caf3-3923-4416-a743-0988ac3f1ee1/files/sig-water-resources.pdf (accessed 27 February 2017) pp. 22–23.

11 Mr Bruce Edwards, Assistant Secretary, Environment Standards Division, Department of the Environment and Energy, *Committee Hansard*, 14 February 2018, p. 3.

12 Department of the Environment and Energy, *Submission 1*, p. 1.

13 Mr Bruce Edwards, Assistant Secretary, Environment Standards Division, Department of the Environment and Energy, *Committee Hansard*, 14 February 2018, pp. 1–2.

> There may be cases in those instances where we would indeed cover all of the broader impacts on those sites, which would go to broader matters of environment beyond matters of national environmental significance, such as species and communities.[14]

3.17 The Department of the Environment and Energy noted in its submission that it has not been required to undertake any compliance activities in relation to project approvals granted with conditions relating to site rehabilitation activities.[15] It explained that this is due to the early stage of operations for the mines in question:

> The majority of mines in Australia that are in a rehabilitation phase were approved prior to the commencement of the EPBC Act. Section 43A of the EPBC Act exempts actions from requiring an approval if an action was authorised prior to the commencement of the Act. Accordingly, the Commonwealth has no role in regulating these operations. Mines approved under the EPBC Act are not yet at a rehabilitation phase and, therefore, any EPBC approval conditions related to rehabilitation are not yet applicable.[16]

3.18 Mr Edwards explained further in evidence to the committee that the department undertakes various activities which will ensure that when rehabilitation conditions become active, their compliance will be monitored. These activities can include:

- monitoring mine activities based on the expected mine lifecycle as articulated in the mine's initial approvals;
- regular reports or plans required to be submitted by the project operator based on specific conditions that have been imposed;
- proactive risk-based monitoring of specific projects, based on the potential environmental impact of an operation and the environmental history of a proponent; and
- working with the state and territory regulators engaged in overseeing the sites.[17]

Christmas Island phosphate mine

3.19 Under the EPBC Act, the Commonwealth is responsible for:

> …actions that have a significant impact on the environment where the actions affect, or are taken on, Commonwealth land, or are carried out by a

14 Mr Bruce Edwards, Assistant Secretary, Environment Standards Division, Department of the Environment and Energy, *Committee Hansard*, 14 February 2018, p. 2.

15 Department of the Environment and Energy, *Submission 1*, p. 1.

16 Department of the Environment and Energy, *Submission 1*, p. 2.

17 Mr Bruce Edwards, Assistant Secretary, Environment Standards Division, Department of the Environment and Energy, *Committee Hansard*, 14 February 2018, pp. 7–8.

Commonwealth agency (even if that significant impact is not on one of the nine matters of 'national environmental significance').[18]

3.20 The Commonwealth is responsible for the Christmas Island phosphate mine because its mining activities affect, and are undertaken, on Commonwealth land. Rehabilitation efforts are conducted under the *Christmas Island Mine Site to Forest Rehabilitation Program.*[19]

Uranium mines in the Northern Territory

3.21 The Commonwealth has specific regulatory responsibilities in relation to the Ranger uranium mine and the former Rum Jungle uranium mine in the Northern Territory, arising from the Commonwealth's historical involvement in these sites.

Ranger uranium mine

3.22 The Ranger uranium mine is entirely surrounded by the world heritage listed Kakadu National Park in the Northern Territory, and is owned and operated by Energy Resources of Australia (ERA), a company 68 per cent owned by Rio Tinto. The mine commenced operations in 1980, and active mining at the site ceased in 2012.[20] Processing of stockpiled ore from previous mining continues, and under ERA's lease conditions this activity must be finalised by January 2021, with rehabilitation activities to be completed by 2026.[21]

3.23 Responsibility for the governance of the mine is shared between the Commonwealth and Northern Territory governments. Through regulations established under the *Atomic Energy Act 1953*, the Australian Government has set environment protection conditions and rehabilitation objectives for the mine to a very high standard, including requirements:

- that the Ranger project area be returned to a state which would allow it to be incorporated into Kakadu National Park;
- that all tailings are returned to the mined out pits; and
- that contaminants arising from the buried tailings are isolated from the environment for 10,000 years.[22]

3.24 An independent supervisory body monitors the environmental impact of the mine:

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18 Department of the Environment and Energy, *EPBC Act – Frequently asked questions,* 2013, http://www.environment.gov.au/epbc/publications/factsheet-epbc-act-frequently-asked-questions (accessed 27 February 2017).

19 Department of the Environment and Energy, *Submission 1*, p. 2.

20 Rio Tinto, *Energy Resources of Australia Ltd*, http://www.riotinto.com/energyandminerals/energy-resources-of-australia-ltd-4711.aspx. (accessed 28 November 2018).

21 *Submission 27 – Attachment 1*, p. 24.

22 Department of the Environment and Energy, *Submission 1*, p. 2.

> The Supervising Scientist, appointed under the *Environment Protection (Alligator Rivers Region) Act 1978*, is responsible for undertaking environmental research and developing standards and practices to protect the environment of the Alligator Rivers Region from the effects of uranium mining. The Supervising Scientist also provides advice to the Minister for Resources and Northern Australia and the Northern Territory Minister for Primary Industry and Resources, who are responsible for regulation of the Ranger uranium mine under the *Atomic Energy Act 1953*.[23]

Rum Jungle former mine site

3.25 The Rum Jungle former copper and uranium mine is located approximately 105 kilometres south of Darwin, and was actively mined between 1954 and 1971 with the support of the Commonwealth Government. Initial rehabilitation works were undertaken at the site between 1983 and 1986, utilising $18.6 million in Commonwealth funding. These works were ultimately unsuccessful in achieving long term rehabilitation. The Department of Industry, Innovation and Science noted in its submission:

> Since 2009, in response to concerns about the site, including a poor understanding of its environmental condition and potential impact, the Australian and Northern Territory Governments have cooperatively engaged to address and understand Rum Jungle issues. Using Australian Government financial assistance ($33.6 million since 2009), the Northern Territory has monitored and maintained the site. Its work to assess the site's environmental performance identified that the principal environmental issue is acid and metalliferous drainage leading to adverse water quality on-site and downstream, and land use limitations.[24]

3.26 In October 2017 the Commonwealth and Northern Territory Governments signed an agreement to continue rehabilitation planning for the site. Under this agreement the Commonwealth has contributed $10 million which will be used by the NT Government 'to finalise the preferred rehabilitation strategy, undertake maintenance and monitoring, and continue engagement with the Kungarakan and Warai people who are the traditional owners of the site'.[25]

3.27 A fully costed and implementable rehabilitation plan for the site is due to be completed by June 2019.[26] The Northern Territory Government estimates that the full cost to rehabilitate the site is in the order of $300 million.[27]

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23 Department of the Environment and Energy, *Submission 1*, p. 2.

24 Department of Industry, Innovation and Science, *Submission 55*, pp. 5–6.

25 The Hon Barnaby Joyce, Minister for Resources and Northern Australia, 'Rum Jungle rehabilitation planning', *Media Release*, 5 October 2017, http://minister.industry.gov.au/ministers/joyce/media-releases/rum-jungle-rehabilitation-planning (accessed 17 July 2018).

26 Ms Virginia Leitch, Acting Manager Uranium Section, Department of Industry, Innovation and Science, *Committee Hansard*, 14 February 2018, p. 14.

Offshore petroleum activities conducted in Commonwealth waters

3.28 The Commonwealth holds responsibility for mineral and petroleum activities conducted in offshore areas, beyond three nautical miles from the territorial seas baselines (referred to as 'Commonwealth waters').[28] The Commonwealth administers the national regulatory body, National Offshore Petroleum Safety Environmental Management Authority (NOPSEMA):

> NOPSEMA is the independent, expert regulator with responsibility for safety, well integrity and environmental management for all offshore petroleum activities conducted in Commonwealth waters. NOPSEMA also exercises regulatory powers and functions in the coastal waters of the states and the Northern Territory where those powers and functions have been conferred.[29]

3.29 The Department of Industry, Innovation and Science reports that 'there are currently no offshore mineral operations occurring in Commonwealth waters. However there are a number of offshore petroleum activities underway'.[30]

3.30 The majority of the evidence received by the committee during this inquiry related to rehabilitation of onshore minerals and resources projects. As such, the regulatory framework and current practices for closure and rehabilitation of offshore minerals and petroleum projects have not been considered in further detail in this report.

Overview of state and territory regulation of mine rehabilitation

3.31 As noted above, primary regulatory responsibility for the environment and for minerals and resources approvals in Australia rests at the state level. State and territory governments in Australia have legislative frameworks in place that deal with mining approvals, including environmental approvals.[31] These approvals often involve multiple state government agencies.[32]

3.32 The regulatory frameworks in Australian jurisdictions require all new mining projects to have specific plans detailing how mine closure and rehabilitation is

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27 Ms Tania Laurencont, Principal Mining Scientist, Northern Territory Department of Primary Industry and Resources, *Committee Hansard*, 30 October 2017, p. 38.

28 Department of Industry, Innovation and Science, *Submission 55*, p. 1.

29 Department of Industry, Innovation and Science, *Submission 55*, p. 2.

30 Department of Industry, Innovation and Science, *Submission 55*, p. 7.

31 For detailed information provided in relation to the regulatory regimes operating in Australian jurisdictions, see: West Australian Government, *Submission 44*; Northern Territory Government, *Submission 53*; South Australian Government, *Submission 58*; Government of Victoria, *Submission 67*; Government of Tasmania, *Submission 68*; NSW Minerals Council, *Submission 49*.

32 For example, in Tasmania the administration and regulation of mineral tenements is managed by Mineral Resources Tasmania, part of the Department of State Growth, while the environmental regulation of mining operations is primarily managed by the Tasmanian Environment Protection Authority. See: Tasmanian Government, *Submission 68*, p. 2.

scheduled to occur, which are updated through the course of the mine life.[33] For example, in Queensland, under the *Environmental Protection Act 1994 (Qld)*, an Environmental Authority is required for any mining application, which contains a set of conditions and criteria governing environmental management and monitoring, including progressive site rehabilitation.[34]

3.33 Responsibility for abandoned mines in Australia generally rests with state and territory governments, although, as noted above, the Commonwealth has taken joint responsibility with the Northern Territory Government for the rehabilitation of some former uranium mine sites in which the Commonwealth has had historical involvement. Regulation governing these legacy sites is distinct from that which governs the rehabilitation of currently operating mine sites.

3.34 Most state and territory jurisdictions in Australia have specific programs in place that aim to address legacy environmental issues from abandoned mines. The nature and effectiveness of these programs is discussed further in Chapter 5.

3.35 All mining jurisdictions in Australia also have financial assurance mechanisms in place as part of their regulatory framework for dealing with mining projects, which are intended to ensure that funds are available for site rehabilitation in the event that a mine operator is unable to undertake rehabilitation. These mechanisms are discussed further in Chapter 6.

Current regulatory review processes underway in states and territories

3.36 Submitters and witnesses to the inquiry noted that a number of jurisdictions in Australia are currently undertaking reviews of aspects of their regulatory frameworks dealing with mining operations and rehabilitation. These are summarised below, with further discussion where relevant in later chapters of this report.

South Australia

3.37 The South Australian Government commenced a comprehensive review of its mining laws in 2016, the *Leading Practice Mining Acts Review*.[35]

3.38 The first piece legislation implementing changes arising from the review, the Statutes Amendment (Leading Practice in Mining) Bill 2017, was introduced into the South Australian parliament in October 2017. This bill included amendments which implement the review's recommendations to improve environmental protections, including various measures relating to mine closure, rehabilitation and relinquishment

33 See, for example: West Australian Government, *Submission 44*, p. 3; Government of Tasmania, *Submission 68*, p. 2; Government of Victoria, *Submission 67*, pp. 4–5.

34 Minerals Council of Australia, *Submission 50*, p. 12.

35 South Australian Government, *Submission 58*, pp. 7–8.

processes.[36] The bill lapsed prior to the 2018 state election, and the incoming government subsequently introduced the Statutes Amendment (Mineral Resources) Bill 2018 on 2 August 2018, stating:

> These amendments will deliver on the Government's commitment to undertake necessary reforms to the Mining Acts to responsibly unlock the value and opportunities of our mineral resources.
>
> This Bill will be the first phase of a broader suite of legislative, regulation and policy review that will help this Government to deliver its agenda of increasing exports and employment, particularly in regional areas, and improving regulatory efficiency for business.[37]

Queensland

3.39 Queensland Treasury undertook a review of its financial assurance framework for resources activities in 2016. The review identified various issues with the existing system and resulted in a recommended package of reforms.[38] The Queensland Government provided in principle approval for the implementation of these recommendations, which are now being actioned through several reform processes.

3.40 A new *Mined Land Rehabilitation Policy* was released in late 2017 following a discussion paper and public consultation process. This new policy requires all large mines in Queensland to develop a Progressive Rehabilitation and Closure Plan (PRC Plan):

> The PRC Plan is designed to ensure mines are planned to enhance progressive rehabilitation rates by including clear milestones with set delivery dates. Progress towards milestones will be regularly monitored through annual reporting on past performance and a 3-yearly audit to assess current and future performance.
>
> Public accountability is a key policy objective of the reforms and will be included in the PRC Plan framework by ensuring consultation occurs where significant changes are proposed to those commitments made in a PRC plan.[39]

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36 South Australian Department of the Premier and Cabinet, 'Fast Facts: The way forward—Feedback on Review, Recommendations and the *Statutes Amendment (Leading Practice in Mining) Bill 2017*', pp. 28–30, http://minerals.statedevelopment.sa.gov.au/mining/leading_practice_mining_acts_review (accessed 24 January 2018).

37 South Australian Government, 'Leading Practice Mining Acts Review', http://minerals.statedevelopment.sa.gov.au/mining/leading_practice_mining_acts_review (accessed 23 August 2018).

38 Queensland Treasury, 'Improving rehabilitation and financial assurance outcomes in the resources sector', https://www.treasury.qld.gov.au/growing-queensland/improving-rehabilitation-financial-assurance-outcomes-resources-sector/ (accessed 25 January 2018).

39 Queensland Department of Environment and Heritage Protection, 'Mining rehabilitation reforms', https://www.ehp.qld.gov.au/management/env-policy-legislation/mining-rehabilitation-reforms.html (accessed 11 July 2018).

3.41 The requirement to develop a PRC Plan will apply to new mines as part of their site-specific environmental authority application process, as well as existing mines, which will be transitioned into the new framework.[40]

3.42 Queensland's financial assurance framework for resources projects is also being significantly revised following a consultation process in 2017, from the current one-size-fits-all model to an approach with several categories for different types of operations.[41]

3.43 Implementation of these two reforms has been actioned through the introduction of the *Mineral and Energy Resources (Financial Provisioning) Act 2018* (Qld), which was passed by the Queensland Parliament on 23 November 2018.[42]

3.44 Further consultation processes for additional reforms are also underway, including a discussion paper outlining proposals to better manage the residual risks that arise from resources operations once site rehabilitation is complete and responsibility for the site has been relinquished to the state.[43]

New South Wales

3.45 A NSW Audit Office report released in May 2017 identified problems with New South Wales' financial assurance mechanisms for mine site rehabilitation, as well as broader issues relating to the regulatory framework governing mining rehabilitation in the state.[44] In response to this report, the NSW Government released a revised rehabilitation cost estimation tool on 1 July 2017 as part of an effort to improve its security deposit process.[45]

3.46 In addition to this updated tool, the NSW Government instigated a Rehabilitation Reform Project (RRP) with the aim of strengthening operational

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40 Queensland Department of Environment and Heritage Protection, 'Mining rehabilitation reforms', (accessed 14 November 2018).

41 Queensland Treasury, 'Improving rehabilitation and financial assurance outcomes in the resources sector', (accessed 11 July 2018).

42 Queensland Department of Environment and Heritage Protection, 'Mining rehabilitation reforms', (accessed 11January 2019); Office of the Queensland Parliamentary Counsel, 'Mineral and Energy Resources (Financial Provisioning) Act 2018', https://www.legislation.qld.gov.au/view/html/bill.third/bill-2018-017/lh (accessed 11 January 2019).

43 Queensland Treasury, 'Improving rehabilitation and financial assurance outcomes in the resources sector', https://www.treasury.qld.gov.au/growing-queensland/improving-rehabilitation-financial-assurance-outcomes-resources-sector/ (accessed 11 January 2019).

44 Audit Office of New South Wales, *Mining rehabilitation security deposits*, 11 May 2017.

45 NSW Government, *Improving mine rehabilitation in NSW: Discussion paper*, November 2017, p. 15.

rehabilitation requirements for existing mining projects in NSW.[46] This reform project comprises several components, including:

- new requirements for all mining operators to:
  - submit detailed rehabilitation objectives and completion criteria, incorporating a Final Landform & Rehabilitation Map for approval;
  - develop a Rehabilitation Management Plan to demonstrate how rehabilitation will be managed at a given site, with annual reporting requirements in line with this plan; and
  - undertake progressive rehabilitation and maintain records to demonstrate compliance;
- an online dashboard and e-mapping tools to assist mining companies and the regulator to accurately record and track areas of disturbance and rehabilitation progress, with geographic progressive rehabilitation maps available to the public; and
- supporting guidance and codes for industry.[47]

3.47 In November 2017, to complement the operational reforms underway through the RRP measures, the NSW Government released the discussion paper *Improving mine rehabilitation in NSW*, to seek feedback on proposed improvements to the regulatory framework for the rehabilitation of major mining projects in NSW.[48] The proposed improvements outlined in the discussion paper include:

- introducing policy principles which set mandatory, best practice standards for all major mining development, covering progressive rehabilitation, making rehabilitation information publically available, and ensuring rehabilitation can sustain the post mining land use;
- a policy framework to assess final mining voids, where the inclusion of voids will not be considered in new major projects unless the void minimises environmental, community and visual impacts and cannot be feasibly removed;
- requirements for new major projects to consult with the community and provide information on mine design options early in the planning process;
- requirements for new major projects to include standard landform and land use rehabilitation objectives in the development application; and

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46 NSW Government, 'Mine Rehabilitation Discussion Paper', http://www.planning.nsw.gov.au/Policy-and-Legislation/Under-review-and-new-Policy-and-Legislation/Mine-Rehabilitation-Discussion-Paper (accessed 30 January 2018).

47 NSW Government, 'Rehabilitation Reform Project', https://www.resourcesandenergy.nsw.gov.au/miners-and-explorers/programs-and-initiatives/rehabilitation-reform-project (accessed 30 January 2018); NSW Government, *Improving mine rehabilitation in NSW: Discussion paper*, November 2017, pp. 15–16.

48 NSW Government, 'Mine Rehabilitation Discussion Paper', (accessed 30 January 2018).

- improved regulatory coordination across the assessment, operations and post-closure stages of the mine life cycle.[49]

3.48 Public submissions on the proposals in the discussion paper were open until 16 February 2018, with feedback on the discussion paper currently under consideration.[50]

Northern Territory

3.49 The Northern Territory Government's submission noted that the Department of Primary Industry and Resources has developed and undertaken consultation on draft guidelines for mine closure, which set out a framework for closure planning, implementation and long term stewardship.[51]

COAG processes relating to mine rehabilitation

3.50 Through the Council of Australian Governments (COAG) Energy Council, the Commonwealth participates in discussion with the states and territories on resource regulatory issues, through the Energy Council's remit to facilitate the economic and competitive development of Australia's mineral and energy resources. In its submission, the Department of Industry, Innovation and Science explained further:

> Despite not having a direct constitutional role in onshore energy and resource development, the Australian Government undertakes a leadership role in relation to the Energy Council's energy and resource development agenda. In particular, the Australian Government considered the ability of governments collectively to sustain community confidence in the way these extractive industries are regulated is of national importance. The Energy Council is the principal mechanism by which the Australian Government and the department engage with states and territories on resources regulatory issues.[52]

3.51 The Land Access for Resources Working Group (LARWG) was established by the COAG Energy Council in December 2013 to consider policy issues and implement national activities relating to the Energy Council's access for resources reform agenda.[53] The working group facilitated a workshop on mine rehabilitation and abandoned mines in May 2016 attended by government, industry, academic and community representatives. Following this workshop, the working group 'agreed to review leading practice approaches to data collection and management; risk

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49 NSW Government, 'Mine Rehabilitation Discussion Paper', http://www.planning.nsw.gov.au/Policy-and-Legislation/Under-review-and-new-Policy-and-Legislation/Mine-Rehabilitation-Discussion-Paper (accessed 30 January 2018).

50 NSW Government, 'Mine Rehabilitation Discussion Paper' http://www.planning.nsw.gov.au/Policy-and-Legislation/Under-review-and-new-Policy-and-Legislation/Mine-Rehabilitation-Discussion-Paper (accessed 11 July 2018).

51 Northern Territory Government, *Submission 53*, p. 2.

52 Department of Industry, Innovation and Science, *Submission 55*, p. 6.

53 Department of Industry, Innovation and Science, *Submission 55*, p. 6.

assessment; site prioritisation; and management of legacy mines', with the findings of this review to be presented to the Energy Council for consideration late in 2017.[54]

3.52 Representatives from the Department of Industry, Innovation and Science noted at the committee's Canberra public hearing in February 2018 that the LARWG had been rebranded as the Energy Council's Resources and Engagement Working Group, and that the results of the review were now due to be presented to Energy Council Ministers in March 2018.[55] The department provided a further update in August 2018, stating that 'due to unforeseen delays with the supplier and membership changes', the final report has been postponed and is expected to be finalised in early 2019.[56]

3.53 The Energy Council also noted in its final communique of 2017 that issues identified by the Western Australian Government relating to mine site rehabilitation financial obligations and associated interpretations within the Corporations Act and the Australian Accounting Board Standards would be examined by the Resources and Engagement Working Group.[57] This working group reported back to Energy Council Ministers in August 2018, concluding that 'issues around financial provisioning for mine site rehabilitation are best dealt with at the jurisdictional level', and establishing a set of *National Principles for Managing Rehabilitation Risks*.[58] These principles are discussed further in Chapter 6.

Principles underpinning regulatory best practice for mine rehabilitation

3.54 The committee received evidence throughout the inquiry on what constitutes regulatory best practice in relation to mine site rehabilitation. Ms Revel Pointon of the Environmental Defenders Office Queensland identified a number of factors present in a successful framework for the regulation of mine rehabilitation activities, summarised as follows.[59]

Enforceable rehabilitation standards

3.55 This involves the implementation of clear, consistent, strict standards as to what is required of proponents throughout their resource activity and at the end of the

54 Department of Industry, Innovation and Science, *Submission 55*, pp. 6–7.

55 Mr Josh Cosgrave, Acting General Manager, Onshore Minerals Branch, Department of Industry, Innovation and Science, *Committee Hansard*, 14 February 2018, pp. 6–7.

56 Department of Industry, Innovation and Science, *Answers to written questions on notice received on 31 August 2018 arising from a public hearing in Canberra on 14 February 2018*, p. 2.

57 COAG Energy Council, *15th Meeting Communique*, 24 November 2017, p. 2; Mr Josh Cosgrave, Acting General Manager, Onshore Minerals Branch, Department of Industry, Innovation and Science, *Committee Hansard*, 14 February 2018, p. 7.

58 Department of Industry, Innovation and Science, *Answers to written questions on notice received on 31 August 2018 arising from a public hearing in Canberra on 14 February 2018*, pp. 2–4.

59 Ms Revel Pointon, Solicitor, Environmental Defenders Office Queensland, *Committee Hansard*, 12 July 2017, p. 43.

life of the operations, along with any residual obligations after the mine is closed to manage those remaining environmental and community impacts or risks.

Consideration of rehabilitation and closure during project assessment phase

3.56 This requires mine closure and rehabilitation plans to be developed and fully costed by proponents up-front in the assessment stage, prior to a mine going ahead. This practice ensures that:

- the proponent has turned their mind to the requirements of rehabilitation from the beginning of the mine;
- the community has had the right to provide comments on the rehabilitation and closure plan and to have their views heard as to what the most appropriate use of that land is at the end; and
- the costs of rehabilitation can more accurately be assessed by the regulator up-front and planned for by the proponents, allowing also for financial assurance to be assessed in total up-front.

Adequate financial assurance mechanisms

3.57 A system of financial assurance is required that does not provide for discounts or exemptions, with every operator subject to the same strict obligation to clean up after themselves and provide sufficient financial assurance in the event of any unforeseen financial difficulty in the interim.

Clarity around regulatory roles

3.58 For the regulatory framework to operate effectively, regulatory roles must be clearly defined and there needs to be strong collaboration between any regulatory departments involved.

Mechanisms to encourage and enforce progressive rehabilitation

3.59 Mechanisms are required to encourage and enforce progressive rehabilitation. This involves the provision of incentives throughout the mine life for rehabilitation to be progressively undertaken, and effective powers of the regulator to actually enforce that progressive rehabilitation occurs.

Accountability and transparency requirements

3.60 The regulatory framework must have accountability and transparency requirements. This includes transparency and accountability to the community of rehabilitation standards, any rehabilitation that has been undertaken or not at a site, and any liabilities that remain faced by the government. Mechanisms are also required that provide the community with the power to enforce rehabilitation regulations to prevent environmental and community health risks where the regulator fails.

Importance of strong regulation to protect industry and community interests

3.61 Several stakeholders to the inquiry stressed the importance of having good foundational regulation of mine closure and rehabilitation in place, in order to ensure that the minerals industry would continue to enjoy social licence to operate.

3.62 For example, Mr Harley Lacy warned:

> Brand protection, credibility and business sustainability is currently a major issue for mining corporations/companies… Jurisdictions seem to be unaware that their failure to provide good governance and law within which mining companies can operate is not appreciated and is in fact detrimental to that industry. This is because the industry's reputation is only as good as its weakest operators. Those more incapable or unscrupulous and unable to run a professional operation within the industry, damage the reputation of all, and destroy industry credibility within the communities in which they currently, or will hope to [operate] in the event of a mineral discovery.[60]

3.63 The committee heard that in order for a regulatory regime to function effectively, adequate resources must be deployed in monitoring and compliance of those regulations by industry. For example, Dr Martin Brueckner of Murdoch University noted that laws in Western Australia relating to project assessment are strict, but there are no consequent requirements for the regulatory agencies in that state to enforce compliance or monitor implementation once projects have commenced.[61] Dr Brueckner argued that a lack of adequate funding for regulatory agencies to undertake enforcement and compliance monitoring activities is a significant contributing factor to this problem, and stated:

> Better outcomes are possible under the regulation that we have, but regulatory courage ought to be matched with resources. The regulation will only be as good as the enforcement or our ability to enforce and seek compliance by industry.[62]

60 Mr Harley Lacy, *Submission 77*, p. 4. See also: Ms Revel Pointon, Solicitor, Environmental Defenders Office Queensland, *Committee Hansard*, 12 July 2017, p. 43; Mr Dave Sweeney, Nuclear Free Campaigner, Australian Conservation Foundation, *Committee Hansard*, 30 October 2017, pp. 13–14; BHP Billiton, *Submission 54*, p. 5 (in relation to the need for regulated financial assurance bonds).

61 Dr Martin Brueckner, Senior Lecturer, Murdoch University, *Committee Hansard*, 7 March 2018, pp. 14–15. See also Mr Harley Lacy, Private Capacity, *Committee Hansard*, 7 March 2018, p. 12.

62 Dr Martin Brueckner, Senior Lecturer, Murdoch University, *Committee Hansard*, 7 March 2018, p. 15. See also: Environmental Justice Australia, *Submission 26*, p. 4; Mr Chris McCombe, Senior Adviser Environment, Minerals Council of Australia, *Committee Hansard*, 12 July 2017, p. 66.

Chapter 4

Mine rehabilitation industry practice in Australia

4.1 This chapter discusses current site rehabilitation practices in the Australian mining and resources industry.

4.2 The committee received a large volume of evidence concerning two issues in particular that were important to stakeholders: the use of pit voids as an accepted part of final landforms in rehabilitated mine sites; and the level of progressive rehabilitation being undertaken by the industry in Australia. These two issues are a key focus of Chapter 4. Several other issues raised in relation to rehabilitation design and performance are also discussed.

4.3 This chapter also canvasses concerns relating to business practices that stakeholders feared could result in industry deliberately avoiding rehabilitation obligations, namely: the practice of mines being placed into 'care and maintenance' indefinitely; and mines being sold to smaller resources companies with significant rehabilitation liabilities outstanding.

Use of final pit voids and dump sites in mine rehabilitation

4.4 A specific issue discussed at length in relation to rehabilitation expectations was whether, and in what circumstances, open cut mining operators should be allowed to leave final fit voids and waste rock dumps as part of their closure and rehabilitation plans.

4.5 The Lock the Gate Alliance argued that the continued allowance of these features is inconsistent with the industry's stated aims in relation to rehabilitation:

> Regulators in all jurisdictions continue to approve plans of operations, closure plans and various licences and authorities that include huge open pit voids, out of pit waste rock dumps and capped tailings storage facilities as part of the approved final landform. This is in stark contrast to public expectations and the implicit commitment by the mining industry…
>
> A final landform that includes large pit voids, out of pit waste dumps and capped tailings storage facilities represents a permanently and fundamentally altered landscape with diminished utility and value for "subsequent economic activities, conservation or community use". Where mining involves production of acid forming materials, salts, radionucleides and other persistent non-organic pollutants, the long-term consequences of these landforms can be dire as these engineered structures fail or become compromised over time.[1]

Concerns about the impact of final pit voids

4.6 The Australian Conservation Foundation stated that the 'conscious decision to allow open pits and voids to remain post-mining is extremely contentious', and argued that in such cases it is 'a decision by policy makers and regulators that explicitly

1 *Submission 9*, pp. 11–12.

favours corporate interests over the interests and values of affected communities, local stakeholders and the environment'.[2]

4.7 The Lock the Gate Alliance cited a 2016 report on open cut coal mines in NSW, which showed that in that state alone there are at least 45 final pit voids either planned or approved totalling 6050 hectares in size, covering a total area greater than all of Sydney Harbour. It noted in relation to the water impacts associated with these voids:

> Modern coal mines have pits that may extend 150 metres or more below the natural water table. This means water impacts are a key issue with final voids. In most cases, lakes will form in the voids. These will draw down local groundwater and take significant periods of time to fill with water, often centuries. Water quality in these final void lakes is typically poor and will worsen over time. These lakes will become increasingly saline. A scientific study estimated that one large void in the Hunter Valley may contain approximately 1 million tonnes of salt after a period of 500 years. Should these lakes overfill, the flooding of water onto surrounding land would have a detrimental impact.[3]

4.8 The report stated that in many cases final pit lakes from these coal mines will eventually become a terminal sink, resulting in permanent groundwater loss through evaporation. Further, pit lakes can often acquire toxic properties through acid mine drainage and the leaching of other harmful metals from the void into the final pit lake.[4]

4.9 The Hunter Communities Network noted widespread concern in the Hunter Valley, where these coal mines are prevalent, about 'the retention of large toxic water bodies in the landscape' in the form of final pit lakes, and stated:

> The approval of final voids is a cost shifting exercise from the mining industry onto the environment and future generations. The sterilisation of potentially productive land is not factored into the costs benefits analysis of the mining approvals process in NSW.[5]

4.10 Mr Peter McCallum of the Mackay Conservation Group held similar concerns about final pit voids in Queensland:

> What happens [when a final void is left] is that we find that the water table in the surrounding land is affected forever, really, as water flows into those pits and evaporates in the hot, dry summers we have up here. So there is continuous draw-down of groundwater, and that affects both agriculture and natural ecosystems. We believe that the best policy is to fill those voids as much as possible, to avoid a situation where there are large water bodies

2 *Submission 27*, p. 10.

3 *Submission 9*, p. 14.

4 Energy and Resource Insights, 'The Hole Truth: The mess coal companies plan to leave in NSW', provided by the Hunter Communities Network, *Submission 19, Attachment 1*, p. 11.

5 *Submission 19*, p. 1.

> being created that could be toxic. We have seen ones where the water studies that have been done are showing that there would be algal blooms, stratification, hypersalinity and heavy metal contamination in the water. So really they are of no use to anyone at all and they are certainly causing a hazard to the environment in the future.[6]

4.11 The Australian Conservation Foundation recommended that national standards be developed and enforced requiring the backfilling of pit voids, specifically in relation to protection and managements of matters of national environmental significance and water resources.[7] Several other submitters and witnesses also argued that, in light of the long term concerns relating to pit voids, backfilling voids should be encouraged or even mandated.[8]

Industry perspectives on final pit voids

4.12 The Minerals Council of Australia (MCA) stated that the ability to employ open cut mining techniques is essential to the viability of many Australian mining operations, and decisions around whether to backfill a void need to be made on a case-by-case basis:

> The management of mine voids, including the decision whether or not to back fill is neither a simple nor a 'one-size-fits-all' proposition. Backfilling a mine void can be extremely costly, affecting the viability of a mining operation. Furthermore, backfilling may not necessarily lead to an optimal environmental or social outcome and, in some instances be physically impossible (e.g. when tailings or overburden have expanded significantly in volume when disturbed).[9]

4.13 The MCA argued that a range of issues need to be considered when making decisions about whether a final pit void should be part of a site closure plan, including:

- Environmental benefit – what are the risks and opportunities presented by the void management option under consideration. Will there be a commensurate environmental benefit?
- Resource sterilisation – backfilling will remove the future opportunity resulting from changes in technology that would allow further economic extraction of resources.

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6 *Committee Hansard*, 12 July 2017, p. 21. See also: Doctors for the Environment Australia, *Submission 8*, pp. 5–6.

7 *Submission 27*, p. 11.

8 See, for example: Lock the Gate Alliance, *Submission 9*, p. 14; Greenpeace Australia Pacific, *Submission 25*, p. 4; Dr Peter Erskine, *Committee Hansard*, 12 July 2017, pp. 12–13; Mr Peter McCallum, Mackay Conservation Group, *Committee Hansard*, p. 21; Mr Philip Spark, *Submission 52*, p. 1.

9 *Submission 50*, p. 29. See also: Mr Peter Walker, General Manager Care and Maintenance, Copper Mines of Tasmania, *Committee Hansard*, 12 October 2017, p. 13.

- Perverse outcomes – backfilling may lead to unintended environmental consequences including further land clearing (to obtain 'fill' material), water quality impacts, emissions and energy impacts.
- Geochemical stability – the interaction of waste rock and other material with groundwater may present increased environmental risks.
- Community and conservation perspectives – a pit or a pit lake may have future uses, including social (e.g. recreation), conservation (e.g. wetlands) or environmental and economic (e.g. Woodlawn bioreactor near New South Wales).[10]

4.14 The Chamber of Minerals and Energy of Western Australia echoed these arguments, stating that it does not support the mandatory backfill of voids.[11] It argued that any requirements for backfilling voids in particular cases needs to be driven by specific environmental risks:

> In some instances, where there are specific environmental risks such as acid rock drainage or salinity impacts to groundwater, backfill of a void may result in a reduced longer term environmental impact from mining. In such instances, the current WA regulatory framework would identify this risk as part of the [environmental impact assessment] and hence condition requirements such as backfill in the projects approval and [Mine Closure Plan].
>
> Where the requirement to backfill is not driven by a specific environmental risk, it instead just artificially alters the economic viability of a resource and may therefore result in high-grading or non-development, diminishing the State's return on its mineral endowments.[12]

4.15 The Minerals Council argued in particular against the imposition of any additional obligations for existing voids to be backfilled:

> Major capital investment decisions need regulatory certainty. Any retrospective requirement to backfill voids would create significant regulatory risk for the minerals industry, rendering many projects unviable. Furthermore, should the requirement to backfill voids have been in place at the time the investment decision was made it is likely a significant number of mining projects would not have commenced.[13]

4.16 Professor David Mulligan of the Centre for Mined Land Rehabilitation at the University of Queensland commented that at a minimum, future mining approvals may need to be more prescriptive in respect of final pit voids:

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10 *Submission 50*, p. 30. See also: Chamber of Minerals and Energy Western Australia, *Submission 23*, pp. 7–8; NSW Minerals Council, *Submission 49*, pp. 22–23.

11 *Submission 23*, p. 8.

12 *Submission 23*, p. 8.

13 *Submission 50*, p. 30.

> There is a reality that legislation of the past did not always specify a requirement for backfilling (although it has been done) and thus the industry would generally argue that the costs of now designing-out such a feature would be (potentially fatally) uneconomic. The discussion has largely been around the strip mines of the coal industry, and while we possibly need to accept the unlikelihood of voluntary backfilling where another viable, safe and economic use for the void can be identified and proven, there would seem to be limited arguments from a rehabilitation and environmental perspective to allow approvals for new coal mines, for example, to plan to leave a final void.[14]

United States regulation of final voids for surface coal mining

4.17 Several submitters noted that federal legislation has been in place in the United States since the 1970s which establishes minimum environmental standards for the operation and rehabilitation of surface coal mine operations in that country.[15] Under the U.S. Surface Mining Reclamation and Control Act 1977 (SMCRA), federal standards are established that can be enforced by the federal government if state-based regulatory programs are inadequate. SMCRA requires mine operators to restore affected land 'to a condition capable of supporting the uses it could support before mining, or to higher or better uses', as well as requiring operators to:

- restore the approximate original contour of the land by backfilling, grading, and compacting;
- minimize disturbances to the hydrologic system by avoiding acid mine drainage and preventing additional sediments from erosion entering nearby streams and other water bodies;
- reclaim the land as soon as practicable after the coal has been extracted, and even as the mining operation moves forward; and
- establish a permanent vegetative cover in the affected area.[16]

4.18 The Lock the Gate Alliance commented:

> SMCRA was passed 40 years ago. Yet in all Australian jurisdictions the regulators continue to approve large open pit voids, hundreds of them across various landscapes, as the preferred option…
>
> Australia and Australians deserve world's best practice mine site rehabilitation and the intent of SMCRA reflects this. Any future review of coal mining in Australia or within its various jurisdictions must consider SMCRA's goals as the most appropriate and beneficial for Australian tax payers and the environment. The fact is that the US coal industry continued

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14 Professor David Mulligan, *Submission 40,* p. 7.

15 Lock the Gate Alliance, *Submission 9*, pp. 14–16; Hunter Communities Network, *Submission 19, Attachment 1*, p. 16; Environmental Defenders Offices of Australia, *Submission 24*, pp. 14–15.

16 Lock the Gate Alliance, *Submission 9*, p. 15; Environmental Defenders Offices of Australia, *Submission 24*, p. 14.

> to profit and produce [coal] under SMCRA rendering industry arguments in Australia that back filling voids would make the industry unprofitable null and void.[17]

4.19 The NSW Minerals Council disagreed with the contention that voids are required to be filled under the US legislation, arguing in its submission that this is an oversimplification of the regulatory requirements, and it has not been standard practice to fill in voids in some regions of the US for many years.[18]

Other issues relating to final landform design

4.20 In addition to the issue of final pit voids, submitters also commented more broadly on the design of final landforms in the site rehabilitation process. Professors Gregory Hancock and Gary Willgoose from the Sustainable Mine Rehabilitation program at the University of Newcastle lodged a joint submission to the inquiry, stressing the importance of designing final landforms well:

> A key issue is that once mining waste has been placed or a landscape has been constructed, it is relatively costly to make any significant changes. It is even more difficult post-closure if any unforeseen erosion issues emerge. Any constructed landform will be different to the prior undisturbed or natural surface and have some environmental impact. This reconstructed landform will be present forever post-mine closure. It is therefore of critical importance that we as a community get the design right. Any failure will ultimately rest with the community and be a long-term legacy community issue.[19]

4.21 The Professors' joint submission argued that mine operators need to utilise long-term field plots and landform test sites, in conjunction with computer-based landscape evolution modelling, in order to design final landforms that will perform well over extensive time periods.[20]

4.22 Naturally Spatial submitted that Australian practice in relation to final landform design has generally not adapted to modern best practice. For example, principles such as fluvial geomorphic land design (that is, creating final landforms modelled on specific characteristics of surrounding reference landscape areas, rather than building traditionally engineered landforms) are not widely utilised in Australia despite successful examples of their use overseas.[21]

Adequacy of progressive rehabilitation efforts

4.23 The committee heard a range of views concerning the adequacy of progressive rehabilitation efforts by the mining industry in Australia.

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17 *Submission 9*, pp. 15–16.

18 *Submission 49*, p. 24. See also: Peabody Energy, *Submission 47*, pp. 11–12.

19 *Submission 20*, p. 3.

20 *Submission 20*, pp. 3–4.

21 *Submission 6*, pp. 2 and 4–5.

4.24 The Environmental Defenders Offices of Australia characterised some of the benefits of rehabilitation being undertaken progressively, rather than after mining operations have ceased, as follows:

> Progressive rehabilitation provides multiple benefits which help ensure higher quality rehabilitation is undertaken. Historically, consideration of mine closure and rehabilitation has been considered too late in the process, when funds from operation have already dried up. Progressive rehabilitation ensures that the mine operator has turned their attention to rehabilitation requirements throughout the mine life, leading to better understanding of the requirements and management of mine rehabilitation on the site; that funds are made available throughout the mine life for rehabilitation to be undertaken; and provides community confidence and understanding in the operator's commitment to rehabilitation.[22]

4.25 Mr David Marlow commented similarly:

> A progressive (staged) rehabilitation model is far superior to that of a rehabilitation-after-closure model. Progressive rehabilitation is carried out as part of daily operations in the early years, when cash flow is at its healthiest, the management structure is in place and on-site personnel and equipment are available to carry it out. A rehabilitation plan must therefore be in place at the start of operations and its implementation at the forefront of daily management decision-making.[23]

4.26 The Mackay Conservation Group noted in its submission that progressive rehabilitation can prove less costly, as it allows rehabilitation costs to be absorbed into operational expenses.[24]

4.27 Commenting on the Hazelwood mine fire in 2014, Environment Victoria argued that progressive rehabilitation of coal mines protects communities from the risk of catastrophic mine fires, as well as reducing the community health impacts of mining operations.[25] It stated:

> The fire in the Hazelwood coal mine in early 2014 covered the town of Morwell and the surrounding area in toxic coal ash for 45 days… [The] overall cost of fire to the [Victorian] Government, the community and to mine operator GDF Suez has been estimated at over $100 million. The additional cost to the long-term health of the community will, tragically, not be known for many years to come.
>
> The only sections of Hazelwood's northern batters that did not burn during the mine fire are those that had been rehabilitated between 2008 and 2012.

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22 *Submission 24*, p. 6.

23 Mr David Marlow, *Submission 32, Attachment 1*, 'Rehabilitation of land disturbed by mining and extractive industries in Queensland: Some needed legislative and management reforms', *Proceedings of the Royal Society of Queensland*, vol. 121, 2016, p. 43.

24 Mackay Conservation Group, *Submission 18*, p. 2.

25 *Submission 15, Attachment 1*, p. 14.

> This was a powerful demonstration of the role that mine rehabilitation can play in protecting communities from dangerous mine fires.[26]

4.28 The MCA submitted that site rehabilitation is 'undertaken progressively wherever possible during the operational life of a mine, with remaining areas rehabilitated in the post-closure phase'.[27] It elaborated on the role of progressive rehabilitation during mining operations as follows:

> Mine rehabilitation is not necessarily a linear process. Progressive rehabilitation is undertaken in line with the mine plan and varies based on operational needs. Land can be rehabilitated only when it becomes available (i.e. the area is no longer operational and is not needed for future operations). For example, areas of a hard rock mine such as the pit, ramps, roads, tailings storage and processing areas are required for the entire operating life of a mine, but waste rock dumps may be available for progressive rehabilitation. Accordingly, rehabilitation for an individual mine site can vary substantially from year to year.
>
> Mining operations can span from several years to many decades. Closure and therefore rehabilitation planning may be refined periodically based on new information and changes to the operation. Significant changes often require further government approvals.[28]

4.29 Glencore stated in its submission that while it 'aims to progressively rehabilitate and restore land disturbed by mining practices and minimise the active mining footprint to the smallest area possible…this is not always possible or practical'.[29] Glencore noted in particular that the ability to carry out progressive rehabilitation varies significantly between metalliferous mines and coal mines:

> Metalliferous operations (copper, nickel, zinc) are limited in the amount of progressive rehabilitation that can be achieved and available land for rehabilitation mainly due to the nature / formation of mineral ore bodies and the processing and supporting infrastructure (roads, railways, water and electrical services and buildings ranging from administrative through to processing facilities) which usually remains operational for the life of the mine.
>
> In contrast, many of our open cut coal mines are in a position to progressively rehabilitate mined land due to the nature of coal seams and the manner in which they are mined. We mine coal seams in a way which often makes it possible to progressively rehabilitate the land in which they were located. We have a number of examples of this in Australia at mines such as Mangoola in NSW and Rolleston in Queensland.[30]

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26 *Submission 15, Attachment 1*, p. 15.

27 *Submission 50*, p. 20.

28 *Submission 50*, p. 20.

29 *Submission 57*, p. 3.

30 Glencore, *Submission 57*, pp. 3–4.

Adequacy of progressive rehabilitation in practice

4.30 The committee heard concerns that current regulatory settings in Australian jurisdictions are inadequate to ensure that mine operators are undertaking rehabilitation efforts progressively throughout the mine life.

4.31 Some submitters noted that in Queensland, for example, rates of mined land being progressively rehabilitated have reportedly fallen, from 28 per cent of land disturbed by mining operations in 2006 to 22.5 per cent in 2016.[31]

4.32 Mr Chris McCombe, Senior Advisor Environment, MCA, argued however, that the proportion of mined land undergoing rehabilitation is a result of the industry cycle rather than a lack of commitment to progressive rehabilitation:

> [W]ith respect to the state of play with rehabilitation and disturbance, essentially it fluctuates on a cyclical basis in line with the industry. If the industry grows quite quickly, as has happened in the last 10 years essentially, you would expect that the area that is rehabilitated as an overall proportion of the industry footprint would shrink. So you would expect that there would be some fluctuation in terms of the amount of progressive rehabilitation that is out there. Over time, of course, rehabilitation would continue to catch up.[32]

4.33 Mr Peter McCallam of the Mackay Conservation Group cited one positive example in Queensland, where Glencore offers bonus payments to its managers at the Rolleston Open Cut coal mine on the basis of progressive rehabilitation outcomes, incentivising the earliest possible completion of those works.[33] This structure is also in place at Glencore's Mangoola coal mine in the Hunter Valley, NSW, which the committee visited in March 2018. Glencore noted that Key Performance Indicators relating to rehabilitation progress have been developed and form a part of each site's performance incentive scheme, which applies to Senior Management, Mine Managers, Mine Planners, Mine Production and Environmental personnel.[34]

4.34 The Environmental Defenders Offices of Australia argued that current regulatory conditions relating to progressive rehabilitation are not strong enough to drive improvement in industry practice in this area:

> [P]rogressive rehabilitation conditions have proven very difficult to enforce due to the need to rely on the operator to determine when mining has finished in an area, and the high degree of flexibility in operational plans. For example, in Queensland many Environmental Authorities require that progressive rehabilitation commences when 'areas become available within

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31 See, for example: The Australia Institute, *Submission 13, Attachment 1*, 'Dark side of the boom: What we do and don't know about mines, closures and rehabilitation', April 2017, p. 19; Environmental Defenders Offices of Australia, *Submission 24*, p. 8.

32 Mr Chris McCombe, Senior Advisor Environment, *Committee Hansard,* 12 July 2017, p. 72.

33 *Committee Hansard*, 12 July 2017, p. 23.

34 Glencore, 'Site Rehabilitation', Booklet provided at a committee visit to Mangoola mine on 14 March 2018, p. 6.

> the operational land'; a decision which is ultimately reliant on the proponent deciding what constitutes 'available'. When detailed rehabilitation plans are deferred to plans of management rather than conditions of consent, the high degree of flexibility offered for amending plans of management mean there is no certainty of outcomes or timing, further hindering enforceability.[35]

4.35 A significant number of stakeholders called for regulatory standards to be raised in Australian jurisdictions to ensure that progressive rehabilitation efforts are strengthened across the industry, for example by:

- setting strict, enforceable standards for progressive rehabilitation and best practice mine closure planning at the Commonwealth level, to be implemented at the state level;[36]
- mandating specific progressive rehabilitation targets for all mining operations;[37]
- requiring development approvals for mining projects to include conditions relating to progressive rehabilitation;[38]
- requiring that mining tenure renewal is dependent on delivery of progressive rehabilitation;
- amending all mine operations' permits to include fixed, non-negotiable rehabilitation ratios that are maintained through the life of the mine;[39] and
- imposing financial penalties on companies for failing to undertake progressive site rehabilitation.[40]

4.36 The committee also heard various views about how financial assurance mechanisms can be utilised to incentivise progressive rehabilitation. These options are discussed further in Chapter 6.

Other issues raised relating to rehabilitation design and performance

4.37 Submitters and witnesses discussed various other matters in relation to the way specific rehabilitation activities are planned and undertaken in the Australian minerals industry. These included the management of tailings and mine waste materials, and approaches to revegetation and the restoration of ecological diversity at rehabilitated sites.

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35 *Submission 24*, p. 6. See also: Mackay Conservation Group, *Submission 18*, p. 2.

36 Environmental Defenders Offices of Australia, *Submission 24*, p. 22.

37 Mr David Marlow, *Submission 32, Attachment 1*, 'Rehabilitation of land disturbed by mining and extractive industries in Queensland: Some needed legislative and management reforms', *Proceedings of the Royal Society of Queensland*, vol. 121, 2016, p. 44.

38 Greenpeace Australia, *Submission 25*, p. 4

39 Lock the Gate Alliance, *Submission 9*, p. 25.

40 Mr Peter McCallam, Coordinator, Mackay Conservation Group, *Committee Hansard*, 12 July 2017, p. 23.

Management and use of tailings and mine waste rock

4.38 A number of submitters commented on industry practice in relation to the storage and management of mine tailings and other mine waste rock materials.

4.39 Mine tailings are the waste material left over after the valuable mineral component has been removed from the ore through processing. Tailings comprise a slurry including ground-up rock or sand, and the chemical reagents and process water used to extract the commodity.[41] Tailings are conventionally disposed of in a purpose built tailings storage facility (commonly referred to as a tailings dam). Long term issues with tailings dams can include: seepage of tailings material into surrounding surface areas and groundwater; contaminated surface runoff; and in extreme cases, failure of tailings dam structures leading to severe downstream impacts.[42]

4.40 Waste rock (that is, rock material extracted in the process of reaching and mining targeted minerals) can also be problematic to manage and store over the long term. Professors Gregory Hancock and Gary Willgoose from the Sustainable Mine Rehabilitation program at the University of Newcastle noted in an academic paper provided to the committee that waste rock dumps and tailings facilities 'are considered one of the greatest long-term post-mining liabilities'.[43]

4.41 As noted in Chapter 2, a major environmental issue for many legacy and currently operating mine sites in Australia is that of acid and metalliferous drainage (AMD).[44] This occurs where waste rock from mining operations or mine tailings contain elements which react with water and oxygen to form acidic runoff, or to cause the release into the environment of other damaging metals. Doctors for the Environment Australia explained this process as follows:

> 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

41 Minerals Council of Australia, 'Mine rehabilitation in the Australian minerals industry', February 2016, p. 22; GRID-Arendal, 'Mine Tailings Storage: Safety is no Accident', p. 6, provided to the committee by the Mineral Policy Institute at a public hearing in Perth on 7 March 2018.

42 GRID-Arendal, 'Mine Tailings Storage: Safety is no Accident', provided by the Mineral Policy Institute at a public hearing in Perth on 7 March 2018.

43 G R Hancock and G R Willgoose, 'Sustainable mine rehabilitation – 25 years of the SIBERIA landform evolution and long-term erosion model', *From Start to Finish: A Life-of-Mine Perspective*, AusIMM, 2018, p. 371.

44 See, for example: Ms Jennifer Parnell, Manager Scientific Services, Mineral Resources Tasmania, *Committee Hansard*, 12 October 2017, p. 33; Monash University, *Supplementary Submission 74.2*, pp. 38–40.

> consumption and contamination of drinking water [may occur] 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.[45]

4.42 Doctors for the Environment Australia argued that current rehabilitation practices in Australia 'are not adequate to prevent AMD contamination of the environment by chemicals harmful to human health'. It cited the example of the Mary Kathleen uranium mine in Northwest Queensland, where seepage is occurring from the mine's tailings storage facility in a way that was not predicted at the time of the mine's 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.[46]

4.43 Submitters and witnesses pointed to several recent cases where mine operators have failed to adequately prevent AMD issues or other contamination from tailings and waste rock storage areas. These included:

- leakage of contaminated tailings water into the underlying environment at the Ranger uranium mine;[47] and
- the mischaracterisation of waste rock at the McArthur River Mine in the Northern Territory, where initial company estimates about the level of acid forming material in waste rock proved to be significantly underestimated, leading to AMD issues and combustion of a waste rock facility.[48]

Radioactive tailings from uranium mine operations

4.44 Mr Dave Sweeney from the Australian Conservation Foundation commented that managing tailings from uranium mining operations is a particular challenge due to the radioactivity of this material:

> [T]ailings management…is probably the single largest rehabilitation challenge with uranium mining. It's important to note that the uranium mining takes what was cocooned and effectively isolated, brings it to the surface, pulverises it, breaks it, chemically treats it and removes about

45 Doctors for the Environment Australia, *Submission 8*, p. 5.

46 *Submission 8*, p. 5.

47 Ms Mia Pepper, Nuclear Free Campaigner, Conservation Council of Western Australia, *Committee Hansard*, 7 March 2018, p. 4.

48 Charles Roche and Simon Judd, *Ground Truths: Taking responsibility for Australia's Mining Legacies*, Mineral Policy Institute, June 2016, pp. 11 and 23–24; Mr Rick Humphries, Coordinator, Mine Rehabilitation Reform Campaign, Lock the Gate Alliance, *Committee Hansard*, 30 October 2017, p. 27.

> 20 per cent of it for use or sale as uranium oxide, but a whole range of other radioactive materials are now available. They can move them into water.[49]

4.45 The Australian Conservation Foundation noted that while regulatory requirements for the Ranger Uranium Mine include that contaminants arising from the mine's tailings must be isolated from the environment for 10 000 years, this level of environmental protection is not afforded in relation to any other uranium mines in Australia. It recommended that this radioactive mine tailings standard of isolation for a period of not less than ten thousand years should be a Commonwealth requirement for all current and any future uranium operations in Australia.[50]

Developing secondary uses for mining waste materials

4.46 Dr Anita Parbhakar-Fox, Senior Research Fellow at the University of Tasmania's ARC Transforming the Mining Value Chain research hub, informed the committee that new techniques recently developed are able to better characterise mine waste material and identify possible treatment options and future uses. These techniques can enable better rehabilitation of mine tailings, both at current mine sites and abandoned mine sites with ongoing environmental legacies. Additionally, they can help prospective sites better predict what issues will emerge during operations, and allow for further economic uses of materials that were previously considered mine waste.[51]

4.47 Professor David Mulligan of the Centre for Mined Land Rehabilitation at the University of Queensland submitted similarly that there is residual value present in tailings storage facilities which would otherwise present an environmental and social liability into the future. Professor Mulligan argued that maximising the recovery of this value through the re-processing of tailings should be incentivised, ahead of developing new areas for extraction:

> Apart from generating a revenue stream, the re-processing of the past…will provide technological opportunities (and new industries and employment) to then produce a more benign waste…stream that should then provide an opportunity to work with a less toxic, less hostile residual substrate. This in turn would lead to lower risk rehabilitation strategies and hence improved and more successful environmental outcomes.[52]

4.48 Dr Parbhakar-Fox argued that greater funding for initial-stage research in these kinds of advancements is needed in order to help drive uptake of better practice across the mining industry:

> In my experience as an impartial academic researcher, the mining industry has become more interested in engaging in developing and adhering to

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49 Mr Dave Sweeney, Nucelar Free Campaigner, Australian Conservation Foundation, *Committee Hansard*, 30 October 2017, p. 16.

50 Australian Conservation Foundation, *Submission 27*, p. 17. See also: Conservation Council of Western Australia, *Submission 17*.

51 *Committee Hansard*, 12 October 2017, pp. 4–5.

52 *Submission 40*, p. 7.

> better mine waste practices. However, the level of interest and engagement, like the geological materials we are working with, is heterogeneous. The major limitation I see is a lack of funding for detailed scientific research at the early stages.
>
> …
>
> The concept of a zero-waste mine is not impossible if academics, companies and governments work together, because we have sufficient tools that can enable us, from a scientific perspective, to achieve this. But the funding to do so and the courage to take the plunge and undertake total deposit characterisation, not just ore characterisation, must be met by industry and government.[53]

Restoring functioning ecological systems after mine rehabilitation

4.49 The ARC Centre for Mine Restoration (ARC-CMR) commented in detail on industry practice in relation to restoring appropriate vegetation and habitat environments at rehabilitated sites. It submitted that the mining industry in Australia is not sufficiently equipped to provide appropriate ecological restoration outcomes:

> The technical capacity and science to achieve [ecological restoration] for many Australian mine sites is limited and is a key constraint in achieving proven, cost-effective and scalable solutions in restoration. Too often, once a stable, non-polluting landform has been constructed, industry approaches restoration as a 'gardening exercise' with the expectation that simply spreading seeds or planting tubestock will result in the establishment of functionally appropriate, ecologically resilient and biodiverse native vegetation indicative of a native reference site. As history shows, across Australia this approach has been met with almost universal failure.[54]

4.50 The ARC-CMR identified various reasons why adequate outcomes are not being obtained, including:

- inadequate biodiversity surveys to inform the setting of appropriate restoration targets;
- problems with the supply of appropriate seed, and lack of knowledge to deliver seed that will maximise seedling establishment
- a lack of information on key factors necessary to provide for the establishment of sustainable ecosystems that are resilient and support native wildlife including rare and threatened species; and
- a critical shortage of restoration researchers trained in the skills to overcome these impediments for the resources sector.[55]

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53 *Committee Hansard*, 12 October 2017, p. 5.

54 *Submission 64*, p. 2.

55 *Submission 64*, p. 2.

Consideration of heritage values and other possible post-mining land uses

4.51 Australia ICOMOS (International Council for Monuments and Sites) lodged a submission outlining its view that cultural and heritage values associated with mine sites are generally not well incorporated into rehabilitation and closure planning in Australia. It noted that the *Australia ICOMOS Charter for Places of Cultural Significance* (known as the *Burra Charter*) provides a 'widely-recognised, best practice standard for managing cultural heritage places in Australia', and is the 'appropriate standard for addressing mining cultural heritage in a rehabilitation context':[56]

> Mine rehabilitation legislation and guidance, as applied by the States and Territories, does not currently apply best practice standards to mining heritage. The regulations and strategic frameworks do not recognise and apply the principles of the *Burra Charter* and do not generally engage appropriate cultural heritage expertise.[57]

4.52 Australia ICOMOS argued that there is a role for the Australian Government to ensure that regulatory processes for the rehabilitation and closure of active mines with significant heritage values achieve the following:

- engage the right cultural heritage expertise and agencies within government in developing rehabilitation and closure guidelines;
- engage communities in the process of agreeing on post-mining land uses;
- recognise the human connection to landscapes, as part of rehabilitation and closure planning and that the application of agriculture and biodiversity to post-mine landscapes will not be applicable to all sites;
- ensure that socio-economic values are considered, as well as environmental, for the transition to, and management of, post-mining land uses; and
- ensure long-term management of such sites is facilitated by government(s) during the mine's life, not left until the end.[58]

4.53 The Closure Planning Practitioners Association submitted that current regulatory frameworks do not adequately account for social and economic considerations in planning for final post-mining land uses:

> With only the environmental aspects of mine closure and rehabilitation being routinely considered during mining approval processes, a bias towards environmental rehabilitation outcomes has emerged which has the potential to limit economic development of the land post-closure, to the detriment of local communities.[59]

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56 Australia ICOMOS, *Submission 28*, pp. 3 and 4.

57 Australia ICOMOS, *Submission 28*, p. 4.

58 Australia ICOMOS, *Submission 28*, pp. 7–8.

59 Closure Planning Practitioners Association, *Submission 3*, p. 1.

4.54 It argued that the Commonwealth should develop a mine closure policy that 'aligns regulation of rehabilitation with economic development objectives to optimise the environmental, social and economic benefit from mining assets'.[60]

4.55 Naturally Spatial submitted similarly that complete restoration of disturbed lands at mine sites is not always possible, and argued that in these cases alternate land uses should be considered:

> An examination of alternative land uses such as grazing, recreation, and even urban development, as opposed to reestablishment of natural ecosystems, affords the potential for communities to harness unforeseen employment opportunities after a mine has closed… [T] he burden of long term liability often falls on the local community that once hosted the mining operation so it makes sense to plan for this succession and maintain economic options that are viable in a healthy community, once a mine has closed.[61]

Business practices that may result in the avoidance of rehabilitation obligations

4.56 The committee heard concerns in relation to two particular business practices that some stakeholders feared can result in companies deliberately avoiding their rehabilitation obligations. These are the practice of mines being placed into 'care and maintenance' indefinitely as an alternative to undertaking rehabilitation and closure; and mines being sold to smaller resources companies with significant rehabilitation liabilities still outstanding.

Use of 'care and maintenance' as an alternative to site rehabilitation

4.57 As noted in Chapter 2, mine operations where production has been suspended are referred to as being in a state of 'care and maintenance', where the site is maintained and infrastructure remains largely intact until production recommences or the mine is closed.

4.58 Some stakeholders expressed concern that in some cases, care and maintenance is used to avoid rehabilitation obligations when there is no prospect of mine operations recommencing. The Environmental Defenders Offices of Australia (EDOs) submitted:

> Of concern in every state and territory is that mines can avoid or delay rehabilitation responsibilities by entering an indefinite, and often undefined, 'care and maintenance' mode. Responsibilities during 'care and maintenance' tend to relate to keeping a site safe and stable, and avoid any need to undertake progressive or meaningful rehabilitation. A decision to enter 'care and maintenance' can occur with no need for the proponent to provide certainty as to when they will recommence operations or close and rehabilitate the mine.[62]

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60 Closure Planning Practitioners Association, *Submission 3*, p. 2.

61 *Submission 6*, pp. 9–10.

62 *Submission 24*, p. 6.

4.59 The EDOs submission noted a 2013 report of the Queensland Auditor-General, which found:

> There are a number of reasons why a mine might go into care and maintenance, such as changes in world commodity prices. It can also be used as a means of avoiding rehabilitation. There is no clear definition of care and maintenance sites and there are a lack of protocols between [the Queensland Department of Environment and Heritage Protection] and [the Queensland Department of Natural Resources, Mines and Energy] about the management of these sites. This results in sites remaining in care and maintenance while the departments dispute over the administrative and regulatory responsibility for the site.[63]

4.60 Dr Peter Erskine of the Sustainable Minerals Institute at the University of Queensland explained that one reason why a significant number of sites in Australia are now in care and maintenance is that during the recent commodities boom, second-class mineral deposits that would not have been mined under normal conditions became economically viable:

> If you opened a mine like that and the prices suddenly changed and you had a security bond with the government that was too large that you could walk away from it, you would wait until the resource became more valuable. So a site will enter care and maintenance… When prices crashed that became a big worry regarding when these mines were ever going to reopen… So they remain a liability for the company and government while they are in this unsure state.[64]

4.61 Mr David Morris commented on a specific example in the Northern Territory at the committee's Darwin hearing:

> Out at Nhulunbuy, for example, you have the Alcan Gove alumina refinery now in care and maintenance, but you have the company, which is Rio Tinto, saying that it basically doesn't foresee any situation where it would be reopened. The question you have to ask in those circumstances is: why is it in care and maintenance other than to avoid the relinquishment of the rehabilitation bond and the commencement of costs associated with rehabilitation?[65]

4.62 Most states and territories do not appear to hold detailed records of the number of sites in care and maintenance and the length of time these sites have been in that state, although there are examples of sites being in care and maintenance for decades.[66]

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63 *Submission 24*, p. 6.

64 *Committee Hansard*, 12 July 2017, p. 13.

65 Mr David Morris, Private Capacity, *Committee Hansard*, 30 October 2017, pp. 3–4.

66 The Australia Institute, *Submission 13, Attachment 1*, 'Dark side of the boom: What we do and don't know about mines, closures and rehabilitation', April 2017, p. 1.

4.63 The MCA articulated the reasons for sites entering care and maintenance, acknowledging that low commodity prices may be one motivation:

> The decision to move a site into care and maintenance is a major decision for a mining company with all potential impacts carefully evaluated. One factor influencing this decision may be low commodity prices – which are often cyclical. Under these circumstances, a company may choose to manage the site until economic conditions are favourable to recommence operations.
>
> Care and maintenance should not be confused with premature closure of a mine. Periods of care and maintenance may last several years. However, in both care and maintenance and premature closure, the ongoing liability for the site remains with the mining lease holder – it is not relinquished until government requirements have been met. Care and maintenance should also not be confused with abandonment, which is safe-guarded by financial assurance mechanisms.[67]

4.64 Several stakeholders argued that regulations should be implemented that prevent mines remaining in care and maintenance indefinitely, and include stricter parameters around allowing sites to enter care and maintenance, to ensure it is not simply used to avoid rehabilitation. Mr Morris told the committee:

> [R]egulations should really include some kind of reasonableness requirement for a mine going into care and maintenance. Potentially, if there were a dip in commodity prices that meant a mine needed to go into a period of maintenance until that price came back up, that might be reasonable. But you've got to set some kind of reasonableness parameter around it, or a time frame parameter around it, because otherwise you can have these mines sitting and deteriorating in their care and maintenance mode, where the government can't draw upon the rehabilitation bond they have and the community can't start being employed in the rehabilitation of that site. You end up having a legacy that drags out for a very long time, and the only beneficiary of that is the company that's responsible for the site.[68]

Mines being sold with significant rehabilitation liabilities outstanding

4.65 Some stakeholders expressed alarm at the practice of larger mining companies selling mining leases on to smaller operators towards the end of the mine life, arguing that this practice increases the risk of unsatisfactory rehabilitation outcomes, and may

67 *Submission 50*, p. 23.

68 *Committee Hansard*, 30 October 2017, pp. 3–4. See also: Lock the Gate Alliance, *Submission 9*, p. 25; Environmental Defenders Offices of Australia, *Submission 24*, pp. 6 and 22; Greenpeace Australia, *Submission 25*, p. 4; Mr Peter Coggins, *Submission 69*, p. 5; Mr Dave Sweeney, Nuclear Free Campaigner, Australian Conservation Foundation, *Committee Hansard*, 30 October 2017, p. 12.

in some cases be a strategy deliberately designed to avoid fulfilling rehabilitation obligations.[69] The Environmental Defenders Offices of Australia submitted:

> There is significant community concern that larger mining and resource companies are selling mines, with their associated rehabilitation obligations, to smaller companies that may not have sufficient capital to fulfil rehabilitation obligations. This is a particular risk where the costs of rehabilitation have been significantly underestimated. In these instances, requirements that the new operator must have sufficient funds to meet any rehabilitation liabilities are meaningless.[70]

4.66 The Construction, Forestry, Mining and Energy Union commented that where rehabilitation costs at a site have been underestimated, it follows that the sale of the mine to another party will involve inadequate recognition of this liability in the sale price:

> This should always be a concern, but where the sale is to a much smaller company with a much smaller balance sheet, the concern is magnified. During the recent downturn after the end of the resources investment boom, a number of mines have been sold to much smaller companies… While in many cases the smaller businesses genuinely intend to run the business profitably, they have lesser capacity to ride through market turbulence and are more likely to fail. This has adverse implications for workers' entitlements as well as for site rehabilitation.[71]

4.67 One specific case raised is that of the Blair Athol mine in Queensland, where Rio Tinto sold the mine to a smaller company in 2016 for a purchase price of $1, along with the transfer of an $80 million rehabilitation bond to the Queensland Government. Submitters and witnesses noted 'significant concerns' that this figure is insufficient to provide for the full rehabilitation of the site, and that the true cost of rehabilitation may be double the amount held.[72]

4.68 The Lock the Gate Alliance argued that the Commonwealth should 'explore mechanisms to ensure that the financial and technical capacity of purchasers to deliver their rehabilitation responsibilities could be tested and vetted to protect the public interest'.[73]

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69 Mr Dave Sweeney, Nuclear Free Campaigner, Australian Conservation Foundation, *Committee Hansard*, 30 October 2017, pp. 12 and 13; Lock the Gate Alliance, *Submission 9*, p. 25; Environmental Justice Australia, *Submission 26*, pp. 7–8; Professor David Mulligan, *Submission 40*, p. 6.

70 *Submission 24*, p. 13.

71 *Submission 10*, p. 5.

72 Environmental Defenders Offices of Australia, *Submission 24*, p. 13; Environment Council of Central Queensland, *Submission 4*, p. 1; Mr Rick Humphries, Campaign Coordinator, Lock the Gate Alliance, *Committee Hansard*, 12 July 2017, p. 35; Mr Michael McCabe, Coordinator, Capricorn Conservation Council, *Committee Hansard*, 12 July 2017, p. 63.

73 *Submission 9*, p. 19.

4.69 The Minerals Council of Australia argued that there are 'legitimate reasons why companies may sell sites to other companies that may be able to realise the potential of the resource under a different cost structure'.[74] It stated that potential advantages of this occurring can include:

- extension of the mine life with ongoing additional benefits for neighbouring communities, including employment and local businesses;
- maximum use of an economic resource to the benefit of the state – the resources would otherwise be sterilised through rehabilitation for mine closure; and
- encouraging innovative operators in the recovery of remaining resources.[75]

4.70 The Minerals Council argued that in these scenarios, rehabilitation performance safeguards remain in place, including financial assurance requirements such as security bonds.[76]

74 *Submission 50*, p. 30.

75 *Submission 50*, p. 30.

76 *Submission 50*, pp. 16–17.

Chapter 5

Abandoned mines

5.1 As noted in Chapter 2, abandoned mines (also sometimes referred to as 'legacy mines', 'orphaned mines', 'neglected mines' or 'derelict mines') arise when mining leases or titles no longer exist, and responsibility for rehabilitation cannot be allocated to any individual, company or organisation responsible for the original mining activities.[1] Many abandoned mine sites cause ongoing environmental problems that require remedial works to stabilise and rehabilitate. In these circumstances, responsibility for these sites falls to government, or to private landowners.

5.2 For the most part, abandoned mines in Australia operated prior to the introduction of modern rehabilitation and financial regulatory requirements (although there have also been significant recent examples). As such, the cost of remediating and rehabilitating abandoned mine sites represents a significant potential liability for governments in Australia.

5.3 This chapter examines how Australian jurisdictions are attempting to deal with the legacy issues associated with abandoned mines, and what improvements can be made to these processes.

Number and impact of abandoned mines in Australia

5.4 According to research undertaken in 2012, at that time there were 52,534 abandoned mine records within Australia.[2] However, many state mine datasets are incomplete, and the recorded numbers of abandoned mines vary widely between states.[3] Table 5.1 lists the number of abandoned mine records by state.

Table 5.1: Recorded abandoned mines in Australian jurisdictions[4]

State/Territory	NSW	Vic	Qld	WA	SA	Tas	NT	ACT	Total
Number	410	19 010	15 380	9 870	3 638	4 226	0	0	52 534

5.5 Ms Corinne Unger, a specialist in the field of abandoned mine rehabilitation and post-mining land use and first author of the study that identified the above

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1 Department of Industry, Innovation and Science, *Legacy Mines*, https://industry.gov.au/resource/Mining/Pages/Legacy-Mines.aspx (accessed 29 May 2017).

2 C. Unger, A.M. Lechner, V.Glenn, M. Edraki, D.R. Mulligan, 'Mapping and prioritising rehabilitation of abandoned mines in Australia', *Life-of-Mine Conference 2012*, p. 7.

3 C. Unger, A.M. Lechner, V.Glenn, M. Edraki, D.R. Mulligan, 'Mapping and prioritising rehabilitation of abandoned mines in Australia', *Life-of-Mine Conference 2012*, p. 7.

4 Source: C. Unger, A.M. Lechner, V.Glenn, M. Edraki, D.R. Mulligan, 'Mapping and prioritising rehabilitation of abandoned mines in Australia', *Life-of-Mine Conference 2012*, p. 7.

numbers, informed the committee how the number of abandoned mines was aggregated:

> It is a very poor dataset. The first study that we did in 2011 with my colleagues was really just to look at the quality of the data. Every state defines them differently. So [the 50,000 number] is, on the one hand, a number that we used, but it is also meaningless in many ways. In some states, an individual shaft was a site; in other sites, they were clustered. We tried to make sense of that and describe it in the research paper that we presented at a conference and later published in a journal. So the focus really was on: where are the data; how accessible are they?[5]

5.6 Ms Unger commented further on the state of the information held on abandoned mines by different jurisdictions in Australia:

> [E]very state has some form of dataset, but often they are historical records from exploration. They are not necessarily deliberately put together to understand abandoned mines. They are just a dataset which really need to be shifted to the next stage of identifying which ones are abandoned mines and which ones have environmental and health risks, and just to overlay those environment values and human population and other aspects over it. With spatial databases now, we should be able to do it.[6]

5.7 Ms Unger stated that more funding is needed, under national coordination, to develop a coherent and useful national inventory of abandoned mine sites in Australia, and that such an inventory would help in identifying priority sites that require the most urgent attention.[7]

5.8 Dr Mohan Yellishetty, Associate Professor in Resources Engineering at Monash University, noted that the university has been working to assemble a comprehensive national database on derelict, abandoned and operating mines in Australia.[8] The University provided the committee with five studies completed so far towards this work, examining potential environmental and socio-economic impacts of neglected and abandoned mining occurrences in Victoria, New South Wales, Tasmania, South Australia, Queensland and Western Australia.[9]

Impact of abandoned mines in Australia

5.9 As noted in Chapter 2, poor or non-existent rehabilitation of historical mines in Australia has resulted in ongoing environmental and social damage. The committee heard some direct examples of how this has affected individual landholders. For

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5 *Committee Hansard*, 12 July 2017, p. 14.

6 *Committee Hansard*, 12 July 2017, p. 14.

7 *Committee Hansard*, 12 July 2017, pp. 14–15.

8 Monash University, *Supplementary Submission 74.2*, pp. 1–2.

9 Monash University, *Supplementary Submissions 74.1–74.4*. The final of these studies estimates that the number of neglected mining occurrences in Australia may be even higher than the 50,000 figure identified in 2012, stating that the true number may be more than 75,000 sites nationally. See *Supplementary Submission 74.4*, p. 2.

instance, Ms Georgie Spreadborough gave evidence to the committee regarding the Mt Oxide abandoned copper mine site, which is located on the property her family has owned in Northern Queensland since the 1900s. Ms Spreadborough stated that the mining lease had been surrendered to the Queensland Government by the tenement holder in 1999, and that despite some initial remediation works being undertaken since 2008, significant environmental impacts are still occurring.[10] Ms Spreadborough told the committee that these effects are particularly significant after heavy rainfall events that cause a river downstream from the site to start 'running blue' due to contamination:

> When we have an event and it flows down the creek, there are no fish. The frogs, the fish—everything—dies. We have some purple-necked wallabies that live on a rock face and actually drink that water. I do not know how they are still alive. I'm not sure what it is doing to the trees, but, certainly, the fish, frogs and things just die… Any birds that land in the [mine] pit—they are dead… You could go down there and you might see 10 or 20—pelicans and others. And you do not really know because it is so acidic. It would just eat them.[11]

5.10 Mr David Morris spoke of the community impacts of abandoned mine sites in the Northern Territory, referencing in particular the Redbank copper mine:

> My experience with legacy mines is that they leave an enormous trust deficit in the communities that deal with them. That's a negative because at the moment people have poor experiences with development. But it's also a really big risk, I think, for future developments of any kind in remote areas of the Northern Territory because when you bring a proposal to that community, you are faced with the trust deficit that arises from a previously unplanned inappropriately funded rehabilitation. The best example I can give to the committee of that is the Redbank copper mine, which has been described as leaving the river areas around it devoid of life. You can imagine the pain and suffering that is occasioned by not being able to fish or to use for all manner of traditional purposes the rivers that your ancestors have for thousands for years.[12]

5.11 The impact of poorly rehabilitated abandoned mines on Indigenous communities is explored further in Chapter 7.

Liabilities associated with abandoned mines

5.12 Abandoned mines represent significant liabilities for state and territory governments, which are ultimately responsible for the costs associated with safety and environmental hazards resulting from these sites. While no definitive costings are available at a national level, the committee heard evidence that the cost of rehabilitating all major abandoned mine sites in Australia would run into billions of

10 *Committee Hansard*, 12 July 2017, pp. 25–29.

11 Ms Georgie Spreadborough, *Committee Hansard*, 12 July 2017, p. 29.

12 Mr David Morris, Private Capacity, *Committee Hansard*, 30 October 2017, p. 2.

dollars.[13] The liabilities associated with these sites are not consistently accounted for across Australia, and as such may be underreported.[14]

5.13 Ms Corinne Unger argued that due to the inconsistency in reporting on liabilities from abandoned mines across different jurisdictions in Australia, the Commonwealth Accounting Standards need to be reviewed to ensure that these liabilities are accounted for clearly and consistently:

> Accounting standards must require liability accounting for abandoned mines. That needs to happen at a national level for those responsibilities there to be brought in under the contaminated land legislation and registers and at a state level. While we are not accounting for those liabilities, it is easy to avoid them, and then they become simply reactive responses… This relatively ad hoc approach is very immature when it comes to managing abandoned mines.[15]

5.14 Professor David Mulligan of the Centre for Mined Land Rehabilitation at the University of Queensland commented similarly:

> Full liability accounting is needed to ensure governments understand the scale of abandoned mine [and] mining legacies across jurisdictions. This forms the basis for development of policies and well-focussed programs, engaging appropriate expertise and preparing progress reports on performance[.][16]

Leading practice approaches to managing abandoned mines

5.15 Ms Corinne Unger provided the committee with a conceptual diagram of what an ideal management program would look like for an abandoned mine (Figure 5.1).

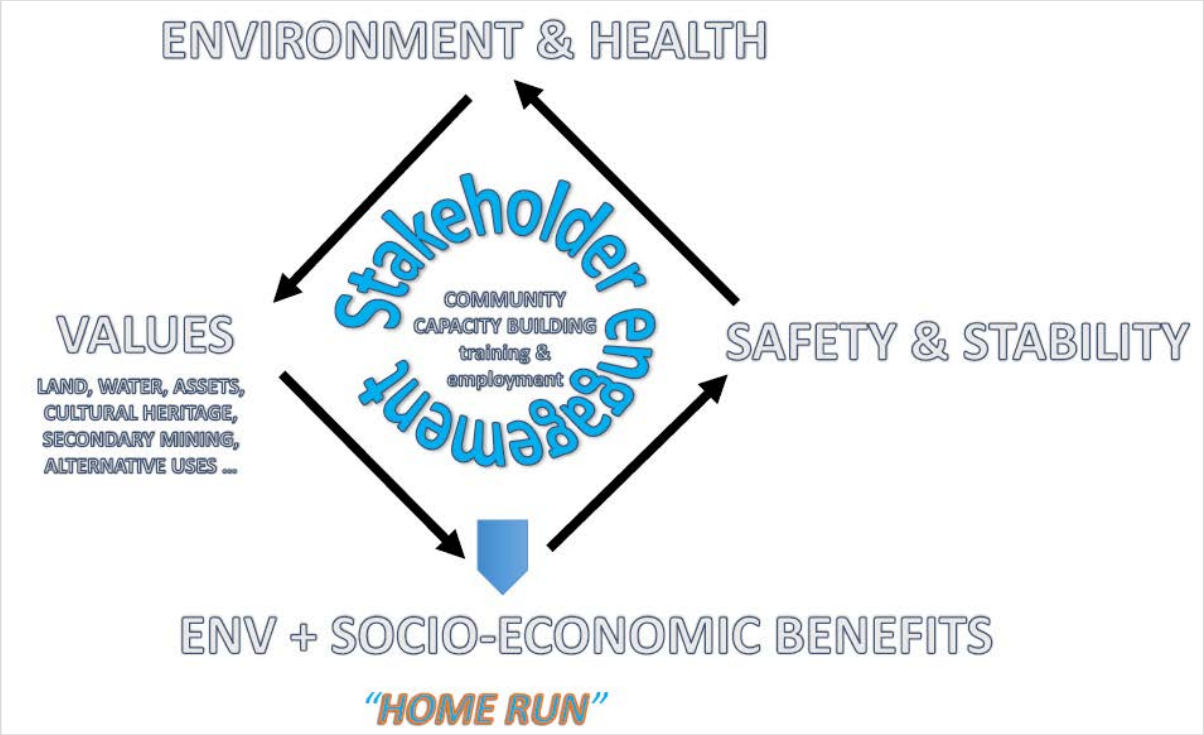
13 Mr Rick Humphries, Campaign Coordinator, Lock the Gate Alliance, *Committee Hansard*, 12 July 2017, pp. 32 and 41.

14 See: Corinne Unger, *Submission 37*, pp. 4–5.

15 *Committee Hansard*, 12 July 2017, p. 11; *Submission 37*, pp. 5–6.

16 *Submission 40*, p. 5.

Figure 5.1: Abandoned mine management components[17]



5.16 Ms Unger described such a program as follows:

> When addressing an abandoned mine, safety and stability are primary concerns and issues that have to be addressed. Often, then, you can progress onto the environmental and health aspects—if they are polluting or if they are causing any human health aspects. Then there are also values… In those values, there are land, water, assets, cultural heritage, secondary mining opportunities and alternative uses. The idea is that, throughout that process, if stakeholders are engaged in that process, you effectively have community capacity building, training and employment opportunities and, often, partnership arrangements. I call it the home run: if you have all of those things combined in a really coherent project and you end up with environmental and socioeconomic benefit.[18]

5.17 Ms Unger pointed to the British Columbia Crown Contaminated Sites Program as an example of an effective abandoned mines program, with features including:

- a clear government policy on abandoned mines, outlining the principles by which contaminated sites are to be managed;
- clear risk assessment processes for assessing and prioritising sites;
- full accounting for liabilities arising to the state from contaminated sites; and

17 Source: Corinne Unger, 'Legacy Issues and Abandoned Mines', in *Mining in the Asia-Pacific: Risks, Challenges and Opportunities* (O'Callaghan and Graetz Eds.), Springer International Publishing, 2017, pp. 333–369.

18 Ms Corinne Unger, Private Capacity, *Committee Hansard*, 12 July 2017, p. 9.

- a clear inventory of identified contaminated sites, with publicly available information on the status of works at each site.[19]

Approaches to abandoned mines taken by Australian jurisdictions

5.18 The following section summarises the approaches taken by state and territory governments in managing the risks posed by abandoned mines in Australia, and discusses the role of the Commonwealth Government and cross-jurisdictional initiatives in this area.

Queensland

5.19 The Queensland Government operates an Abandoned Mine Lands Program, which is administered by the Department of Natural Resources, Mines and Energy (DNRME) and assesses abandoned mine sites in order to reduce significant public health and safety risks. According to its website, the program:

- manages impacts from major abandoned mine sites including Mount Morgan;
- delivers mine shaft repair programs in the historic gold mining towns of Charters Towers and Gympie;
- manages responses relating to subsidence issues at Collingwood Park, a suburb in Ipswich that is underlain by two decommissioned underground coal mines;
- undertakes progressive assessment and close-out of public safety risks at smaller mine sites across Queensland; and
- provides an emergency first response with specialised technical expertise for newly reported issues on abandoned mine sites, such as historic mine shaft collapses and mine subsidences.[20]

5.20 In the 2016–17 state budget, the Queensland Government provided $42 million in funding to the Abandoned Mine Lands Program over five years.[21]

5.21 The Queensland Government released a Discussion Paper in May 2018 entitled *Achieving improved rehabilitation for Queensland: addressing the state's abandoned mines legacy*.[22] The discussion paper notes that there are approximately 120 priority abandoned mine sites in Queensland, and proposes a range of legislative and policy changes to the way abandoned mines are classified, prioritised for

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19 Ms Corinne Unger, *Committee Hansard*, 12 July 2017, p. 9. See also: British Columbia, *Crown Contaminated Sites Program: 2016 Biennial Report*, June 2016.

20 Queensland Government, 'Abandoned Mine Lands Program (AMLP)', https://www.qld.gov.au/environment/land/abandoned-mines/program (accessed 7 August 2018).

21 The Hon Dr Anthony Lynham, Queensland Minister for Natural Resources and Mines, 'Budget boosts abandoned mine clean-up effort', *Media Release*, 13 June 2016.

22 Queensland Government, *Achieving improved rehabilitation for Queensland: addressing the state's abandoned mines legacy*, May 2018, https://www.treasury.qld.gov.au/growing-queensland/improving-rehabilitation-financial-assurance-outcomes-resources-sector/ (accessed 7 August 2018).

remediation works, and managed. Queensland Treasury's website states that the issues raised in the paper 'continue to be progressed', with further information on initiatives arising from the paper to be made available 'once the appropriate policy approvals have been obtained'.[23]

Western Australia

5.22 Western Australia's Abandoned Mines Program was created in 2013, alongside a new financial assurance system for the mining industry in the state, the Mining Rehabilitation Fund (discussed further in Chapter 6). The program provides a framework for identifying and prioritising the management and rehabilitation of abandoned mines in Western Australia, underpinned by an *Abandoned Mines Policy* released in January 2016. This policy states:

> The reality is that it is neither practical nor desirable to rehabilitate all abandoned mine sites in WA. Availability of funds will result in the works being undertaken over many years. Therefore a policy is required to establish the principles that should be used in making decisions about the management and/or rehabilitation of these sites.
>
> Management decisions regarding abandoned mine sites need to balance risk, costs and benefits to both the environment and the WA community, and also recognise the varying values of abandoned mines. Every site will need to be considered individually, with management and/or rehabilitation undertaken in a landscape context.[24]

5.23 As at the end of the 2017 financial year, there were five projects in the program—one site which was abandoned after the introduction of the Mining Rehabilitation Fund (MRF), and four historic sites:

> The Ellendale Diamond Mine was abandoned in 2015 and was the first site where works were undertaken using the funds from the principal of the MRF. Ellendale continues to be managed in care and maintenance whilst DMIRS is undertaking an Expression of Interest process to have mining recommence at the site.
>
> There are four historical abandoned mine sites identified as pilot sites for rehabilitation funded from the interest generated on the MRF: Black Diamond Pit Lake, Pro-Force Plant Site, Bulong Nickel Tailings Storage Facility and the Elverdton Dumps.
>
> Two of the pilot Sites, Black Diamond and Pro-Force, were successfully completed during the 2016–17 financial year… Planning has commenced on the last two pilot projects – Bulong and Elverdton.[25]

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23 Queensland Treasury, 'Improving rehabilitation and financial assurance outcomes in the resources sector', https://www.treasury.qld.gov.au/growing-queensland/improving-rehabilitation-financial-assurance-outcomes-resources-sector/ (accessed 14 January 2019).

24 Government of Western Australia, *Abandoned Mines Policy*, January 2016, p. 1.

25 Western Australia Department of Mines, Industry Regulation and Safety, *Mining Rehabilitation Fund Yearly Report 2017*, pp. 6–7.

5.24 Dr Phil Gorey, Acting Deputy Director-General, Resource and Environmental Regulation, Western Australian Department of Mines, Industry Regulation and Safety, commented on the projected scope of the works program to be undertaken into the future in Western Australia:

> Our view is that the interest that's generated from the MRF as it builds up will generate in the order of $10 million or more in interest [each year] available for abandoned mine sites. Our view would be that that will be sufficient to deliver a realistic program of rehabilitation, because managing projects beyond that scale presents further challenges for government. That would be a realistic program that we thought we could deliver.[26]

5.25 Dr Gorey explained that one benefit of the structure of the MRF is that it enables long term planning for site works:

> [W]hile we've talked about something like $10 million interest being generated out of the fund every year, that really is every year. That's $10 million this year, $10 million next year and so forth. With the rehabilitation of mine sites, one of the issues that some of the other jurisdictions may have when they're relying on, essentially, funding from central government, is that the funding cycles for those are often around three years or five years, if you're lucky. Trying to manage closing a mine site in five years is extremely challenging. What we're able to do with the MRF, because we have this perpetual fund, is plan and deliver what we would say would be more cost-effective outcomes of closure, because we know we will actually have money over the next 10 years, if that's what it takes to close a mine site.[27]

Northern Territory

5.26 Abandoned mine sites in the Northern Territory are managed through the Legacy Mines Program, established in 2014. The Northern Territory Government advised that the program has a statutory responsibility 'for the identification, assessment, investigation, prioritisation, management and remediation of environmental harm caused by unsecured mining activities'.[28] It stated further that its efforts utilise 'a multidisciplinary approach to rehabilitation planning, relying on expert scientific advice, innovative mine remediation technology, international leading practice and genuine engagement with stakeholders'.[29]

5.27 In 2013 the Northern Territory Government introduced a Mining Rehabilitation Levy on current mining operators to provide funds to help deal with legacy sites. Under this arrangement a one per cent levy is imposed on operators, based on the value of the rehabilitation security held for their authorised sites. The funds collected through this levy are in a statutory Mining Remediation Fund, to be

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26 *Committee Hansard*, 7 March 2018, p. 49.

27 *Committee Hansard*, 7 March 2018, p. 49.

28 *Submission 53*, p. 2.

29 Northern Territory Government, *Submission 53*, p. 2.

used by the Department of Primary Industry and Resources to minimise or rectify environmental harm caused by unsecured mining activities.[30] Mr Michael Fawcett, Director, Mining Remediation Division at the Department of Primary Industry and Resources, explained further to the committee:

> Since it has been introduced it now applies to all securities we hold. It is a one per cent levy on the security and it is paid annually in cash. For example, a $100 million security attracts a $1 million levy payment per annum. It goes to the Mining Remediation Fund, which currently is holding a balance of approximately $16 million.[31]

5.28 Mr Fawcett noted that a high-level estimate of the cost to fully remediate all legacy sites in the Northern Territory is around $1 billion, covering approximately 40 sites with legacy aspects.[32] Mr Fawcett commented further on the role of the Mining Remediation Fund in this context:

> Based on the current level of securities, [the Mining Remediation Fund] is taking in approximately $14 million a year. I don't think it was ever the intent that it is going to wipe all of these legacies off the face of the earth, but it provides a tool to manage, and perhaps to manage impacts more than complete remediation of sites.[33]

5.29 Sites currently subject to rehabilitation activities under the Legacy Mines Program include the Redbank copper mine in the Gulf region near the QLD/NT border, and various historical sites near Tennant Creek.[34]

5.30 The Northern Territory Government's submission noted that the Department of Primary Industry and Resources is currently developing a 5-year Legacy Mines Strategic Plan to provide a framework to enable the rehabilitation of legacy mines to be prioritised.[35] This includes finalising a comprehensive inventory of all legacy sites in the Northern Territory to help prioritise future works.[36]

5.31 As noted in Chapter 3, the Northern Territory Government is also undertaking planning activities under a partnership agreement with the Commonwealth Government for rehabilitation activities at the former Rum Jungle uranium mine.

New South Wales

5.32 NSW's Derelict Mines Program (DMP) is administered by the NSW Department of Industry, and aims to:

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30 *Submission 53*, p. 2.

31 *Committee Hansard*, 30 October 2017, p. 37.

32 *Committee Hansard*, 30 October 2017, pp. 37 and 41.

33 *Committee Hansard*, 30 October 2017, p. 37.

34 Mr Michael Fawcett, Director Mining Remediation Division, Northern Territory Department of Primary Industry and Resources, *Committee Hansard*, 30 October 2017, p. 38.

35 *Submission 53*, p. 2.

36 Mr Michael Fawcett, Director, Mining Remediation Division, Northern Territory Department of Primary Industry and Resources, *Committee Hansard*, 30 October 2017, p. 38.

- reduce or eliminate risks to public health, safety and the environment;
- stabilise and prevent further degradation of derelict mine sites; and
- remove or contain contamination or sources of nuisance at their source and prevent them from spreading.[37]

5.33 The DMP prioritises expenditure of allocated funds by considering a variety of matters including public safety and environmental risks posed by a given mine, as well as cost effectiveness of proposed remediation works.[38] The program has been operating since 1974, with a funding allocation for works in the 2016–17 financial year of $3.3 million.[39]

5.34 The DMP does not have any statutory or legislative responsibility to remediate sites, and operates on an *ex gratia* basis without assuming responsibility for abandoned sites as a result of expending funds on remedial works.[40] It allocates funding only after all other avenues have been exhausted at a site.

Tasmania

5.35 Tasmania has had an abandoned mines program in place since 1996, which works to rehabilitate legacy mining sites according to priority criteria, including:

- removing risks to health and safety;
- stabilising sites and reducing erosion impacts;
- maintaining or increasing biological diversity; and
- ameliorating contamination of sites.[41]

5.36 A proportion of mining company royalties is paid into the Rehabilitation of Mining Lands Trust Fund to fund this program.[42] Ms Jennifer Parnell, Manager, Scientific Services at Mineral Resources Tasmania, informed the committee that the trust fund has facilitated rehabilitation work on 60 mining legacy sites across Tasmania since its inception, and identifies its work plan based on its budget of $150,000 in funding per annum.[43] Ms Parnell noted that this program at its current

37 NSW Government, 'Derelict Mines Program', https://resourcesandgeoscience.nsw.gov.au/landholders-and-community/minerals-and-coal/derelict-mines-program (accessed 6 August 2018). Secondary aims of the program are listed as being to: optimise beneficial reuse of derelict mine sites; encourage native plant and animal life; conserve items of significant heritage value; and improve visual amenity.

38 NSW Government, 'Derelict Mines Program' (accessed 6 August 2018).

39 NSW Government, 'Derelict Mines Program', (accessed 6 August 2018).

40 NSW Government, *Derelict Mines Program Policy*, February 2016, p. 2, available at https://resourcesandgeoscience.nsw.gov.au/landholders-and-community/minerals-and-coal/derelict-mines-program (accessed 7 August 2018).

41 Government of Tasmania, *Submission 68*, p. 3.

42 The Australia Institute, *Submission 13*, Attachment 1, p. 47.

43 *Committee Hansard*, 12 October 2017, pp. 34, 37–38.

scale is directed towards undertaking works on priority sites in Tasmania, rather than aiming to rehabilitate all legacy mine sites in the state.[44]

Victoria

5.37 In Victoria, historical mines are not subject to the regulatory framework under which current mines operate. The Victorian Government stated in its submission that several government agencies collaborate on the rehabilitation of historical sites on Crown land 'on a case-by-case, public risk basis', while historical sites on private land are deemed to be the responsibility of the landholder.[45] It stated further:

> Current management for historical sites primarily focuses on mine shafts. [The Department of Environment, Land, Water and Planning] and [Parks Victoria] actively manage sites which are assessed as posing a significant risk to the public. Each site is assessed and subsequently managed by a variety of means including fencing, back filling, capping or installation of grates. Brochures and warning signs are used to alert visitors to hazardous areas, as relevant.[46]

5.38 Additionally, it listed a number of projects aimed at dealing with contaminated land as a result of historical mining activity, including:

- identification of contaminated sites within the city of Bendigo under the Bendigo Former Mine Land Project;
- a project to identify potentially contaminated water bodies within the Loddon Mallee Region; and
- an $8 million contaminated sands project undertaken by Parks Victoria and the Victorian Environment Protection Authority in Derwent Gully (on the outskirts of Bendigo).[47]

South Australia

5.39 The South Australian Government's submission to the inquiry did not specifically mention programs relating to abandoned mines.[48] According to analysis undertaken by the Australia Institute in 2017, South Australia does not have a formal program for dealing with abandoned mines in the state. However, where an abandoned mine is causing an environmental impact 'a case may be made to spend money on preventing this environmental damage, but as this would require Government funding such cases are very rare'.[49]

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44 *Committee Hansard*, 12 October 2017, p. 38.

45 *Submission 67*, p. 13.

46 Government of Victoria, *Submission 67*, p. 13.

47 Government of Victoria, *Submission 67*, pp. 13–14.

48 South Australian Government, *Submission 58*.

49 The Australia Institute, *Submission 13, Attachment 1*, 'Dark side of the boom: what we do and don't know about mines, closures and rehabilitation', April 2017, p. 38.

Commonwealth involvement in abandoned mines rehabilitation

5.40 As noted in Chapter 2, the Commonwealth is currently working with the Northern Territory Government in a Partnership Agreement to fund planning activities for proposed rehabilitation at the Rum Jungle former uranium mine, due to the Commonwealth's historical ownership and responsibility for that mine.

5.41 Beyond this involvement in former uranium sites in the Northern Territory, the Commonwealth has little direct regulatory responsibility in relation to abandoned mines in Australia. The Commonwealth does take a role, however, in working with state and territory governments on issues relating to abandoned mines, through ministerial forums and other processes undertaken through the Council of Australian Governments (COAG).

5.42 In 2010, the Commonwealth Government facilitated the production of a guidance document, the *Strategic Framework for Managing Abandoned Mines in the Minerals Industry* (Strategic Framework), through a collaborative process involving the then Ministerial Council on Mineral and Petroleum Resources and the Minerals Council of Australia.[50] The Strategic Framework noted that each state and territory has developed its own approach to managing abandoned mine sites, and stated that its aim is to 'promote convergence of these approached across jurisdictions' to address issues such as:

- site inventories and site data management;
- improved understanding of liability and risk relating to abandoned mines;
- improved performance reporting;
- the standardisation of processes and methodologies; and
- knowledge and skill sharing across jurisdictions.[51]

5.43 The Strategic Framework acknowledged that management of abandoned mines 'is a complex task requiring government, community and industry involvement and cooperation'. It stated further:

> Management options vary and are largely dependent on risks, resources available for rehabilitation and the desired end land use. A site may be rehabilitated to as close as possible to the original environment, but other rehabilitation options include making sites available for an agricultural land use, or considering for adaptive reuse, such as a heritage precinct or a waste management facility. Possible options will depend on the nature and location of the site.
>
> The challenge for managers is to find innovative solutions for protecting the multiple values of abandoned sites, while ensuring that risks to public safety and the environment are managed appropriately. A particular

50 Ms Corinne Unger, *Submission 37*, p. 3.

51 Ministerial Council on Mineral and Petroleum Resources, *Strategic Framework for Managing Abandoned Mines in the Minerals Industry*, 2010, p. 7, available at https://industry.gov.au/resource/Mining/Pages/Legacy-Mines.aspx (accessed 6 June 2018).

> challenge for abandoned mines management is to implement effective rehabilitation with limited resources. It is important to promote innovation and share experiences of success and failure.[52]

5.44 Current cross-jurisdictional activities in the area of abandoned mines are now undertaken under the auspices of the Resources Policy and Engagement Working Group of the COAG Energy Council. As noted in Chapter 2, this working group facilitated a workshop on mine rehabilitation and abandoned mines in May 2016 attended by government, industry, academic and community representatives. Following this workshop, the working group 'agreed to review leading practice approaches to data collection and management; risk assessment; site prioritisation; and management of legacy mines'.[53] The results of this review were due to be presented to Energy Council Ministers in March 2018;[54] however, that timeline has now been postponed until 'early 2019'.[55]

Stakeholder views on the regulation of abandoned mines in Australia

5.45 Submitters and witnesses identified a number of challenges associated with regulating the management of abandoned mines in Australia. These included:

- an absence of regulatory standards in relation to abandoned mines, resulting in the management of these sites falling into a 'regulatory black hole' outside of the frameworks that govern operating mines;
- a lack of coordination between government agencies, most commonly where the mines or industry department and the environmental regulator in a jurisdiction do not work as effectively as they could to regulate and manage abandoned mines;
- regulatory arrangements that make it difficult for abandoned mine sites to be used for secondary purposes; and
- a lack of funding for abandoned mines programs.[56]

Inconsistency in regulatory standards applied to abandoned mines

5.46 The absence of a responsible party in the case of abandoned mine sites means that decisions on when to undertake up rehabilitation activities at a site, and the extent of those activities, are largely discretionary on the part of state and territory

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52 Ministerial Council on Mineral and Petroleum Resources, *Strategic Framework for Managing Abandoned Mines in the Minerals Industry*, 2010, p. 7.

53 Department of Industry, Innovation and Science, *Submission 55*, pp. 6–7.

54 Mr Josh Cosgrave, Acting General Manager, Onshore Minerals Branch, Department of Industry, Innovation and Science, *Committee Hansard*, 14 February 2018, pp. 6–7.

55 Department of Industry, Innovation and Science, Answers to written questions on notice received on 31 August 2018 arising from a public hearing in Canberra on 14 February 2018, p. 2.

56 Ms Corinne Unger, Private Capacity, *Committee Hansard*, 12 July 2017, pp. 9–10; Professor David Mulligan, *Submission 40*, p. 5; Environmental Defenders Offices of Australia, *Submission 24*, pp. 11–12.

governments. Ms Revel Pointon from the Environmental Defenders Office Queensland commented that at the state level:

> …abandoned mines are not subject to regulation that requires environmental remediation by the government, which is a huge loophole… There is no actual regulation of environmental harm around abandoned mines, which can be significant.[57]

5.47 Ms Pointon stated that community members have limited options available to them in seeking protection from poor rehabilitation outcomes:

> There are very few powers that the community can seek to protect the environment or their communities where rehabilitation is not adequately undertaken, particularly for abandoned mines. For example, many community members have contacted our office around the Mount Morgan Mine because they are concerned about the risk that their communities and environment face from the tailings dam of that mine—an abandoned mine site. However, once a mine is actually abandoned, there's very little right for the citizens to force the government to take action to adequately rehabilitate the site and remove the environmental and community impacts that are posed by it.[58]

5.48 At the Commonwealth level, any mine sites that were abandoned prior to the introduction of the *Environmental Protection and Biodiversity Conservation Act 1999* are not subject to regulation or monitoring under that Act.[59] As such, there is no recourse at a federal level for environmental contamination arising from historical abandoned mine sites.

5.49 Ms Corinne Unger argued that regulatory practice needs to be reviewed so that current environmental standards which apply to operating mines can be applied to abandoned mines.[60] Ms Unger pointed to regulation in Canada, which includes a requirement for sites to be regulated according to environmental standards, irrespective of whether mining companies or governments are responsible for managing contamination at sites.[61]

5.50 Ms Unger commented further at the committee's Brisbane public hearing:

> At the moment, because [the EPBC Act], [National Environment Protection Measures] and so on are not being applied, there is something fundamentally wrong about the management of these sites which makes them discretionary or ad hoc. There needs to be something at EPBC [Act] level which just draws a line in the sand—'From now on, if there's a site that hits a trigger, whether it be for water quality or whatever, or it's in close

57 *Committee Hansard*, 12 July 2017, p. 48.

58 Ms Revel Pointon, Solicitor, Environmental Defenders Office Queensland, *Committee Hansard*, 12 July 2017, p. 44.

59 Department of the Environment and Energy, *Submission 1*, p. 2.

60 *Submission 37*, p. 6. See also: Professor David Mulligan, *Submission 40*, p. 5.

61 *Submission 37*, p. 10.

> proximity to or draining into sensitive national areas.' There must be some sort of trigger that forces the site to undergo a systematic investigation and reporting. Then, from that point, you could plan something, but there's absolutely no trigger at the moment to go and study these sites properly.[62]

Funding of abandoned mines programs

5.51 The committee heard evidence that the level of funding provided to state and territory abandoned mines programs is insufficient to properly rehabilitate these sites around Australia.[63] Mr Rick Humphries of the Lock the Gate Alliance argued that all the state-based abandoned mines programs will lead to incremental improvements in outcomes but will 'come well shy of what is needed' to fully address the problems associated with abandoned mines.[64]

5.52 Professor David Mulligan of the Centre for Mined Land Rehabilitation at the University of Queensland commented:

> The very existence of these sites for which governments have responsibility present[s] a constant and high risk from a public safety, health and liability perspective. The identified need to address the multiple and complex issues these sites present is well understood by government officers in the relevant departments that have the responsibility for their management, but lack empowerment to effectively manage and attempt to reduce the risks present at these sites due to a lack of allocated funding. A variety of funding models have been proposed and/or implemented over the years across the different State/Territory jurisdictions, but the issues and legacies of these blights from history remain. Our inability to effectively manage the multi-layered, multi-disciplinary risks continues to be a major concern that just keeps being spoken about without action.[65]

5.53 Submitters and witnesses made several suggestions about how funding for abandoned mines programs in Australia could be increased, including:

- introducing a temporary per-tonne levy for the mining industry in order to build up a significant pool of funds to address abandoned mines legacy impacts;[66]

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62 *Committee Hansard*, 12 July 2017, p. 17.

63 See, for example: Mr Michael McCabe, Coordinator, Capricornia Conservation Council, *Committee Hansard*, 12 July 2017, p. 59 (in relation to Mt Morgan mine in QLD); Ms Rhonda Yates, Manager, Minerals and Energy, Northern Land Council, *Committee Hansard*, 30 October 2017, p. 6.

64 Mr Rick Humphries, Coordinator, Mine Rehabilitation Reform Campaign, Lock the Gate Alliance, *Committee Hansard*, 30 October 2017, p. 32.

65 *Submission 40*, p. 5.

66 Mr Rick Humphries, Coordinator, Mine Rehabilitation Reform Campaign, Lock the Gate Alliance, *Committee Hansard*, 30 October 2017, p. 32.

- hypothecating a small percentage of the mining royalties received by governments to create a fund to start rehabilitating the worst abandoned mine sites;[67] and
- increasing direct funding from the Commonwealth Government to the states and territories to assist in the rehabilitation of abandoned mine sites.[68]

Coordinating national responses to abandoned mines

5.54 The Lock the Gate Alliance submitted that there 'have been numerous attempts to create a national response to the abandoned mines situation' in Australia, including a 2012 forum hosted by the Sustainable Minerals Institute at the University of Queensland that brought a range of industry, government, academic and non-government stakeholders together.[69]

5.55 Professor David Mulligan noted that this forum delivered several key themes, including recognising that abandoned mine management is a critical social and environmental responsibility in Australia. Professor Mulligan noted that potential partnership opportunities exist which could support the implementation of the Strategic Framework, although there has been no progress on developing an Implementation Plan for the Strategic Framework since its release in 2010.[70]

5.56 Ms Corinne Unger commented on the process underpinning the creation of the Strategic Framework in 2010, and subsequent developments:

> The abandoned mines working group which developed this framework created it over 5 years, after which, the Australian government withdrew its support for the working group. They were encouraged to continue to meet by the Australian government, however in the absence of Australian government leadership and administrative support this did not occur. Clearly for a strategic framework to be implemented there needs to be leadership and long term continuity. There are also other stakeholders who need to be involved for effective outcomes.[71]

Canadian model of jurisdictional cooperation

5.57 Several submitters and witnesses drew the committee's attention to the National Orphaned/Abandoned Mine Initiative (NOAMI) operating in Canada, as an

67 Mr Charles Roche, Executive Director, Mineral Policy Institute, *Committee Hansard*, 7 March 2018, p. 16.

68 Greenpeace Australia Pacific, *Submission 25*, p. 8.

69 *Submission 9*, pp. 21–22. See also Professor David Mulligan, *Submission 40*, p. 5.

70 *Submission 40*, p. 5.

71 *Submission 37*, pp. 3–4.

example from which Australia could learn lessons in creating a coordinated national response to abandoned mines. [72]

5.58 The NOAMI initiative was established in 2002, and is a national multi-stakeholder partnership guided by an Advisory Committee that 'brings together representatives from the Canadian mining industry, federal, provincial and territorial governments, non-government organisations and Aboriginal Canadians'.[73] The Advisory Committee takes direction from Canadian mines ministers and reports their progress to these ministers annually.

5.59 NOAMI's role is to examine the legislative, policy and program framework in Canada for addressing issues associated with orphaned and abandoned mines, and make recommendations for improvement.[74] It does not directly clean up abandoned mine sites. NOAMI's activities are jointly funded by Canada's federal government, provincial and territorial governments, the Mining Association of Canada and the Prospectors and Developers Association of Canada. It is administered by a secretariat in the federal department Natural Resources Canada.[75]

5.60 NOAMI has worked to progress various issues in relation to abandoned mines in Canada, including implementing a national inventory of orphaned and abandoned mines, and releasing a series of best practice reports examining issues relating to mine relinquishment and long-term stewardship issues.[76]

5.61 Ms Corinne Unger commented that the success of the NOAMI model is predicated on the national government taking a leadership role in the process, without taking the responsibility for program implementation from the states.[77] Ms Unger argued that if a similar initiative was implemented in Australia it could serve to connect knowledge across jurisdictions and save 'reinvention of the wheel in each state' as well as building on the collective challenges face.[78]

5.62 Various other submitters and witnesses also expressed support for the establishment of a national abandoned mines commission or similar initiative, led by

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72 See, for example: Lock the Gate Alliance, *Submission 9*, p. 3; Australasian Institute of Mining and Metallurgy, *Submission 11*, p. 4; Hunter Communities Network, *Submission 19*, p. 3; Greenpeace Australia Pacific, *Submission 25*, p. 11; Mr Charles Roche, Executive Director, Mineral Policy Institute, *Committee Hansard*, 7 March 2018, p. 17.

73 Keith Cunningham, 'Canada's National Orphaned/Abandoned Mines Initiative', *AUSIMM Bulletin*, June 2017, p. 38, available at http://www.abandoned-mines.org/en/document/publication/ (accessed 12 June 2018).

74 Keith Cunningham, 'Canada's National Orphaned/Abandoned Mines Initiative', *AUSIMM Bulletin*, June 2017, p. 38.

75 Keith Cunningham, 'Canada's National Orphaned/Abandoned Mines Initiative', *AUSIMM Bulletin*, June 2017, p. 38.

76 Keith Cunningham, 'Canada's National Orphaned/Abandoned Mines Initiative', *AUSIMM Bulletin*, June 2017, pp. 38–40.

77 *Committee Hansard*, 12 July 2017, p. 10.

78 *Committee Hansard*, 12 July 2017, p. 14.

the Commonwealth Government.[79] The Australian Institute of Mining and Metallurgy (AusIMM) argued that the formation of a multi-stakeholder advisory panel, similar to the NOAMI model, would benefit Australia, mining industry professionals and the environment by 'facilitating socially, environmentally and economically sustainable rehabilitation and beneficial post-mining land uses for these legacy sites'.[80]

5.63 The Northern Territory Government's submission noted that all Australian jurisdictions are facing significant challenges relating to the rehabilitation of abandoned mines, and suggested that the Commonwealth could take a greater coordinating role on these issues:

> The Commonwealth could investigate the development of a governance model such as [a national secretariat] to support the coordination of knowledge, research and policies between existing State and Territory abandoned mines programs. This would allow for a more collaborative and consistent approach to addressing the legacy of past mining practices and advance the objectives of sustainable development.[81]

5.64 Professor David Mulligan noted that a proposal to establish a National Abandoned Mines Hub had previously been developed in 2012:

> [The purpose of the proposed hub was] to assist in the implementation process of the national policy for abandoned mines, and to provide a platform for governments, industry and key stakeholder groups across Australia to engage in a dialogue about abandoned mines, to collaborate and share information to address negative legacies and explore opportunities for beneficial post-mining land uses.
>
> State/Territory parochialism and an inability to capture any government funding whatsoever for this initiative meant the establishment of such a hub did not progress.[82]

5.65 Mr Chris McCombe, Senior Adviser, Environment at the Minerals Council of Australia, expressed support for greater collaboration across jurisdictions in Australia, without necessarily supporting the adoption of the NOAMI model or a formal abandoned mines commission:

> I am supportive of collective action. With respect to the vehicle for that collective action, I don't think it needs to be as hard-nosed as an abandoned mines commission. People often refer to the National Orphaned/Abandoned Mines Initiative, NOAMI, in Canada. That is very much a collaborative approach between jurisdictions and the industry. Whilst that is suitable for Canada, there might be other collaborative-type approaches that could instead be implemented here in Australia. My understanding is, under the

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79 See, for example: Lock the Gate Alliance, *Submission 9*, p. 3; Hunter Communities Network, *Submission 19*, p. 3; Greenpeace Australia Pacific, *Submission 25*, p. 11; Mr Charles Roche, Executive Director, Mineral Policy Institute, *Committee Hansard*, 7 March 2018, p. 17.

80 *Submission 11*, p. 4.

81 *Submission 53*, p. 4.

82 *Submission 40*, p. 5.

> COAG Energy Council, the [Resources Policy & Engagement] Working Group is actually working through a process of bringing together various abandoned mine managers across the country to improve the way they do business and to share learnings. I think that is a really positive thing.[83]

5.66 Ms Unger expressed the view that while current COAG initiatives are encouraging, they are not the same as the implementation of a NOAMI-like model.[84] Speaking more broadly about the need for national coordination in relation to mine rehabilitation issues, Environmental Justice Australia expressed scepticism that existing COAG mechanisms are sufficient:

> A national coordination process needs to be more robust and more transparent than current dysfunctional National Environment Protection Council and COAG processes that, in the environmental area, is characterised by a lack of outcomes due to lack of commitment, and a need for consensus amongst State and Federal government.[85]

Leveraging value associated with abandoned mine sites

5.67 The committee heard evidence that in some cases existing or latent value present in abandoned mines can be realised as part of rehabilitation and management plans.

5.68 Dr Phil Gorey, Acting Deputy Director-General, Resource and Environmental Regulation, Western Australian Department of Mines, Industry Regulation and Safety, commented on Western Australia's approach:

> [T]hese abandoned [mine] features, while they present risks—safety and environmental risks are often those that are foremost in the minds of people—there are occasions where they can be considered assets as well. Some of these sites are valued tourist attractions; some of these are recreation areas; some of these have scientific value. In some cases what we talk about is not necessarily rehabilitating the abandoned mine site but addressing the environmental and safety risks at that site.[86]

5.69 Western Australia's Abandoned Mines Policy includes a principle that the 'potential historical, cultural, social, environmental, educational or economic value of an abandoned mine site should be considered when developing a management and/or rehabilitation plan'.[87]

5.70 Submitters noted that in some cases abandoned mine sites can be redeveloped for other productive uses. The former Kidston gold mine in northern Queensland was

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83 Mr Chris McCombe, Senior Advisor, Environment, Minerals Council of Australia, *Committee Hansard*, 12 July 2017, p. 72.

84 Ms Corinne Unger, *Submission 37*, p. 4.

85 Environmental Justice Australia, *Submission 26*,

86 *Committee Hansard* , 7 March 2018, pp. 48–49.

87 Government of Western Australia, *Abandoned Mines Policy*, January 2016, p. 6.

cited as a leading example.[88] This site is being redeveloped into a large scale hydro pumped storage project and solar farm, which will use the two large adjacent mining pits at the site as the upper and lower reservoirs for the proposed hydro-electricity project.[89]

Heritage values

5.71 The Government of Victoria stated in its submission that historical mine sites 'are often recognised as contributing to the heritage fabric' in localised areas, citing the Castlemaine Diggings National Heritage Park north of Melbourne as a particular example. It noted that there are over 300 historical mines managed under Victorian heritage legislation.[90]

5.72 Australia ICOMOS submitted that there are currently no overarching guidelines or best practice standards utilised in Australia in managing the heritage values of abandoned mines. It argued that there is a role for the Australian Government to be more proactive in this area, including by:

- ensuring that jurisdictions managing mine rehabilitation and closure of abandoned mines with significant heritage values have policies and programs for managing legacy sites which include the application of the *Burra Charter* to cultural heritage; and
- supporting a national multi-stakeholder working group to build capacity to manage the complex and challenging issues associated with heritage conservation and environmental and safety risks of abandoned mines.[91]

Ecological values

5.73 Greenpeace Australia Pacific noted that some abandoned mine workings had developed ecological value over time that should be maintained:

> [R]esearch has highlighted that some types of derelict mines can provide important habitats for the conservation of threatened species. An important consideration when it comes to the rehabilitation of abandoned mine sites is the preservation of ecological assets that have emerged since abandonment. An example of this is a number of endangered bat species that have taken up residence in abandoned mine shafts in south-east Australia. Derelict mines should be managed in order to improve subterranean bat habitats wherever possible (balancing this with the need to minimise risks to human safety).[92]

88 Closure Planning Practitioners Association, *Submission 3*, p. 6; Ms Robyn Charlton, *Submission 36*, p. 3.

89 Queensland Government, *Achieving Improved Rehabilitation for Queensland: Addressing the State's Abandoned Mines Legacy*, May 2018, p. 19.

90 *Submission 67*, p. 13.

91 Australia ICOMOS, *Submission 28*, p. 8.

92 Greenpeace Australia Pacific, *Submission 25*, p. 8.

Secondary mining and reprocessing operations at abandoned sites

5.74 The Strategic Framework noted in 2010 that some abandoned mine sites with previously uneconomic or unknown mineral resources 'have become economically viable mines through improved mining, exploration and metallurgical technologies'.[93] It cited the common example of the reprocessing of mine tailings into an economic resource, and stressed the importance of taking possible secondary mining opportunities into account when planning for the management or rehabilitation of abandoned sites.[94]

5.75 These possibilities were discussed by stakeholders to the inquiry. Mr Michael McCabe, Coordinator at the Capricornia Conservation Council, told the committee that the best hope for fully rehabilitating the Mount Morgan abandoned mine site in Queensland may rest on a proposal from a resources company to re-mine some of the minerals present at the site, while addressing the historical environmental impacts of the site over time.[95]

5.76 Professor David Mulligan commented in his submission that regulatory settings in Australian jurisdictions need to be adjusted to encourage initiatives like this:

> The potential opportunities for reprocessing and gaining 'wealth from waste' at sites like these, wealth that could be integrated and re-invested into the site itself to fund the rehabilitation more broadly [are] clearly there (and indeed recognised). However, in order for a small operator (or indeed even a larger company) to take on such opportunities, there needs to be policies and regulations introduced and approved that allow such re-engagement with a site and that allow the new operator to mine/remine without having to take on the whole historic liability of the site.[96]

5.77 The Minerals Council of Australia stated in its submission:

> Commercial solutions [for abandoned mines] should also be considered. Issues of legal liability could be addressed to open up potential exploration, mining and industry led rehabilitation of abandoned mines (including models that enable access to residual resources). Furthermore, innovative approaches to use abandoned mines for economic or community purposes should also be encouraged.[97]

5.78 One prominent successful example of a site where secondary mining operations are assisting in dealing with the environmental legacies of past operations is the Savage River mine in North-West Tasmania. The site had closed in 1996 with

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93 Ministerial Council on Mineral and Petroleum Resources, *Strategic Framework for Managing Abandoned Mines in the Minerals Industry*, 2010, p. 10.

94 Ministerial Council on Mineral and Petroleum Resources, *Strategic Framework for Managing Abandoned Mines in the Minerals Industry*, 2010, p. 10.

95 *Committee Hansard*, 12 July 2017, p. 59.

96 *Submission 40*, pp. 5–6.

97 *Submission 50*, p. 37.

significant environmental legacy issues outstanding following 30 years of open cut mining. The Tasmanian Government then reached an arrangement for a new operator to take over the site under an agreement that provided the new owners with indemnity against pollution caused by previous operations at the site, while simultaneously establishing the Savage River Rehabilitation Project (SRRP), under which the current site operators contribute to works addressing some of the historic legacies at the site.[98] This agreement was established via specific state legislation.[99]

5.79 The Tasmanian Government stated that the experience with the SRRP 'has proven that having a current operator on a mine where there are previous mining legacies greatly assists the Government in appropriately managing its environmental responsibilities' as well as providing opportunities for genuine collaboration in dealing with mining legacies.[100] Witnesses who gave evidence at the committee's public hearing in Burnie also commended the work being undertaken by the current site operators at Savage River, Grange Resources.[101]

Utilising industry knowledge and capability

5.80 The Minerals Council of Australia stated that opportunities exist to 'harness industry expertise in rehabilitation, closure and risk management' and use these to manage the impacts of abandoned mines. It argued that this could include:

- industry and government knowledge sharing and the use of industry expertise to advise on rehabilitation techniques;
- providing options for companies to link the rehabilitation of abandoned mines within a mining lease to offset requirements;
- bundling of rehabilitation into existing earthmoving contracts to reduce costs;
- local partnerships between industry and government on rehabilitation as part of enhancing social licence to operate; and
- practical partnerships between industry, government and the community for regional training and education.[102]

98 EPA Tasmania, 'Savage River Rehabilitation Project', https://epa.tas.gov.au/epa/water/remediation-programs/savage-river-rehabilitation (accessed 20 August 2018); Ministerial Council on Mineral and Petroleum Resources, *Strategic Framework for Managing Abandoned Mines in the Minerals Industry*, 2010, pp. 33–34.

99 Tasmanian Government, *Submission 68*, p. 4.

100 *Submission 68*, p. 4.

101 Dr Anita Parbhakar-Fox, Senior Research Fellow, ARC Transforming the Mining Value Chain Research Hub, University of Tasmania, *Committee Hansard*, 12 October 2017, pp. 9 and 10; Mr Scott Jordan, Campaigner, Bob Brown Foundation, *Committee Hansard*, 12 October 2017, p. 26.

102 *Submission 50*, pp. 36–37.

Chapter 6

Financial assurance mechanisms and reporting requirements

6.1 The ultimate cost of rehabilitating a mine is difficult to predict. Rehabilitation can occur over several decades or longer and is a costly process. Various factors will influence this cost for any given mine site, including the final landform use of the site and the standard of environmental rehabilitation required.

6.2 All jurisdictions in Australia have a system in place whereby governments extract financial assurance from mine operators that rehabilitation costs will be paid. These mechanisms are designed as a last resort measure to ensure that the state will not be left to foot the bill for site rehabilitation in the event that an operator is unable to meet its obligations.

6.3 Concerns have been raised in recent times about the adequacy of these mechanisms and the transparency with which they operate. This chapter outlines the various approaches taken by Australian jurisdictions, and assesses their adequacy in ensuring that rehabilitation liabilities do not ultimately fall to the taxpayer.

Approaches to financial assurance taken by Australian jurisdictions

6.4 A range of financial assurance mechanisms for mine site rehabilitation costs are utilised by state and territory governments in Australia. Most commonly, a system of bonds (either cash bonds or bank guarantees) raised for individual mine sites is utilised. This is the primary form of rehabilitation security used in New South Wales, Victoria, Tasmania, South Australia, Queensland and the Northern Territory.[1]

6.5 In recent years, Western Australia and the Northern Territory have modified their financial assurance systems to incorporate a pooled fund, whereby individual operators make contributions into a common fund which can then be drawn upon by the state or territory.[2] Queensland is also proposing reforms to its system of financial assurance that would include a pooled fund.

General features of bond-based financial assurance systems

6.6 The Minerals Policy Institute broadly described the bond instruments used as financial assurance for mine rehabilitation as follows:

> [A bond] is an agreed sum, which can be retained in full, or in part, in the event that mine closure requirements are not met. These funds then become available to the managing agency to implement successful closure. There are various types of bonds available, but simply put, bonds systems are an

1 See: Government of Tasmania, *Submission 68*, p. 3; NSW Government, *Improving Mine Rehabilitation in NSW: Discussion Paper*, November 2017, p. 7; South Australian Government, *Submission 58*, pp. 6–7; Government of Victoria, *Submission 67*, p. 8; Northern Territory Government, *Submission 53*, p. 1.

2 Department of Industry, Innovation and Science, *Submission 55*, p. 4.

> "upfront or gradual set-aside or guaranteeing of expected clean-up cost". Between the states and territories there is a diversity of bonds arrangements and exemptions, with a growing trend towards increasing bonds to 100% of estimated closure costs.[3]

6.7 The Minerals Council of Australia emphasised in its submission that security bonds are a safeguard of last resort, and do not remove mining companies' obligation to rehabilitate land, but rather are only drawn upon in exceptional circumstances when all other options to enable rehabilitation have failed.[4] It listed some common features of bond mechanisms used in Australian jurisdictions as follows:

- the bond must be lodged with government prior to the commencement of mining (and often in advance of final approval);
- the form of bond typically includes cash or a bank guarantee, which cannot be accessed by the company;
- the bond is intended to cover the forward liabilities for a mine over a defined period, usually aligned with the mine plan or operations;
- the bond amount is periodically reviewed and updated in line with changes to the mine plan and evolving rehabilitation methods;
- in some cases, a bond can be discounted based on an operator's good environmental performance or other social and economic factors; and
- bonds are returned to the company only once the regulator is satisfied rehabilitation targets have been achieved.[5]

6.8 Australian jurisdictions have varied approaches to setting the bond amounts required of mine operators. Some jurisdictions, including New South Wales, South Australia and the Northern Territory, have a policy of requiring that bond amounts cover 100 per cent of the estimated cost of rehabilitating the site.[6] Some jurisdictions, such as New South Wales, also have a policy of progressively returning part of the security bond held in relation to a project as progressive rehabilitation works are completed at the site.[7]

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3 Mineral Policy Institute, *Ground Truths: Taking Responsibility for Australia's Mining Legacies*, 2016, p. 29, included with *Submission 43*.

4 *Submission 50*, p. 16.

5 *Submission 50*, p. 16.

6 NSW Government, *Improving Mine Rehabilitation in NSW: Discussion Paper*, November 2017, p. 7; South Australian Government, *Submission 58*, pp. 6–7; Northern Territory Government, *Submission 53*, p. 1.

7 NSW Government, *Improving Mine Rehabilitation in NSW: Discussion Paper*, November 2017, p. 7.

Amount held by state and territory governments in rehabilitation securities

6.9 The Australia Institute stated in a 2017 discussion paper that Australian governments collectively hold around $10 billion in environmental bonds for mine rehabilitation liabilities.[8]

6.10 The committee heard further specific evidence of the quantum of financial securities held by state and territory jurisdictions, as follows:

- A representative of Queensland Treasury Corporation informed the committee that the state held $6.9 billion in financial assurance bonds as of July 2017, with a majority of this held in bank guarantees and some in cash bonds.[9]
- The Audit Office of New South Wales stated in May 2017 that the total value of security deposits held by the New South Wales Government was around $2.2 billion in 2016, covering around 450 mine sites in the state. This total has increased from around $500 million in 2005.[10]
- The Northern Territory Government held a total of $1.28 billion in mining securities as at March 2018 for the nine operational mine sites in the Northern Territory.[11]
- The Victorian Government held $477 million in bank guarantees and cash as rehabilitation bonds as of June 2017. This included seven major sites with bonds of more than $10 million each, accounting for over 73 per cent of the total bond amount held by the state.[12] In October 2017, the Victorian Government further increased the bond amounts held for the three major brown coal mines in the Latrobe Valley, bringing the total bonds for those three operations alone to $591 million.[13]
- The South Australian Government stated in its submission to the inquiry that, as at 30 December 2016, it held approximately $122.5 million in financial assurance bonds.[14]

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8 The Australia Institute, *Submission 13*, Attachment 1, p. 2.

9 Mr Adrian Noon, Special Advisor, Strategic Commercial Advisory, Queensland Treasury, *Committee Hansard*, 12 July 2017, p. 5.

10 NSW Audit Office, *Mining Rehabilitation Security Deposits*, May 2017, p. 2.

11 Northern Territory Department of Primary Industry and Resources, 'Mining Securities', March 2018, https://dpir.nt.gov.au/mining-and-energy/mines-and-energy-publications-information-and-statistics/authorised-mining-sites/mining-securities?utm_source=TractionNext&utm_medium=Email&utm_campaign=Insider-Subscribe-130917 (accessed 28 August 2018).

12 Government of Victoria, *Submission 67*, p. 8.

13 The Hon Jacinta Allen MP, Acting Victorian Minister for Resources, 'New Rehab Bonds for Latrobe Valley Coal Mines', *Media Release*, 6 October 2017. Updated figures for the total amount held in bonds for all sites in Victoria were not available at the time of writing.

14 South Australian Government, *Submission 58*, p. 7.

- Tasmania is reported to have held around $55 million in rehabilitation security bonds as of February 2016.[15]
- Western Australia held approximately $146 million in rehabilitation-related bonds as at June 2017, in addition to approximately $92 million in a separate mining rehabilitation fund (discussed further below).[16]

Pooled fund approaches to financial assurance

6.11 As noted above, Western Australia has adopted a financial assurance scheme based primarily on a pooled rehabilitation fund, and Queensland is proposing a model that also has a pooled fund as its central mechanism. The Northern Territory has taken an approach that is still primarily based on a system of bonds, with an additional pooled fund component. These approaches were discussed in some detail during the inquiry and are outlined below.

Western Australia

6.12 Western Australia adopted a financial assurance system based on a central Mining Rehabilitation Fund (MRF) in 2012. This system is explained in the Western Australian Government's submission to the inquiry as follows:

> The MRF is a statutory, government held fund that receives annual levy contributions from current mine site operators. It will ensure there is a perpetual funding source available to the Western Australian Government to respond to the environmental, safety and/or amenity impacts that may arise from mine site abandonment.[17]

6.13 The MRF levy payments for each operator are based on the risk level associated with the site and the area of disturbed land,[18] and are set at a rate of 1 per cent of the project's rehabilitation liability estimate in a given year.[19] All mine operators report their land disturbance and rehabilitation data annually, and this data is made publicly available.[20]

6.14 Under the MRF framework, the principal in the fund accumulated through levy payments can only be used to fund the rehabilitation of any new abandoned mines, while interest raised from the fund can be used for the rehabilitation of pre-existing legacy abandoned mine sites.[21]

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15 The Australia Institute, *Submission 13*, Attachment 1, p. 46.

16 Western Australia Department of Mines, Industry Regulation and Safety, *Mining Rehabilitation Fund Yearly Report 2017*, pp. 5–6, available at http://www.dmp.wa.gov.au/Environment/What-is-the-MRF-19522.aspx (accessed 18 November 2018).

17 Western Australian Government, *Submission 44*, p. 5.

18 Conservation Council of Western Australia, *Submission 17*, p. 4.

19 Mining Rehabilitation Fund Regulations 2013 (WA), r. 4.

20 Chamber of Minerals and Energy Western Australia, *Submission 23*, p. 4.

21 Conservation Council of Western Australia, *Submission 17*, p. 4.

6.15 The MRF has replaced the previous system of financial assurance for mine rehabilitation in Western Australia, which involved mine operators being required to lodge unconditional performance bonds (UPB) with the WA Government. The UPB system was introduced in the 1980s with the intention of ensuring that the state was not exposed to unacceptable costs should a mining project fail to meet rehabilitation requirements.[22]

6.16 Under the MRF system, bonds may still be applied to a project at the discretion of the Minister, but the policy intent of government is not to require bonds in addition to MRF payments. As part of the transition to this new system, mine operators have been able to seek release from their existing UPBs if they made levy payments and were assessed as being of good standing. Consequently, the majority of UPBs in place were retired between 2013 and 2016, with the bonds returned to the mining operators.[23] As of 30 June 2017:

- the balance of the MRF (that is, the total accumulated through levy payments and interest, less operational expenditure) stood at $92.4 million;
- a total of just over $1 billion has been returned to the mining sector through the retirement of UPBs that have passed the MRF eligibility criteria; and
- the value of remaining UPBs for participants in the MRF was approximately $39.6 million, while a further $106.7 million in UPBs was held for entities not part of the MRF scheme.[24]

6.17 The MRF scheme applies to most resources and minerals projects in Western Australia, but does not apply to projects that have been specifically established under State Agreement Acts. This includes some of the larger and more complex projects in the state.[25]

Northern Territory

6.18 The Northern Territory has had a requirement for financial securities to be held for mine rehabilitation liabilities since 2006. This is the primary form of financial assurance held for each mining project in the territory. As noted in Chapter 5, since 2013 mine operators in the Northern Territory have also had to pay an annual 1 per cent levy, based on the value of the financial security held for each mine site, into a Mining Remediation Fund, the proceeds of which are used by government to address issues caused by abandoned mines.[26]

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22 Chamber of Minerals and Energy Western Australia, *Submission 23*, p. 5.

23 Chamber of Minerals and Energy Western Australia, *Submission 23*, p. 5.

24 Western Australia Department of Mines, Industry Regulation and Safety, *Mining Rehabilitation Fund Yearly Report 2017*, pp. 5-6, available at http://www.dmp.wa.gov.au/Environment/What-is-the-MRF-19522.aspx (accessed 18 November 2018).

25 Association of Mining and Exploration Companies, *Submission 16*, p. 5.

26 *Submission 53*, p. 2.

Recent Queensland reforms

6.19 Until recently, Queensland required financial assurance for mine site rehabilitation to be provided in the form of cash bonds or bank guarantees on an individual project basis; however, these arrangements are now set to change as a result of reforms recently passed through the Queensland parliament.

6.20 Queensland Treasury Corporation undertook a review of its financial assurance framework for resources activities in 2016, which identified various issues with the existing system and resulted in a recommended package of reforms.[27] The Queensland Government has commenced implementing these reforms primarily through the *Mineral and Energy Resources (Financial Provisioning) Act 2018* (Qld), which passed through the Queensland Parliament in November 2018.[28]

6.21 Under these changes, Queensland will put in place a new system of financial assurance consisting of a pooled Financial Provisioning Fund (scheme fund), into which mine site operators will have to make annual contributions. Additional sureties (e.g. bonds) will still be applied in some circumstances.[29]

6.22 For an operation with an estimated rehabilitation cost of $100,000 or greater, the manager of the financial provisioning scheme must allocate the project to one of four risk categories (very low, low, moderate, or high) based on factors including the financial soundness of the proponent and the resource characteristics of the project. This categorisation will then determine the form and amount of financial assurance required.[30]

6.23 For projects assessed in the three lowest risk categories, financial assurance will be provided through annual payments into the scheme fund, calculated as a percentage of the total estimated rehabilitation cost (ERC) for the project, as follows:

- Very low risk projects: 0.5 per cent of ERC payable per annum.
- Low risk projects: 1.0 per cent of ERC payable per annum.

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27 Queensland Treasury, 'Improving rehabilitation and financial assurance outcomes in the resources sector', https://www.treasury.qld.gov.au/growing-queensland/improving-rehabilitation-financial-assurance-outcomes-resources-sector/ (accessed 25 January 2018).

28 Queensland Department of Environment and Heritage Protection, 'Mining rehabilitation reforms', https://www.ehp.qld.gov.au/management/env-policy-legislation/mining-rehabilitation-reforms.html (accessed 11 January 2019); Office of the Queensland Parliamentary Counsel, 'Mineral and Energy Resources (Financial Provisioning) Act 2018', https://www.legislation.qld.gov.au/view/html/bill.third/bill-2018-017/lh (accessed 11 January 2019).

29 Mineral and Energy Resources (Financial Provisioning) Bill 2018 (Qld), *Explanatory Notes*, p. 2.

30 Queensland Government, *Mineral and Energy Resources (Financial Provisioning) Act 2018: Risk Category Allocation Information Sheet*, 2018, pp. 2 and 4, available at https://www.treasury.qld.gov.au/growing-queensland/improving-rehabilitation-financial-assurance-outcomes-resources-sector/ (accessed 27 August 2018).

- Moderate risk: 2.75 per cent of ERC payable per annum.[31]

6.24 For projects deemed high risk, proponents will have to provide financial assurance through a surety equal to 100 per cent of the ERC for the project. Sureties may be provided through a bank guarantee, an insurance bond or payment of a cash bond (or a combination of these forms of surety).[32]

6.25 Sureties may also be required for projects in the three lowest risk categories, in cases where the mining company (or its parent company) already has other active projects in Queensland and the total ERC for the project portfolio is likely to exceed $450 million (a threshold which represents approximately 5 per cent of the total ERC in Queensland). This requirement is designed to ensure that the scheme fund will not be overexposed to risk from one particular entity or corporate group, and protect the viability of the scheme fund in the event a failure of a significant resources player in Queensland.[33]

6.26 Monies accumulated in the scheme fund may be used by the Queensland Government in circumstances where a project operator does not comply with its rehabilitation obligations, and for other resource related activities such as funding legacy abandoned mines, abandoned operating sites and research into rehabilitation techniques.[34]

6.27 Mr Adrian Noon, Special Advisor, Strategic Commercial Advisory at Queensland Treasury, explained to the committee that the structure of the fund scheme is designed to encourage progressive rehabilitation:

> The intent of the new structure, including the structure of the new financial assurance scheme, is to provide incentives for mining companies to increase their progressive rehabilitation. That happens by virtue of the model in that you have your financial assurance, your rehabilitation exposure, calculated under the new calculator and then you pay a rate depending on where you are assessed in the risk factors. Those rates in the discussion paper range from 0.5 to 2.75 per cent depending on where you are rated so the more you can achieve through progressive rehabilitation, the lower your fee will be under the new scheme. The scheme is actually designed to encourage more progressive rehabilitation.[35]

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31 Queensland Government, *Mineral and Energy Resources (Financial Provisioning) Act 2018: Risk Category Allocation Information Sheet*, 2018, p. 10.

32 Queensland Government, *Mineral and Energy Resources (Financial Provisioning) Act 2018: Risk Category Allocation Information Sheet*, 2018, p. 11.

33 Mineral and Energy Resources (Financial Provisioning) Bill 2018 (Qld), *Explanatory Notes*, p. 2; Queensland Government, *Mineral and Energy Resources (Financial Provisioning) Act 2018: Risk Category Allocation Information Sheet*, 2018, p. 7.

34 Mineral and Energy Resources (Financial Provisioning) Bill 2018 (Qld), *Explanatory Notes*, p. 2.

35 *Committee Hansard*, 12 July 2017, p. 3.

Other pooled fund approaches

6.28 The South Australian Government's system of financial assurance for mining operations is primarily based on bonds; however, it has an additional pooled fund in place in relation to quarries in the state:

> Unique to South Australia, the Extractive Areas Rehabilitation Fund…has operated since 1971 as a pooled fund form of financial assurance for the quarrying industry. The fund receives revenue from hypothecating a portion of the royalty the South Australian Government receives from the production of quarried materials. It has funded the completion of over 1000 rehabilitation projects to the value of over $34 million… Actuarial assessment undertaken in 2015 assessed that the fund was adequate to meet rehabilitation costs of existing extractive operations over the next 20 years at the current royalty hypothecation rate of 22 cents per tonne of material.[36]

6.29 South Australia is also proposing to alter its primary financial assurance framework for mining operations in the state, including through the establishment of a statutory Mining Rehabilitation Fund. These changes are being progressed through the Statutes Amendment (Mineral Resources) Bill 2018, which was introduced into the South Australian Legislative Assembly on 2 August 2018.[37]

Commonwealth involvement in financial assurance for mine rehabilitation

6.30 The Commonwealth can impose financial assurance bonds on mining projects as part of conditions set under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). These bonds can only be imposed in relation to specific matters of national environmental significance relevant to a project, and are separate to any financial assurance requirements imposed by a state or territory government relating to the broader rehabilitation of the site.[38] Since the implementation of the EPBC Act in 2000, there have been 41 mining and resource projects approved under the Act with conditions relating to financial assurance mechanisms.[39]

6.31 The Commonwealth also has responsibility for financial assurance mechanisms relating to offshore petroleum extractive projects in Australian territory.[40]

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36 South Australian Government, *Submission 58*, p. 7.

37 South Australian Government, 'Leading Practice Mining Acts Review', http://minerals.statedevelopment.sa.gov.au/mining/leading_practice_mining_acts_review (accessed 23 August 2018).

38 Mr Bruce Edwards, Assistant Secretary, Environment Standards Division, and Mr James Tregurtha, Acting First Assistant Secretary, Environment Standards Division, Department of the Environment and Energy, *Committee Hansard*, 14 February 2018, pp. 5 and 6.

39 Department of the Environment and Energy, *Submission 1*, p. 1.

40 Department of Industry, Innovation and Science, *Submission 55*, p. 8.

Jurisdictional knowledge sharing on financial assurance matters

6.32 The South Australian Government has noted that it hosted an intergovernmental forum on financial assurance issues in March 2017. This conference drew over fifty representatives from mining, environmental, planning and treasury agencies in Australian jurisdictions to consider and discuss unified, robust approaches forward for Australia in the area of financial assurance.[41]

6.33 As noted in Chapter 3, the COAG Energy Council's Resources and Engagement Working Group recently undertook an investigation regarding mine site financial obligations and associated interpretations within the *Corporations Act 2001* and the Australian Accounting Board Standards, and the possibility of pursuing a nationally consistent approach to these issues. The Department of Industry, Innovation and Science informed the committee that this working group advised Energy Council Ministers on 10 August 2018 that it had completed its consideration of these issues. The working group's position provided to the Energy Council is that 'issues around financial provisioning for mine site rehabilitation are best dealt with at the jurisdictional level' rather than through a nationally coordinated approach.[42]

6.34 The working group also developed a set of *National Principles for Managing Rehabilitation Financial Risks* (National Principles), which provide guidance to jurisdictions to ensure financial provisioning is robust and minimise the exposure of states and territories to unmet rehabilitation obligations. The principles are to be applied at the discretion of individual jurisdictions, and were endorsed by Energy Council Ministers at the same meeting in August 2018.[43]

6.35 The explanatory text to the National Principles states that that they 'provide a nationally consistent approach under which states [and] territories apply individual mechanisms [or] processes to ensure companies meet their rehabilitation and closure obligations'.[44] The National Principles are as follows:

> *Principle 1*
>
> Responsibility rests with the tenement holder to ensure mine/petroleum site rehabilitation and closure obligations are fulfilled and managed in accordance with individual state/territory legislation and approval and monitoring processes.

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41 South Australian Government, *Leading Practice Mining Acts Review: Fast Facts Update – Regional meetings and your submissions*, June 2017, p. 6.

42 Department of Industry, Innovation and Science, Answers to written questions on notice received on 31 August 2018 arising from a public hearing in Canberra on 14 February 2018, p. 2.

43 Department of Industry, Innovation and Science, Answers to written questions on notice received on 31 August 2018 arising from a public hearing in Canberra on 14 February 2018, p. 2.

44 COAG Energy Council, 'National Principles for Managing Rehabilitation Financial Risks', provided by the Department of Industry, Innovation and Science, Answers to written questions on notice received on 31 August 2018 arising from a public hearing in Canberra on 14 February 2018, p. 4.

Principle 2

Robust mine rehabilitation and closure plans are established before project commencement and endorsed by the state/territory body administering mine/petroleum site compliance.

Principle 3

Notwithstanding the obligation for tenement holders to rehabilitate mine sites, state/territories should hold financial securities for rehabilitation and closure. These being set at levels that reflect the level of disturbance and risk of the operation, minimising the state/territory's financial exposure.

Principle 4

Robust risk-based mechanisms are in place to ensure cost estimates for rehabilitation and closure remain current and accurate throughout the life of the project.

Principle 5

Rigorous and continuous monitoring processes are applied for the early identification of any potential risk that a company may not be able to fulfil its rehabilitation and closure obligations.

Principle 6

Mechanisms, including legislation, are developed to monitor and apply financial obligations for rehabilitation and closure with consideration given to the interaction of state/territory and Commonwealth legislation.

Principle 7

Financial assurance policy and mechanisms should incentivise progressive rehabilitation, improved rehabilitation and closure planning, and final rehabilitation towards a beneficial final landform.[45]

Stakeholder views about the adequacy of financial assurance mechanisms

6.36 Submitters and witnesses presented a range of views on the adequacy of financial assurance mechanisms for mine rehabilitation liabilities utilised in Australia.

Concerns about the adequacy of bond amounts held by governments

6.37 The Mineral Policy Institute stated that there are numerous examples in Australia of rehabilitation bonds being insufficient to meet the actual cost of site closure. It argued that in this situation, where actual costs of closure are greater than the loss of bonds, there is no financial incentive for a company to rehabilitate and deliver a successful mine closure.[46]

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45 COAG Energy Council, 'National Principles for Managing Rehabilitation Financial Risks', provided by the Department of Industry, Innovation and Science, Answers to written questions on notice received on 31 August 2018 arising from a public hearing in Canberra on 14 February 2018, p. 4.

46 Mineral Policy Institute, *Ground Truths: Taking Responsibility for Australia's Mining Legacies*, 2016, p. 29, included with *Submission 43*. See also: Mr Harley Lacy, *Submission 77*, p. 2.

6.38 Dr Peter Erskine, Associate Professor at the Centre for Mined Land Rehabilitation at the University of Queensland, has argued that actual rehabilitation costs for mines in Queensland and New South Wales may total between three and ten times the amount held by those state governments in rehabilitation bonds.[47] The New South Wales Audit Office found in May 2017 that despite the state holding $2.2 billion in security deposits for mining rehabilitation, these security deposits are not likely to be sufficient to cover the full costs of each mine's rehabilitation in the event of a default.[48]

6.39 The inadequacy of bond coverage for some sites has also been under discussion in Victoria. Following recommendations of the 2016 report of the Hazelwood Mine Fire Inquiry, the Victorian Government reviewed and updated its rehabilitation bond policy as it applied to three coal mines in the Latrobe Valley.[49]

6.40 As a result of this review, the security bond amounts held for the three mine operations in question were raised significantly, resulting in an increase from a total of $127 million held in June 2016 to a total of $591 million in October 2017.[50] This increase was welcomed by Environment Victoria, which stated that Victorian taxpayers were now 'much better protected from mine operators who might try to get away with a lower standard of mine rehabilitation, or even worse, who might not rehabilitate them at all'.[51]

6.41 The Victorian Government's submission to the inquiry stated that the review of its coal mine rehabilitation bond policy would 'inform a broader review of the rehabilitation bond policy across the earth resources sector, including for mineral mines, extractive industry quarries, and petroleum operations'.[52]

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47 Lisa Main and Dominique Schwartz, 'Industry insider warns taxpayers may foot bill for mine rehabilitation unless government, industry step up', *ABC News Online*, 19 September 2015, http://www.abc.net.au/news/2015-09-19/taxpayers-may-foot-bill-for-mine-rehabilitation/6787954 (accessed 28 August 2018); Dr Peter Erskine, Private Capacity, *Committee Hansard*, 12 July 2017, p. 17.

48 NSW Audit Office, *Mining Rehabilitation Security Deposits*, May 2017, pp. 2 and 15.

49 Government of Victoria, *Submission 67*, p. 8.

50 The Hon Jacinta Allen MP, Acting Victorian Minister for Resources, 'New Rehab Bonds for Latrobe Valley Coal Mines', *Media Release*, 6 October 2017; Victorian Government, 'Statement of reasons to require further rehabilitation bonds from the Latrobe Valley coal mines', http://earthresources.vic.gov.au/earth-resources-regulation/information-for-community-and-landholders/mining-and-extractives/latrobe-valley-coal-mines/latrobe-valley-coal-mines-bonds/third-statement-of-reasons (accessed 23 January 2017).

51 Dr Nicholas Aberle, Environment Victoria Campaigns Manager, '$300 million increase in mine rehabilitation bonds to protect environment, Victorian taxpayers and Latrobe Valley community', *Media Release*, 6 October 2017.

52 *Submission 67*, p. 9.

Ensuring rehabilitation costs are adequately calculated

6.42 In this context, some submitters and witnesses expressed concern that rehabilitation costs are not being accurately calculated during regulatory assessment processes, resulting in inadequate financial assurance being secured.

6.43 The ARC Centre for Mine Site Restoration (CMSR) argued that the costs of environmental restoration are not being adequately determined prior to regulatory approval:

> A full and complete understanding of the costs of restoration, which will vary markedly between landforms, operations and regions, must be determined and presented during initial mine planning and be included transparently as part of the approvals process.
>
> Approvals have been granted for projects with little or no understanding of the restoration requirements of the final landform (e.g., the specific chemico-physical and hydrological properties of waste material), despite a general lack of understanding about the implications this might pose for establishing representative native plant communities. Approvals should not be granted on a 'mine first, figure out how to restore later' approach.[53]

6.44 The CMSR argued further that costing should also consider the need for rigorous pre-mining surveys, as well as the need for long term monitoring until a full restoration outcome is achieved.[54]

6.45 The Minerals Council of Australia commented as follows in relation to the quantum of financial assurance required of mining operators:

> In calculating the amount of financial assurance required for a particular operation, companies are typically required to use a standard state government calculator or other method deemed acceptable to government. These funds are intended to cover the full cost of rehabilitating mine sites by third parties post-production, however, it may be less costly for the company to rehabilitate land during and post operation (where resources and plant machinery are already available).
>
> Financial assurance calculators are periodically updated to reflect changing expectations, modern rehabilitation methods, and changes to service costs. The overall pool of funds held by government has increased substantially in recent years, reflecting both this and significant industry expansion.[55]

6.46 Mr Rick Humphries, from the Lock the Gate Alliance, argued that the calculators utilised by state and territory governments to estimate rehabilitation costs do not adequately capture the full extent of rehabilitation liabilities, as they do not cover:

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53 *Submission 64*, pp. 2–3.

54 *Submission 64*, p. 3.

55 *Submission 50*, p. 16.

> …all the things that a company would include when they're costing the actual closure of a mine... Some of these spreadsheets that companies use have several thousand line items. They get down to minute costings to try to get a handle, and even then they're inaccurate. The models that the industry uses internally, which are never released—and those numbers are never released—are much more sophisticated and include a lot more line items than the government calculators.[56]

6.47 Mr Harley Lacy also commented that internal cost estimates may not accord with reported liabilities:

> Within the mining industry it is fairly well known that the real costs of rehabilitation and mine closure are, as in any commercial enterprise, essentially confidential information known only to the owners of projects. Closure costs can be calculated "in terms of immediate closure", and in fact some corporations do undertake this regularly as a standard process during the process of building that cost base for corporate reporting.
>
> Companies that report closure costs, as required under corporations laws… allow closure cost to be subjected to accounting treatments such as the use of Net Present Value (NPV), and other discounting processes that provide a future cost of closure, often many multiples less than the actual cost of closure when that closure occurs.[57]

6.48 Mr Charles Roche of the Mineral Policy Institute commented on this issue at the committee's Perth public hearing, in the context of WA removing the bond component from financial assurance:

> If the mine closes after 20 years, when it's supposed to, they've done progressive rehabilitation. If it closes after three, because they've done their numbers wrong, you've got a massive liability that is unfunded because it's predicated on what the amount would be in 20 years. Not only is that smaller; they've applied NPV to that figure, which effectively reduces it into nothing. When you're working at timescales in decades, the use of NPV as a financial instrument—and this is recommended by regulators like the New South Wales authorities—effectively means we don't take closure costs or rehabilitation costs seriously.[58]

6.49 Dr Peter Erskine expressed the view that in order to ensure that the true cost of rehabilitation liabilities is reflected in the amount of financial assurance provided to governments, independent third-party audits of rehabilitation costs should be introduced. Dr Erskine noted that this is in place in other jurisdictions around the world, and stated:

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56 *Committee Hansard*, 12 July 2017, p. 36.

57 *Submission 77*, p. 1.

58 *Committee Hansard*, 7 March 2018, p. 16.

> By having a third-party audit of what the rehabilitation liabilities actually are rather than the companies putting them up would give us greater confidence that we know what the full costs of rehabilitation are.[59]

Types of bonds and financial assurance mechanisms

6.50 Stakeholders offered various perspectives on what systems of financial assurance should be encouraged in Australia.

6.51 Mr Peter McCallum of the Mackay Conservation Group argued for the retention of cash bonds for mining projects, rather than bank guarantees or other mechanisms, stating that cash bonds help drive rehabilitation work as they provide a greater cost incentive for companies to undertake rehabilitation as soon as possible.[60]

6.52 Mr Rick Humphries, Mine Rehabilitation Campaign Coordinator for the Lock the Gate Alliance, commented that mechanisms such as cash bonds may be required to ensure that companies are adequately engaging with rehabilitation issues at the senior executive level:

> I guess [a cash bond is] a blunt instrument but, in my experience, unless you get the CEO or the CFO interested and engaged in this thing called 'closure, rehabilitation and relinquishment', you will get nowhere because all other senior managers are basically rewarded on cost, production and safety. Closure does not get a look in and that is because it is not seen to be a business risk. So by having a major cash impost up-front, which you could draw down and reduce if you proved to the regulator that you were delivering on your rehabilitation commitments… then you get the most important person in the company engaged and actively driving behaviour and performance to reduce that liability, and that is what you need to happen. Unless we create a material business risk then those companies are not going to react.[61]

6.53 The Mineral Policy Institute argued that bonds should cover the full costs of mine closure, rather than allowing for any discounts or provision of partial bonds:

> When full mine closure costs are held in bonds it provides an incentive to rehabilitate, especially if supported by strong regulation and enforcement with criminal liability and punitive financial instruments.
>
> A 100% bond can ensure that the company responsible for mining is responsible for paying for the rehabilitation. If rehabilitation and on-going management costs are calculated accurately this should avoid costing the taxpayer money and, thereby, improve community confidence in mining.[62]

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59 *Committee Hansard*, 12 July 2017, pp. 15 and 17.

60 Mr Peter McCallum, Coordinater, Mackay Conservation Group, *Committee Hansard*, 12 July 2017, p. 21. See also: Lock the Gate Alliance, *Submission 9*, pp. 24–25.

61 Mr Rick Humphries, Mine Rehabilitation Campaign Coordinator, Lock the Gate Alliance, *Committee Hansard*, 12 July 2017, p. 37.

62 Mineral Policy Institute, *Ground Truths: Taking Responsibility for Australia's Mining Legacies*, 2016, p. 29, included with *Submission 43*.

6.54 The Minerals Council of Australia disagreed that cash bonds and bank guarantees are optimal mechanisms for providing financial assurance:

> While the industry supports an appropriate mechanism to safeguard governments from incurring financial liability, it is important these mechanisms be efficient, incentivise good performance and come at least cost to industry.
>
> The provision of large cash-based security bonds can impact a company's borrowing capacity and unnecessarily tie up company cash resources that would otherwise be available for growth, rehabilitation work and other improvements.
>
> Financial assurance provided as a bank guarantee is not cost-free for companies. Bank guarantees, while generally having relatively low servicing costs – a percentage of the principal – can cost companies tens of millions of dollars each year to maintain.
>
> We consider greater flexibility is needed to reduce the opportunity cost of financial assurance, while providing appropriate protection for government.[63]

Views on pooled fund models such as Western Australia's MRF scheme

6.55 The Association of Mining and Exploration Companies (AMEC) lauded the MRF scheme introduced in Western Australia, and argued that this model should be adopted by other jurisdictions:

> AMEC is advocating for the implementation of the MRF model in all Australian jurisdictions as an alternative for the current environmental security bonding / financial assurance systems. A positive outcome from the MRF is that there is also a financial incentive for progressive rehabilitation during the life of the mine as the impact of the annual levy reduces when the estimated Environmental Liability falls.[64]

6.56 Conversely, some submitters to the inquiry expressed concern that the MRF system has ultimately left the Western Australian Government less prepared to deal with abandoned mines than under the previous system. For example, the Conservation Council of WA (CCWA) noted that if the levy payments made into the MRF continue on current trends, it would take until 2057 for the fund to recover the amount of funds that have been relinquished since the MRF's introduction through the retirement of unconditional performance bonds previously held by the state.[65] It argued:

> The State of WA is now in a position where there is a bigger deficit for funding the liability of currently operating mines than before the introduction of the MRF. This liability is significant.
>
> While there is now [an] additional $85 million to be invested for the funding of legacy sites that didn't previously exist, it is unclear if generating

63 *Submission 50*, p. 17.

64 *Submission 16*, p. 6.

65 *Submission 17*, p. 6.

> this huge gap in securities and guarantees to protect against the rehabilitation liability was an expected outcome and how it is being managed.
>
> There is also no clear time frame described for the maturity of the fund and while we are seeing some trial projects it is still unclear on what the cost of some of the most problematic mines will be and when the fund will be able to be used to address those sites.[66]

6.57 Ms Mia Pepper of the CCWA told the committee that a positive aspect of the MRF system is that it can encourage progressive rehabilitation; however, the lack of a bond or other financial incentive can mean there is then less incentive to complete final site rehabilitation. Ms Pepper argued that this may prove an incentive for companies to sell off sites to smaller resource players or put sites into care and maintenance once the best part of the resource has been exploited.[67] CCWA advocated for a model of financial assurance that would incorporate an MRF-style pooled funding mechanism as well as a bond system for individual sites.[68]

6.58 Mr Dave Sweeney of the Australian Conservation Foundation expressed similar concerns about the MRF:

> We are concerned that it is an approach that delivers for industry the flexibility of freeing up capital, but doesn't deliver for every other stakeholder the certainty that capital will be there and be there in the numbers and the scale that's necessary to address the issue.[69]

6.59 Several stakeholders highlighted that in the case of the Ellendale Diamond Mine, the mine operator was able to enter administration and liquidation in 2015 and avoid paying any rehabilitation costs, after $12 million in bonds was returned to them in 2013 under the MRF framework.[70] CCWA stated:

> The issue here is that Kimberley Diamonds went into administration and left Ellendale as an abandoned mine site with ease under WA regulations. Had there been a bond the company and its executives may have had a greater incentive to be financially responsible, avoided going into administration. Failing corporate responsibility, the Government would have had access to $12 million to secure and remediate the site, rather than drawing down on the MRF which is still in its early stages of establishment

66 *Submission 17*, p. 7.

67 Ms Mia Pepper, Nuclear Free Campaign Volunteer, Conservation Council of Western Australia, *Committee Hansard*, 7 March 2018, pp. 1–2.

68 Ms Mia Pepper, Nuclear Free Campaign Volunteer, Conservation Council of Western Australia, *Committee Hansard*, 7 March 2018, p. 2. For a similar argument, see: Ms Georgina Coggins, *Submission 35*, p. 2.

69 Mr Dave Sweeney, Nucelar Free Campaigner, Australian Conservation Foundation, *Committee Hansard*, 30 October 2017, p. 13.

70 See, for example: Lock the Gate Alliance, *Submission 9*, p. 7; The Australia Institute, *Submission 13*, Attachment 1, p. 63; ARC Centre for Mine Site Restoration, *Submission 64*, p. 3.

> and represents just [two per cent] of the total liability of mining in the state.[71]

6.60 The Mineral Policy Institute argued similarly that the return of bonds to mine operators under the MRF framework 'has left the state exposed and potentially created a perverse disincentive for companies to abandon rather than close mine sites', again citing the Ellendale mine as an example. In summarising the MRF reforms it stated:

> With these reforms, the WA Government is clearly demonstrating the need for action and is providing leadership on tackling mine closure and mining legacies in Australia. Whether other measures will need to be implemented to overcome the lack of direct financial incentive to undertake mine closure is yet to be seen.[72]

6.61 Ms Bronwyn Bell, Manager, Natural Resources at the Chamber of Minerals and Energy of Western Australia, argued that the MRF system has several advantages over the previous system in Western Australia, namely:

> The old bond system offered no revenue stream for the abandoned mines that historically have been created in WA and still exist in WA. It didn't ensure that there was transparency of data, annual reporting around the MRF, and disturbance and rehabilitation data, and so there are certainly plenty of additional benefits that you have from an MRF system designed as the one that we have here. Yes, the fund is new and, yes, it will take some time to amass the capital that is intended, but that was always well understood up-front and there was always the expectation that it would take some years to amass sufficient capital.
>
> … The other thing to note with the bond system is that although it's easy to say that there was a billion dollars or something sitting in the government's hands for those [bonds], that money actually wasn't on the government's books as such. It was a guarantee that could be called upon if it were needed, whereas now the state does have those funds. They are there, sitting and accruing interest. That interest is being used for the Abandoned Mines Program, and there have been four pilot projects that have accessed that so far. I think that the current system offers a lot of advantages that the historic system didn't.[73]

Other methods of financial assurance

6.62 The committee heard evidence relating to some other novel mechanisms for financial assurance that are being pursued in Australia and elsewhere. Mr Adrian Noon from Queensland Treasury noted that the Queensland Government has been examining alternate options for financial assurance as part of its ongoing reform process, including using insurance bonds for rehabilitation liabilities:

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71 *Submission 17*, p. 8.

72 Mineral Policy Institute, *Ground Truths: Taking Responsibility for Australia's Mining Legacies*, 2016, p. 32 (internal citations omitted), included with *Submission 43*.

73 *Committee Hansard*, 7 March 2018, p. 25.

> In moving to a broader range of instruments, we are in particular looking at insurance bonds. In overseas jurisdictions, particularly in North America, there is a very strong market for insurance bonds for rehabilitation. The Australian regulator, APRA, has recently approved rehabilitation bonds for Australia. The insurers will be required to meet the same requirements. As part of the [Queensland Government's] reform package, there is a discussion paper on acceptable forms of surety. That discussion paper will put out to everybody for comment what we think will be acceptable future forms of surety.[74]

6.63 Representatives from Copper Mines of Tasmania (CMT) highlighted the model of financial security for mine rehabilitation used in Ireland.[75] This system involves a requirement for companies to put money into a fund over the life of the mining operation, based on an agreed estimation of closure costs, with the fund then able to be drawn upon to undertake progressive rehabilitation and closure works at the site. Mr Peter Walker, General Manager Care and Maintenance at CMT, expressed the view that such a system could work well in Australia, and contrasted it with the current bond-based system in place in Tasmania:

> At the moment, we [at CMT] have to put up a bond, perhaps by bank guarantee. CMT is big enough, so the bank guarantee is secured by our general assets, but there are smaller companies that have to secure their bank guarantees with a cash deposit. If they want to rehabilitate separately to the cash amount for the bank guarantees, they have to fund the rehabilitation, so they have to find the money twice, basically. It's only when it's all done that they get their cash back. A fund that they could draw on to do the rehabilitation would be very useful. That could go up and down throughout the life of the mine if they're doing progressive rehabilitation. It's not having to depend on money when the mine's closed; it's actually been done when they're in operation and generating some cash flow, which I think will be very useful.[76]

Legislative tools to ensure financial liability for rehabilitation stays with site operators

6.64 Two further issues were raised with the committee in relation to legislative measures that could be implemented in order to ensure that the financial responsibility for mine site rehabilitation remains with site operators, rather than being ultimately passed onto government.

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74 Mr Adrian Noon, Special Advisor, Strategic Commercial Advisory, Queensland Treasury, *Committee Hansard*, 12 July 2017, p. 6.

75 Mr Peter Walker, General Manager Care and Maintenance, and Mr Geoff Cordery, Environment Manager, Copper Mines of Tasmania, *Committee Hansard*, 12 October 2017, pp. 17–18.

76 *Committee Hansard*, 12 October 2017, pp. 17 and 18.

Use of 'Chain of responsibility' legislation as an enforcement tool

6.65 Several submitters referred to Queensland's 'chain of responsibility' legislation as another regulatory tool that could help ensure liabilities for mine site rehabilitation do not ultimately fall back onto government.[77] The *Environmental Protection (Chain of Responsibility) Amendment Act 2016* (Qld) provides the Queensland Government with power to make orders forcing environmental clean-up against persons relating to companies. The Environmental Defenders Offices of Australia explained:

> The Act allows the piercing of the corporate veil to make individuals responsible for decisions or actions which led to environmental harm or breach of conditions where the company is unable to provide for the remediation of the harm or potential harm. Under this Act, an individual can be made liable for activities or omissions of a company even after the individual has left the company. The individual may also have only profited from the decision or action to be held liable. This has reduced the risk of the Queensland Government being left with the liability of funding the often significant clean-up costs if companies go into administration.[78]

6.66 Mr Rick Humphries, Coordinator, Mine Rehabilitation Reform Campaign at the Lock the Gate Alliance, commented:

> In the current Queensland legislation, which focuses on bankruptcy and insolvency, there are two mechanisms. One is an early warning mechanism where Queensland has greater oversight of the financial health of mine operators and in the event that a company shows early signs of financial distress then the government has the ability to step in and enforce an environmental protection order early on in the piece to ensure that certain works are undertaken. If the company does indeed go belly up, then the financial assurance is protected from the creditors. That is the intent of the legislation. In the event of [insolvency], it's to ensure that, if there is a fulsome [insolvency] of a holding company or a subsidiary, the owners—the parent company or the joint-venture partners and those people who are financially benefiting from that particular operation—can have environmental protection orders served on them. That would tap into their funding to make sure that the job was done, the taxpayer was protected and the company's obligations were satisfied. That is the intent of the act.[79]

6.67 These groups argued that similar 'chain of responsibility' legislation could be developed and enacted at the Commonwealth level to ensure that such mechanisms are applied across Australia.[80] Environmental Justice Australia agreed with this sentiment, but expressed concern that the ability to take action under the Queensland

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77 Environmental Defenders Offices of Australia, *Submission 24*, p. 21; Environmental Justice Australia, *Submission 26*, p. 8; Lock the Gate Alliance, *Supplementary Submission 9.1*, p. 3.

78 Environmental Defenders Offices of Australia, *Submission 24*, p. 21.

79 *Committee Hansard*, 30 October 2017, pp. 31–32.

80 Environmental Defenders Offices of Australia, *Submission 24*, p. 21; Lock the Gate Alliance, *Supplementary Submission 9.1*, p. 3.

legislation is subject to a two year time limit, which could prove problematic given the long life of mines and the ability for mines to be placed into care and maintenance.[81]

Treatment of mine site rehabilitation obligations under Commonwealth insolvency law

6.68 The Western Australian Government submitted that current legislative provisions relating to insolvency in the *Corporations Act 2001* (Corporations Act) can allow for mining companies that have entered liquidation to avoid mine site rehabilitation obligations. It cited the abovementioned case of the Ellendale Diamond mine, stating:

> Under the Corporations Act (in particular Division 7A), a liquidator of a company can disclaim onerous property in the winding up of a company. This occurred in 2014, when the liquidators of the Kimberly Diamond Company disclaimed the mining lease for the Ellendale Diamond mine in the Kimberley region, Western Australia. At that time, the Rehabilitation Liability Estimate for the site was approximately $40 million. This was the first occurrence of these provisions of the [Corporations Act] being used to disclaim mine site rehabilitation obligations. The parent company of Kimberley Diamond Company (Kimberley Diamonds Ltd) continues to operate and is listed on the Australian Stock Exchange.[82]

6.69 The Western Australian Government also noted a secondary problem arising in these circumstances:

> [U]nder the winding up provisions of the *Corporations Act 2001*, there is no specific individual or entity that is a creditor (secured or otherwise) for the purposes of meeting rehabilitation liabilities. The 'environment' is not a creditor. This has the obvious effect whereby the Crown may ultimately be forced to accept the liability associated with an abandoned mine while the assets of the company or person do not make a contribution to these costs.[83]

6.70 It suggested that in order to resolve these issues under the Corporations Act, consideration should be given to addressing matters such as parent company and director obligations, onerous property provisions, and treatment of the State as creditors during distribution of company assets.[84]

6.71 The COAG Energy Council's Resources and Engagement Working Group considered this issue as part of its recent deliberations concerning mine site rehabilitation financial obligations. The Department of Industry, Innovation and Science stated that no specific changes to the Corporations Act are being countenanced following the deliberations of the working group:

> The onerous property provisions of the [Corporations Act] and inadequate financial provisioning for rehabilitation and closure were noted as common

81 *Submission 26*, p. 8.

82 *Submission 44*, p. 5.

83 *Submission 44*, p. 5.

84 *Submission 44*, p. 5.

> national issues. However all jurisdictions agreed that the issues associated with mine site rehabilitation and associated financial obligations are best dealt with at a jurisdictional level.[85]

Disclosure of costs and liabilities around site rehabilitation

6.72 Several issues were raised with the committee in relation to the transparency and disclosure obligations, both for governments reporting information relating to rehabilitation costs and financial assurance measures, and for companies in reporting rehabilitation liabilities to shareholders.

Transparency of information relating to financial assurance mechanisms

6.73 Most jurisdictions in Australia do not report on the specific value of bonds or other site rehabilitation securities for individual mines, instead publishing aggregated data about the total amount of financial assurance held across the jurisdiction.[86] The Australian Conservation Foundation described this lack of disclosure of bond values for individual mine sites by state and territory governments as 'alarming'.[87]

6.74 The two exceptions to this practice in Australia are Victoria and the Northern Territory. Victoria has had a relatively longstanding policy of publishing rehabilitation bond amounts for individual mining operations,[88] while the Northern Territory Government decided to publish the quantum of the financial securities held for each individual mine site in the territory for the first time in September 2017.[89] Mr Armando Padovan, Executive Director, Mines Division at the Northern Territory Department of Primary Industry and Resources, explained to the committee why the Northern Territory Government had decided to take this approach:

> It's just about being open and transparent in terms of how we do business with different operators. There have been requests for many years, I understand, on what those security amounts are. By not releasing it, there's a whole range of speculation about what the government is hiding. By putting it out there, we can be very open and transparent and put that one to bed.[90]

6.75 While supportive of the government's move to start publishing this information, Mr Justin Tutty from the Environment Centre NT contended that the

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85 Department of Industry, Innovation and Science, Answers to written questions on notice received on 31 August 2018 arising from a public hearing in Canberra on 14 February 2018, p. 3.

86 The Australia Institute, *Submission 13*, Attachment 1, p. 57.

87 *Submission 27*, p. 8.

88 The Australia Institute, *Submission 13*, Attachment 1, pp. 53–57.

89 Daniel Fitzgerald and Katrina Beavan, *ABC News Online*, 'Mining bonds revealed as part of transparency push by Northern Territory Government', 13 September 2017, https://www.abc.net.au/news/rural/2017-09-13/northern-territory-government-reveals-environmental-mining-bonds/8940332 (accessed 6 December 2018).

90 *Committee Hansard*, 30 October 2017, p. 42.

bond amounts themselves were not sufficient for the public to fully assess issues relating to a mine's financial assurance status:

> [T]here's been this change where now the bonds for Territory mines have been published. That's great. That's a good step. I consider it's only one side of an equation. We've been promised for some years now, similarly, that mining management plans will be made public rather than being hidden behind commercial confidentiality. That hasn't happened yet, which means that, for most of those Territory mines, we know what the bond is but we don't know what requirements that bond is underpinning. We don't know what actions those operators have to take to get the bond back.[91]

Public reporting of rehabilitation liabilities by corporations

6.76 Another concern raised by stakeholders was that mining companies are not required to thoroughly report publicly on their expected rehabilitation and closure costs.

6.77 The Minerals Council of Australia submission stated that mining companies are required to make provision for rehabilitation and closure liabilities in accordance with Australian Accounting Standards Board Standard (AASB) 137 titled Provisions, Contingent Liabilities and Contingent Assets, and 'where material these will be disclosed in the companies' audited financial statements'.[92]

6.78 Various submitters argued that the current accounting standards do not require enough specificity in disclosure of liabilities for mine site rehabilitation. The Western Australian Government commented in its submission:

> [T]he current standards allow for consolidating all obligations (e.g. personnel, financing, rehabilitation) into a single category of current or non-current liabilities. There are very few examples where publicly listed companies specify mine closure costs for particular mine sites. In addition, there is often little transparency as to the assumptions made in the financial statements relating to when those costs (liabilities) will come due, the discounting rates applied for those future costs, or whether there are other assumptions relating to closure standards. This can be of particular concern when a regulator is also considering the risks associated with unplanned closure… The Western Australian Government suggests the current Accounting Standards do not provide for a modern degree of transparency of financial provisioning to provide confidence that mine closure obligations will be met.[93]

6.79 The Tasmanian Government echoed these concerns in its submission, stating that clearer financial reporting of rehabilitation liabilities by mining companies would assist governments when reviewing and setting security deposits, taking into account

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91 Mr Justin Tutty, Member, Environment Centre of the Northern Territory, *Committee Hansard*, 30 October 2017, p. 18.

92 *Submission 50*, p. 21.

93 *Submission 44*, p. 6.

an accurate reflection of a company's financial position and level of risk.[94] The Tasmanian Government suggested that the Commonwealth could consider reforming these accounting standards under the *Corporations Act 2001* to ensure that mining companies are obligated to clearly report on their rehabilitation liabilities for each mine site they operate.[95]

6.80 The South Australian Government also commented on this issue in its submission:

> South Australia…supports the consideration of strengthening financial disclosure legislation through the Commonwealth Corporations Act to ensure mining companies are required to publically disclose the allocation of financial provision for rehabilitation, commensurate with the likely final cost of rehabilitation over the life of the mine. This would give the community increased confidence of the ability of the company to meet rehabilitation outcomes.[96]

6.81 A number of non-government stakeholders also expressed support for the strengthening of the legislative and regulatory framework at the Commonwealth level in order to require more detailed and accurate reporting on mine rehabilitation liabilities.[97] The Lock the Gate Alliance recommended that disclosure of the following items by mining companies be made mandatory:

- the timeframe to closure for each mine asset held by the company;
- the total estimated cost of closure for each asset, both in terms of the present closure obligation (unplanned closure) and total projected cost (at the end of the mine's life – before and after discounting for time values);
- the mine closure risk assessment for each asset;
- the rehabilitation bonds and financial assurance held as an offset; and
- investment to date in progressive rehabilitation.[98]

6.82 Environmental Justice Australia expressed similar views about information that should be subject to mandatory reporting, and suggested that in addition to individual company disclosure, a national body should also publish up to date information on these issues across the industry.[99]

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94 Government of Tasmania, *Submission 68*, p. 5.

95 *Submission 68*, p. 5; Ms Jennifer Parnell, Manager, Scientific Services, Mineral Resources Tasmania, *Committee Hansard*, 12 October 2017, pp. 36–37.

96 *Submission 58*, p. 5.

97 Mr Dave Sweeney, Nuclear Free Campaigner, Australian Conservation Foundation, *Committee Hansard*, 30 October 2017, p. 12; Mr Charles Roche, Executive Director, Mineral Policy Institute, *Committee Hansard*, 7 March 2018, p. 16; Environment Victoria, *Submission 15*, pp. 3–4; Lock the Gate Alliance, *Submission 9*, p. 2.

98 *Submission 9*, p. 2.

99 *Submission 26*, pp. 8–9.

6.83 The potential for changes to Australian Accounting Board Standards relating to mine site rehabilitation was considered by the COAG Energy Council's Resources and Engagement Working Group as part of its broader recent deliberations concerning mine site rehabilitation financial obligations. The Department of Industry, Innovation and Science advised the outcome of these considerations as follows:

> In respect of Australian Accounting Standards, no specific changes have been proposed. The Australian Accounting Standards Board has agreed to future consideration of options to upgrade closure and rehabilitation reporting requirements in the Australian Accounting Standards at an aggregate level. Any consideration of changes to the standards will need to ensure consistency with international standards is maintained and minimise any further perception by users that existing requirements are already onerous.[100]

100 Department of Industry, Innovation and Science, Answers to written questions on notice received on 31 August 2018 arising from a public hearing in Canberra on 14 February 2018, p. 3.

Chapter 7

Mine rehabilitation employment opportunities and Indigenous engagement

7.1 This chapter deals with two additional issues of significance raised throughout the committee's inquiry.

7.2 Firstly, it considers evidence received by the committee in relation to Indigenous Australians' engagement with mine closure planning and rehabilitation processes. It then discusses the potential employment and community benefits of a greater focus by industry and government on mine rehabilitation.

Involvement of Indigenous Australians in mine planning and rehabilitation

7.3 The Minerals Council of Australia commented on the value that can be created for Aboriginal Australians where mining occurs on native title land, through the establishment of Indigenous Land Use Agreements:

> The mineral industry's approach to agreement-making with Traditional Owners is based on the principle that communities most impacted by mining operations should benefit most through leveraging of economic activity associated with mineral wealth to drive social and economic growth.
>
> In addition to training and employment, land use agreements with mining companies have provided unprecedented wealth creation for Indigenous people in regional and remote Australia. For example, the total value of native title related payments in 2011–12 alone was estimated at $3 billion, with assets in Indigenous trusts from mining activity valued at $40 billion in total.[1]

7.4 Other submitters noted, however, that Aboriginal communities can be impacted particularly negatively by poor mine planning and rehabilitation processes. For example, Dr Rebecca Lawrence and Professor Ciaran O'Faircheallaigh argued in a joint submission that the potential positive benefits to Aboriginal people, by way of employment and revenue streams in negotiated agreements, may be far outweighed by the long-term negative impacts of abandoned or poorly rehabilitated mine sites:

> [I]t can be argued that Aboriginal Australians have more to lose from inadequate rehabilitation and closure practices than any other segment of the population. The majority of mining in Australia takes place on the Aboriginal estate and Traditional Owners, unlike many others involved in mining, do not leave when mines close. They and their homelands will bear, in some cases for many generations, the costs of any failures in mine closure policy and regulation. Mining companies come and go, but

1 *Submission 50*, p. 8.

> Aboriginal communities are connected to their ancestral homelands and are left with environmental legacies for future generations.[2]

7.5 Dr Lawrence and Professor O'Faircheallaigh expressed concern that native title Indigenous Land Use Agreements negotiated in relation to major mining projects in recent years generally have not specifically dealt with mine closure and rehabilitation issues. They argued that much more needs to be done to support Aboriginal people in using negotiated agreements which protect their interests during mine-closure and post-closure.[3]

7.6 In discussing the potential impacts of inadequate site rehabilitation, Professor David Mulligan noted that for Indigenous Traditional Owners, 'the loss and non-re-instatement of the land's cultural values is a very significant loss and a failure to meet a social and community commitment'.[4] Dr Lawrence and Professor O'Faircheallaigh cited the Ranger uranium mine and the McArthur River mine in the Northern Territory as examples where long-term mining legacies are of particular concern to Aboriginal communities:

> The Ranger Mine is legally required to ensure that radioactive tailings do not contaminate the surrounding environment for 10,000 years. Glencore has indicated that it will take 300 years to rehabilitate toxic waste dumps at McArthur River, and publicly committed to ensuring that the post-mining landscape will be left in a safe condition for 1,000 years. These are time-scales of epic proportions and there is no prospect that Glencore or ERA will continue to exist as a corporate entity for 300, let alone 1,000 or 10,000, years. This raises fundamental questions around corporate capacity, state regulation and monitoring, and the legacies of long-term environmental challenges for affected Aboriginal communities.[5]

Lack of opportunity for meaningful engagement with Aboriginal interests

7.7 Dr Lawrence and Professor O'Faircheallaigh argued in their submission that existing regulatory structures do not adequately allow for input into key decision making processes by Traditional Owners specifically relating to mine rehabilitation:

> The existing regime for regulating rehabilitation and closure provides no significant opportunity for the articulation of Aboriginal interests, let alone for the major role in decision making that is required for Aboriginal Traditional Owners if those interests are to be protected. Key State policy and legislative arrangements provide no opportunity for Aboriginal input. The Queensland Government's Mined Land Rehabilitation Policy, for instance, does not contain the words Aboriginal, Indigenous or native title, and neither do the sections of Queensland's *Mineral Resources Act 1989* that govern provision and use of financial security for mine rehabilitation. Even more worrying, the same applies to a Discussion Paper published by

2 *Submission 82*, pp. 2 and 3.

3 *Submission 82*, p. 4.

4 *Submission 40*, p. 6.

5 *Submission 82*, p. 3.

> the Queensland Government in 2017, titled *Queensland Government Consultation Report: Better Mine Rehabilitation for Queensland*. Similar comments could be made in relation to the other major mining states and territories. Put simply, 25 years after Mabo, legislators and regulators are failing completely to make the connection between mine rehabilitation, and Aboriginal people and their native title. This constitutes a fundamental failure to protect native title rights, and demands Commonwealth intervention to fulfil its legislative mandate under the *Native Title Act 1993*.[6]

7.8 The committee heard further detailed evidence around these issues specifically in relation to two mine sites in the Northern Territory: the Rum Jungle former uranium mine and the McArthur River mine.

Rum Jungle

7.9 The committee heard evidence at its Darwin hearing from representatives of the Kungarakan people, traditional custodians of the Finniss River in the Fitzmaurice region of the Northern Territory, where the Rum Jungle abandoned mine site is located. Mrs Kathleen Mills, Senior Elder of the Kungarakan, told the committee that the unremediated site had had a devastating impact on the surrounding land, with significant problems still ongoing following more than 30 years of attempts to have the area fixed.[7]

7.10 Ms Helen Bishop, Chairperson of the Kungarakan Culture and Education Association, stated that the Kungarakan people are encouraged that the Commonwealth and Northern Territory governments are progressing plans to undertake meaningful rehabilitation activities on the Rum Jungle site. Ms Bishop expressed concern, however, that while the Kungarakan people are mentioned as traditional owners in the partnership agreements between the Commonwealth and the Northern Territory, this does not afford any rights as equal participants in the process of developing rehabilitation strategies:

> In both agreements between the state about remediating that mine, Kungarakan people are mentioned only as [Traditional Owners]—what does that mean? It doesn't put us as an equal holder of interest—primary interest, before anybody else—in that land. We are primarily responsible for what happened there… I'm suggesting that any Aboriginal people who have primary responsibility for a mine area, whether it be a lease, exploratory or remediation—those people will be written into the agreements between the state and the federal government that make it a responsibility to communicate with them at an effective level, as the state and the Commonwealth do to each other. That way no-one's missing out; there's nothing hidden.[8]

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6 *Submission 82*, pp. 3–4.

7 *Committee Hansard*, 30 October 2017, p. 23.

8 *Committee Hansard*, 30 October 2017, p. 23.

7.11 Ms Bishop commented further at the committee's Darwin hearing in October 2017 that communication with traditional owner representatives has been lacking as the rehabilitation planning project has progressed:

> I'm also a representative person on the Rum Jungle Indigenous liaison committee group. Since our last meeting with…the body who runs the project, there's been no communication since May last year [nearly 18 months ago]. We were to have a meeting in August. My point is: would you do this to your state counterpart if you had them in your project? No, you wouldn't. We don't want to be made invisible. We have a primary responsibility there. I think we should be named, like any other primarily responsible person or group, such as the Commonwealth and the state, should be named. Therefore, it makes us all equal in the stakes and the way we communicate with each other. We're equal parties. We all win that way.[9]

7.12 The Rum Jungle Traditional Owner Liaison Committee, representing both the Kungarakan and Warai Traditional Owners of the site, lodged a submission with the committee in April 2018 describing recent developments they consider have significantly undermined previous good work in engaging traditional owners with the rehabilitation planning process.[10] The submission stated that a strong sense of trust had been developed over the past six years due to 'deliberate and active engagement' by the Commonwealth and Northern Territory Governments with traditional owners. The submission lamented, however, that a recent decision of the Northern Territory Government to discontinue the position of Senior Scientist within the department responsible for overseeing the project has now undone 'all of the good engagement and trust building to date', particularly as the decision was made without consulting Traditional Owners:[11]

> The role of the Traditional Owners participation is in question when communication and governance issues do not respect or represent the cultural rights, interests or concerns of Traditional Owners.
>
> It is wholly inappropriate, culturally ignorant and disrespectful that decisions are made without consultation that ultimately impact upon Traditional Owners responsibility, accountabilities and cultural authority and oversight of the Project.
>
> This situation has raised alarm for Traditional Owners. It is a warning that [the Northern Territory] Government can and will make decisions in future, without respecting the interests, needs or concerns of Traditional Owners. This demonstrates that the governance body does not reflect upon the relevance of TO representative status as essential for the success of the

9 *Committee Hansard*, 30 October 2017, p. 23.

10 Rum Jungle Traditional Owner Liaison Committee, *Submission 90*.

11 Rum Jungle Traditional Owner Liaison Committee, *Submission 90*, p. 1.

> project, nor does it offer opportunity to equally represent their status at the Governance table.[12]

7.13 The Northern Territory Department of Primary Industry and Resources, which is responsible for the Northern Territory Government's involvement in the project, declined an opportunity provided by the committee to respond to the issues raised in the traditional owners' submission.

McArthur River mine

7.14 The McArthur River Mine is an open-cut zinc, lead and silver mine located in the Gulf of Carpentaria, 900 kilometres southeast of Darwin, and has been operating since 1995. The McArthur River Mine and surrounding areas are situated in the country of the Yanyuwa, Garawa, Mara and Gurdanji peoples.

7.15 Various environmental concerns have been raised about the mine in recent years, including waste dump seepage and acid drainage issues, pollutants entering the McArthur River system, and spontaneous combustion of the waste rock dump at the site.[13]

7.16 Following the committee's site visit to the McArthur River mine in October 2017, the committee took evidence at a public hearing in nearby Borroloola from local community members and Traditional Owners concerning the mine. Witnesses at the hearing raised a number of concerns about the mine, its environmental impact, and the way in which Aboriginal communities have been consulted during the life of the mine.

7.17 Garawa elder Nancy McDinny told the committee there is significant uncertainty within the local community as to how the mine has affected the health of the McArthur River:

> When I saw the river, I used to see fish jumping everywhere. Now… There's no fish there. We used to see fish jumping everywhere, and we lived on both sides of the river—Yanyuwa and Garrwa on that side, and we lived down the river, and we were always going fishing there. This is why we're just worrying about the fish, the river.
>
> No-one is telling us what's happening on the river. We need to know. We're the people living down there, so we need to know what's going on on the river. Our old people are all dying, and we're here, and we want to talk to someone. We need that mine to be closed, because we are living down there, and we don't want our people to get sick. We're the ones who will be copping it down here.

12 Rum Jungle Traditional Owner Liaison Committee, *Submission 90*, p. 3.

13 See: Australian Conservation Foundation, *Submission 27*, pp. 10–11; Jane Bardon, *ABC News Online*, 'McArthur River Mine: Environmental concerns deepen over Glencore's expansion plan', 8 June 2017, http://www.abc.net.au/news/2017-06-08/mcarthur-river-mine-environmental-concerns-over-expansion-plan/8600394 (accessed 18 July 2018).

> Our people still go fishing. We don't know what's wrong with the river. People should tell us what's going on in the river. This is our life. We're worrying about our lives, our children's lives.[14]

7.18 Witnesses told the committee that the community was not satisfied with water quality monitoring undertaken by the mine's independent environmental monitor, and that a lack of trust has arisen on this issue because no local indigenous representatives have been trained to be directly involved in the monitoring activities.[15]

7.19 In addition to environmental concerns, Mr Jack Green told the committee that traditional owners had been denied access to walk along traditional songlines in mining lease area without mine employees accompanying them; and that the mine operator was unwilling to train Aboriginal people so they could undertake this role.[16]

7.20 Further, the committee heard that consultation between the mine operator and Aboriginal custodians had been unsatisfactory. Witnesses told the committee that while some local individuals in the community had been engaged by the mining company for consultation, there was limited engagement with the broader community, and the mining company had failed to communicate with all relevant traditional owner groups.[17]

7.21 The committee heard that Glencore's proposed closure strategy for the site, which is currently subject to an Environmental Impact Statement and approval process, has not been supported by indigenous landholders in the area, and that these groups advocate an alternate closure strategy involving the complete backfilling of the open cut pit at the mine.[18]

Role of the Commonwealth in protecting native title interests

7.22 Dr Lawrence and Professor O'Faircheallaigh recommended that to improve the ability of Indigenous communities to fully participate in rehabilitation and closure, the Commonwealth must 'lead a complete overhaul of state policy and legislation in relation to mine rehabilitation and closure to ensure that native title interests are fully recognised and protected'. By taking this approach:

> …the Commonwealth will do a huge service to all Australians. Aboriginal people have the most to lose from poor mine rehabilitation, and putting them in a position to protect their interests is the best way of promoting

14 Ms Nancy McDinny, *Committee Hansard*, 31 October 2017, p. 2. See also Mr Bruce King, *Committee Hansard*, 31 October 2017, p. 9.

15 Ms Nancy McDinny and Mr Gadrian Hoosan, *Committee Hansard*, 31 October 2017, pp. 4–5.

16 Mr Jack Green, *Committee Hansard*, 31 October 2017, pp. 3 and 5-6.

17 Mr Gadrian Hoosan and Mr Jack Green, *Committee Hansard*, 31 October 2017, pp. 4–5 and 8–9.

18 Ms Lauren Mellor, Community Campaigner, Environment Centre Northern Territory, *Committee Hansard*, 31 October 2017, p. 11.

> Australia's need to ensure that mines are rehabilitated to the highest standard possible.[19]

7.23 Dr Lawrence and Professor O'Faircheallaigh noted further in their submission that in cases where the National Native Title Tribunal (NNTT) makes a determination that mining leases should be granted on native title land, it has the ability to impose conditions relating to mine rehabilitation and closure in order to protect native title rights; however, the NNTT has not imposed such conditions in past approvals. Dr Lawrence and Professor O'Faircheallaigh recommended that the Commonwealth direct the NNTT to impose conditions in these cases that require meaningful Aboriginal participation in decision making on mine closure, rehabilitation and post-closure issues.[20]

7.24 Dr Lawrence and Professor O'Faircheallaigh also contended that further support is required from the Commonwealth for native title holders and claimants in the process of negotiating native title agreements in relation to major mining projects, in order to ensure that such agreements deal comprehensively with mine closure, rehabilitation, and post-closure.[21]

7.25 Ms Rhonda Yates, Manager, Minerals and Energy at the Northern Land Council, expressed the view that 'independent cultural impact assessments and social impact assessments should be undertaken according to best-practice methodologies for all resources development proposals' as part of the environmental impact statement (EIS) process.[22]

Employment opportunities relating to mine rehabilitation works

7.26 The committee heard a range of evidence in relation to the potential for greater investment in mine site rehabilitation to create new employment opportunities and additional economic benefits, both at currently operating sites and at abandoned mines.

7.27 The Lock the Gate Alliance noted in its submission:

> Improved mine rehabilitation planning and execution will extend employment at operating mines beyond "last ore" through the active rehabilitation stage and into the longer "passive" stage that includes revegetation, maintenance and monitoring through to relinquishment. This may take several decades in many instances.[23]

19 *Submission 82*, p. 4.

20 *Submission 82*, p. 4.

21 *Submission 82*, p. 4.

22 *Committee Hansard*, 30 October 2017, p. 6.

23 *Submission 9*, p. 16.

7.28 The Construction, Forestry, Mining and Energy Union stressed the role these rehabilitation works can play in helping communities during the transition period associated with the cessation of mining activities in an area:

> Mine closures are inevitably a traumatic loss for a region where mining is usually a major activity and a source of much employment and economic demand. The post-mining phase of rehabilitation is a major means by which the transition to life after mining may be managed. The sudden and large loss of jobs is mitigated if there is significant rehabilitation employment. This mitigates the social and economic impact of sudden major unemployment and gives the regional community more time to adjust. Rehabilitation projects, just like most mining projects themselves, are generally not long term, but their good management in a manner that benefits the local community can be a significant contributor to the transition process.[24]

Estimates of job creation opportunities in rehabilitation works

7.29 Several submitters and witnesses provided the committee with estimates of the number of jobs that could be created through increased focus on mine rehabilitation activities.

7.30 The Australia Institute provided the committee with an estimate of potential mine rehabilitation jobs in Queensland. Using the Queensland Government's estimation of 220,000 hectares of unrehabilitated land in the state, and rehabilitation workforce estimates provided in the Adani Carmichael Coal Mine Environmental Impact Statement, the Australia Institute estimated that around 18,000 people would be required over five years to address all of Queensland's unrehabilitated mined land.[25] It stated that this estimate was not intended to be definitive, but to 'provide some order of magnitude of how many people might be employed with increased mine site rehabilitation', noting that many factors could affect the accuracy of such figures.[26]

7.31 Mr Peter McCallum, Coordinator of the Mackay Conservation Group, commented that the failure of companies to undertake adequate rehabilitation 'is costing jobs for people in Central Queensland', stating that 2,000 jobs could be created over 10 years in rehabilitation mine sites in the state.[27] Mr McCallum explained:

> We think that mine rehabilitation can be a very useful tool in maintaining the economies of some of those mining towns in Central Queensland. If the mining companies are required to do rehabilitation regardless of the economic circumstances of the industry then that would act as an automatic stabiliser in employment and provide jobs for people who already have

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24 Construction, Forestry, Mining and Energy Union, *Submission 10*, p. 7.

25 The Australia Institute, *Supplementary Submission 13.1*, p. 1.

26 The Australia Institute, *Supplementary Submission 13.1*, p. 4.

27 *Committee Hansard*, 12 July 2017, p. 20. See also: Greenpeace Australia Pacific, *Submission 25*, p. 6.

> skills such as driving bulldozers and trucks on those mine sites, and would continue to maintain employment over downturn periods in the mining industry.[28]

7.32 The Lock the Gate Alliance argued similarly about the prospects of rehabilitation jobs in Queensland:

> [B]ringing mines out of care and maintenance into closure and rehabilitation could deliver hundreds of jobs in areas such as Central Queensland where according to the Department of Natural resources and Mines there are six open cut coal mines in care and maintenance. Rehabilitating these mines will require a significant investment in plant, equipment and people given all these sites have low rates of progressive rehabilitation meaning the majority of these sites remain in a disturbed condition requiring significant earthworks and other physical works to complete the final landforms.
>
> The spin offs or multiplier effects of an investment in rehabilitating mines in care and maintenance in Central Queensland and elsewhere will deliver thousands of jobs and billions of dollars worth of investment in rural and regional Australia over the decades required to rehabilitate these sites.[29]

7.33 The Lock the Gate Alliance argued that the employment opportunities for the rehabilitation of abandoned mines in remote Australia 'are even more significant'. It argued that a strategic, well-funded abandoned mines rehabilitation program targeting high risk sites could generate approximately 1,800 direct jobs and a further 4,300 indirect jobs in rural and regional Queensland.[30]

7.34 Environment Victoria used existing figures on mine rehabilitation expenditure and job creation in the United States to estimate potential expenditure and job creation opportunities that could arise from the rehabilitation of the Latrobe Valley coal mines. It estimated that between 254 and 626 jobs could be created per year over 20 years to complete rehabilitation works at these three sites, depending on final rehabilitation and closure costs.[31] Environment Victoria noted that the types of jobs that are typically involved directly in coal mine rehabilitation include environmental and technical managers, engineers, geologists, biologists, technicians, surveyors, heavy equipment operators, and general labourers.[32]

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28 *Committee Hansard*, 12 July 2017, p. 20. See also: AusIMM, *Submission 11*, p. 4.

29 Lock the Gate Alliance, *Submission 9*, p. 16.

30 Lock the Gate Alliance, *Submission 9*, p. 16.

31 Environment Victoria, *Submission 15*, Attachment 1, pp. 6–7.

32 Environment Victoria, *Submission 15*, Attachment 1, p. 7.

7.35 Some submitters and witnesses were less optimistic about the prospect of significant additional employment opportunities arising through mine rehabilitation programs associated with currently operating mines. For example, the Minerals Council of Australia submitted:

> There are no mass employment opportunities in rehabilitation that follow the mining phase. Rehabilitation, including the development of a post-mining land form, is integrated into the operation of a mine. Mine planning allows the workforce responsible for mining to also undertake work essential for rehabilitation. In most cases there is no single separate workforce that undertakes on-ground rehabilitation and closure activities.[33]

7.36 Mr Chris McCombe, Senior Advisor, Environment at the Minerals Council, explained further to the committee the difficulties associated with attempting to estimate how many employees on an active mine site are involved in rehabilitation works:

> With respect to mining and rehabilitation as part of an operating mine, there are no discrete figures that you could pull out with respect to: these people do rehabilitation, these people do mine planning, these people do water management, these people do some other aspects—they drive dozers. Very much it forms part of an integrated workforce. It is not a case of pulling out, 'This is team A, B or C, therefore we can contribute this number of people specifically to mine rehabilitation.' It is very much part of a whole-of-life operation of a mine.[34]

7.37 The Closure Planning Practitioners Association (CPPA) stated in its submission that primary earthworks and revegetation activities account for the bulk of closure costs and associated employment opportunities. If these works are undertaken progressively during the mine life, the final rehabilitation and decommissioning works are left to be completed within a brief period at the end of the mine life:

> These end of mine life activities usually require specialised, industry specific competencies. The associated work programs generally run for short periods of time (i.e. 2–3 years) with long periods of planning and inactivity. Post closure monitoring and maintenance occurs for longer periods, but different types of monitoring may require different specialist skills, and work is conducted by a small number of people in campaigns. Thus, opportunities for rehabilitation employment may be limited and unsustainable at a local level. Opportunities for rehabilitation employment may be sustainable at a regional or State level, however the volume of employment is unlikely to be sufficient to offset the economic impact of mine closure on communities.[35]

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33 Minerals Council of Australia, *Submission 50*, p. 35.

34 Mr Chris McCombe, Senior Advisor, Environment, Minerals Council of Australia, *Committee Hansard*, 12 July 2017, p. 68.

35 Closure Planning Practitioners Association, *Submission 3*, p. 6.

Need for new expertise in technical mine closure and rehabilitation roles

7.38 The ARC Centre for Mine Site Restoration argued that the need for greater technical expertise to help guide ecological restoration programs at mine sites provides significant employment potential:

> Restoration industries are potentially major employers, and international standards for restoration note a ripple effect of social and economic benefit to the broader community results from effective rehabilitation. Mining development can be reconciled with successful restoration, but only with targeted investment to generate industry ready professionals with the skills to research and develop new biodiversity management strategies and the technologies for the successful re-instatement of resilient, functional, and representative plant communities.
>
> Delivering restoration at a scale that achieves *timely* and *cost-effective* mine-closure capability will require the training of new scientists to deliver new approaches to science-driven innovation and technology. Effective restoration solutions, and scientists trained in their development and application, are needed now if resource development and Australia's prosperity is to be assured and the resource sector continues to operate with community and environmental confidence in the long-term.[36]

7.39 The CPPA commented more broadly on the role of mine closure planners in the rehabilitation process and the need for greater investment in this area:

> Legacies and liabilities of mining are managed through the multi-disciplinary process of mine closure planning. Mine closure planners develop strategies, engage with stakeholders and estimate the costs associated with closing, decommissioning and rehabilitating mines. Key to the mine closure planning function is the ability to recognise gaps in knowledge, techniques and other issues that may result in an adverse closure outcome.[37]

7.40 The CPPA noted that while most professionals employed in this area hold tertiary qualifications, there is 'no recognised qualification in closure planning and management':

> While there are pockets of excellence in mine closure planning within industry (mining companies and their advisors) and regulation, as a whole, there are relatively few people with the skills and experience necessary to effectively plan and execute mine closure. In addition to this, the discipline of mine closure planning is rapidly evolving as knowledge of effective mine closure techniques improves.[38]

7.41 The CPPA argued that the lack of formal training and qualification pathways in this area has led to a capability and capacity deficiency within the industry, impacting the quality of mine closure outcomes. It recommended that the

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36 *Submission 64*, p. 4 (italics in original).

37 Closure Planning Practitioners Association, *Submission 3*, p. 7.

38 Closure Planning Practitioners Association, *Submission 3*, p. 7.

Commonwealth develop a competency framework for mine closure planning practitioners to ensure that standards are consistent across all states and territories. The CPPA recommended further that the Commonwealth take steps to facilitate education and training in order to address skills gaps in the mine closure planning industry.[39]

Increasing Indigenous employment in rehabilitation and monitoring roles

7.42 Several stakeholders commented on the potential for traditional landowners to be engaged in employment opportunities arising through rehabilitation and monitoring work. Ms Rhonda Yates, Minerals and Energy Manager at the Northern Land Council, told the committee:

> There are employment opportunities. [Traditional owners] know the country. Especially when we talk about protection of sacred sites, they know where to go and where not to go. You'll find a lot of traditional owners would like to have employment and assist with the process as an effort of helping them manage their cultural land.[40]

7.43 The Lock the Gate Alliance submitted:

> Within this broader opportunity [for rehabilitation employment], there is the potential to created hundreds of jobs in indigenous communities. The Queensland abandoned mines programme could be linked to the successful Indigenous Rangers programme whereby long-term maintenance, monitoring and management of rehabilitated mine sites could be handed over to existing and expanded regional indigenous ranger programmes.[41]

7.44 Ms Corinne Unger commented that the potential value of employment in regional Australia for Indigenous and non-Indigenous communities requires further research, and similarly argued that stronger links could be developed between abandoned mine works and the Indigenous Rangers program.[42]

7.45 The ARC Centre for Mine Site Restoration contended that focusing on full ecological restoration at mine sites can result in ongoing job opportunities in local communities over significant timeframes, including opportunities for indigenous employment:

> Monitoring and remediation of restoration sites is required until the ecosystem can be determined to be completely restored; the time scale required for these activities continues well past the cessation of mining and would support both regional and local employment. The case of Karara Mining who are developing Australia's first mining based native seed farm using a local indigenous workforce is one example of how substantial,

39 *Submission 3*, p. 7.

40 *Committee Hansard*, 30 October 2017, p. 8.

41 Lock the Gate Alliance, *Submission 9*, p. 16.

42 Ms Corinne Unger, *Submission 37*, p. 7.

> enduring and authentic social benefits arise when the mining industry focuses on restoration excellence.[43]

7.46 The Minerals Council of Australia cited the example of Rio Tinto's Weipa bauxite mine in Far North Queensland as another case where Traditional Owners have been actively engaged in rehabilitation employment:

> Rio Tinto Weipa's community seed collection programme has been running for a number of years and supports Traditional Owners to have a leading role in the land rehabilitation process.
>
> Since 2010 Rio Tinto has engaged a local Indigenous business to facilitate the community programme and engagement, which sees Traditional Owners register as pickers to collect native under storey seed required for land revegetation… In addition to the direct income returned to communities, there are other benefits for Traditional Owners including the opportunity to collect seed on country and greater understanding of the rehabilitation process used on an area after mining has finished.[44]

43 *Submission 64*, p. 4.

44 Minerals Council of Australia, *Submission 50*, p. 23.

Chapter 8

Proposals for Commonwealth regulatory reform

8.1 In addition to the specific potential regulatory reform measures discussed in previous chapters, some broader reform options at the Commonwealth level were also raised during the committee's inquiry. These various proposals included:

- the establishment of a Commonwealth Environmental Protection Authority to focus on issues including mine rehabilitation;[1]
- the establishment of a National Mine Rehabilitation Commission; and
- the development of enforceable national standards relating to mine rehabilitation.

8.2 Submitters and witnesses also commented on possible reforms to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in relation to mine rehabilitation.

A federal body overseeing mine rehabilitation in Australia

8.3 Several submitters and witnesses took the view that greater Commonwealth oversight of mining rehabilitation requirements and practice is required to provide consistency at a national level.

A Commonwealth Environmental Protection Authority

8.4 The Lock the Gate Alliance submitted that suggested reforms to the regulatory framework governing mine rehabilitation can be implemented individually or could be managed and facilitated under a Commonwealth Environmental Protection Authority (EPA):

> We believe the establishment of such an Authority is long overdue and would ensure a nationally consistent and coordinated approach to a range of issues related to the management, regulation and protection of Australia's biodiverse and resource-rich environment.
>
> We believe the reform of Australia's approach to mine closure and rehabilitation would be best achieved through the establishment of a Commonwealth EPA. The EPA would have direct carriage of EPBC [Act] conditioning, national standards and potentially incorporate the proposed National Abandoned Mines Commission within its structure. The EPA could also drive and facilitate [a] review of State and Territory mine rehabilitation liabilities, asset transfers and financial reporting—in partnership with other Commonwealth Agencies.[2]

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1 See: Hunter Communities Network, *Submission 19*, p. 2; Maules Creek Community Council, *Submission 46*, p. 5;

2 Lock the Gate Alliance, *Submission 9*, p. 2. See also: Hunter Communities Network, *Submission 19*, p. 2; Maules Creek Community Council, *Submission 46*, p. 5; Mr Harley Lacy, *Submission 77*, p. 4.

A National Mine Rehabilitation Commission

8.5 Environmental Justice Australia argued that without federal oversight, state jurisdictions 'will continue to fail in their regulation and enforcement of adequate mine rehabilitation'. It stated further:

> Federal oversite of mine rehabilitation is beneficial for several reasons… [A] coordinated approach ensures consistency in mine rehabilitation preparation, regulation and enforcement, increasing the likelihood that community expectations will be satisfied[.][3]

8.6 Environmental Justice Australia recommended that the committee consider the establishment of a National Mine Rehabilitation Commission (NMRC), a body to be comprised of environmental scientists, environmental engineers, environmental and commercial legal experts, with a mandate to devise and implement a national mine rehabilitation strategy. It would include a statutory National Mine Rehabilitation Commissioner with appropriate investigative and enforcement powers to ensure that the national mine rehabilitation coordination plan is adequately implemented.[4]

8.7 Under this proposed model, the functions of the NMRC and Commissioner would be to investigate and report on:

- the status of all mines in each jurisdiction (i.e. in use, mothballed, abandoned);
- the planning requirements for mine rehabilitation in each jurisdiction;
- rehabilitation plans for each mine;
- financial mechanisms for mine rehabilitation;
- laws regarding enforcement to comply with rehabilitation, including where a company goes into administration or claims inability to fulfil rehabilitation requirements;
- estimate the accurate cost to each jurisdiction for adequate rehabilitation for each mine site; and
- preparing a community consultation strategy.

8.8 A national mine rehabilitation plan developed by the NMRC would set out national regulations and standards for mine rehabilitation and closure.[5]

National standards for mine site rehabilitation

8.9 A significant number of stakeholders argued for the development of enforceable national standards relating to mining rehabilitation (irrespective of the establishment of a Commonwealth agency dealing with mine rehabilitation issues).[6]

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3 Environmental Justice Australia, *Submission 26*, p. 6.

4 *Submission 26*, p. 6.

5 Environmental Justice Australia, *Submission 26*, p. 7.

8.10 The Lock the Gate Alliance argued that while industry and the Australian government have at various points collaborated to produce leading practice guidance material relating to mine rehabilitation (as noted in Chapter 2), 'in the absence of a process that sees this guidance translated into action on the ground, they have little impact on rehabilitation performance'.[7] Lock the Gate recommended that in order to drive improvement in rehabilitation performance, the Commonwealth should commit to working with Australian states and territories to develop a set of national standards covering issues including:

- adequacy of financial assurance mechanisms, including ensuring that state and territory security deposit or bond calculators cover the full cost rehabilitation and reflect industry best practice;
- final land form and land use policies (including the use of open pit voids, out of pit waste dumps and above ground tailings storage facilities);
- adequacy of legal requirements requiring progressive rehabilitation and best practice mine closure planning (including the design of enforceable progressive rehabilitation targets aimed at maximising the area of rehabilitation during the mine's operational life);
- closing loopholes that allow mining companies to place sites in indefinite 'care and maintenance';
- assessment regimes around the sale of aging mine assets to smaller operators;
- adequacy of monitoring and enforcement regimes, including strong legal penalties for noncompliance;
- investigation of mine rehabilitation strategic plans at the state and territory level, designed to deliver a coordinated approach that maximizes local employment and minimizes long-term environmental legacies; and
- adoption of the International Council on Mining and Metals and local industry mine closure planning guidance, to mandate the submission of stand-alone closure plans as part of the mining lease approval process.[8]

8.11 Dr Peter Erskine from the Sustainable Minerals Institute at the University of Queensland commented that creating some national minimum standards for rehabilitation would be helpful, using the Society for Ecological Restoration Australasia's (SERA) recently released *National Standards for the Practice of Ecological Restoration in Australia* as a reference point:

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6 Environment Council of Central Queensland, *Submission 4*, p. 2; Maules Creek Branch of the Country Women's Association of NSW, *Submission 7*, p. 2; Hunter Communities Network, *Submission 19*, pp. 3–4; Greenpeace Australia Pacific, *Submission 25*, p. 4; Australian Conservation Foundation, *Submission 27*, p. 2; Ms Lauren Mellor, Community Campaigner, Environment Centre Northern Territory, *Committee Hansard*, 31 October 2017, p. 12.

7 Lock the Gate Alliance, *Submission 9*, p. 23.

8 Lock the Gate Alliance, *Submission 9*, p. 24 and *Supplementary Submission 9.1*, p. 2.

> I think it is time to set some standards… At the very least, I would think, that nationally, when a mine site is going to undertake what should be called restoration, they follow those [SERA restoration] standards, and those standards allow the operator, or whoever is managing the project, to have [a] one- to five-star system as to how well they are going to restore a site. That could be tied to financial incentives around how well they are going to put back or restore a site.
>
> It's timely—actually, it's probably quite late to have some sort of national standard.… I definitely think we need a coordinated approach—apart from abandoned mines—on how we assess not just the voids, but also the ecosystems we are putting back. Every state has a different way to gauge what 'recovery' means, and even having a standardised way of monitoring it would be an advantage.[9]

8.12 Greenpeace Australia also supported the use of the SERA ecological restoration standards in developing appropriate national mine rehabilitation standards.[10]

8.13 Industry representatives were more circumspect about the possibility of national standards for mine site rehabilitation. Mr Chris McCombe, Senior Advisor Environment for the Minerals Council of Australia, commented:

> With respect to national standards, I would suggest the industry is open to engaging in the development of advisory guidelines through a collaborative approach. That is one approach that I think we would be willing to consider. With respect to standards, we need to be very, very careful about how we would approach that, because there is no one-size-fits-all approach to rehabilitation. In some cases, full ecological restoration might be appropriate. In other cases, we might be returning land to farmland or establishing a wetland. So there is no one-size-fits-all approach, and it all depends on the local community's expectations. It also depends on the type of mining that is taking place, so great care would be needed for any suggested standards. Instead, there might be opportunities for advisory guidelines, which would be fit for purpose and adaptable by the states and, maybe, fit for purpose for regional use as well.[11]

8.14 Mr Peter Walker, General Manager, Care and Maintenance at Copper Mines of Tasmania, noted the need for sufficient flexibility in in standards if they are to be implemented nationally:

> I'm not sure if you want to have identical standards everywhere. Even each mine needs to be treated with its own particular set of circumstances. I think there can be some common ground on a lot of the standards, which I think would be very useful, but, in terms of the prescriptive detail, the environment's different. In Tasmania, we have water issues that they don't have in Central Australia, for example. I think some common themes across

9 *Committee Hansard*, 12 July 2017, p. 15.

10 Greenpeace Australia, *Submission 25*, p. 5.

11 *Committee Hansard*, 12 July 2017, p. 72.

> the legislation would be useful, and it's especially useful for companies that do have a presence across multiple states.[12]

Broader industry comments on Commonwealth regulatory role

8.15 Industry stakeholders providing input to the inquiry cautioned more broadly against increasing the level of Commonwealth involvement in the regulation of mining rehabilitation. The Minerals Council of Australia submitted that:

> …state and territory governments should continue to have primacy in the regulation of mine rehabilitation, closure and financial assurance. Each jurisdiction already has in place a mature regulatory framework for managing these matters.[13]

8.16 These stakeholders contended that the Commonwealth's contribution to improved rehabilitation and policy outcomes should generally be limited to: facilitating dialogue between jurisdictions (for example, through COAG Energy Council working groups) and industry to share knowledge and improve practice; and continuing to promote leading practice approaches—for example, through the publication of relevant guidance and leading practice handbooks.[14]

8.17 BHP Billiton argued against any further Commonwealth legislative or regulatory interventions, contending that states and territories 'are the most appropriate level of government to have authority over mining rehabilitation for three key reasons':

- The Commonwealth does not possess the on-ground capacity to undertake site level regulatory enforcement.
- Successful mining rehabilitation requires significant and ongoing engagement with the local community over an extended period of time. State and territory authorities are the most appropriate tier of government to be a party to local level of community engagement in the form of community consultation committees and local environmental conservation groups. We do not believe the Commonwealth is appropriately positioned to oversee this sort of community level engagement.
- State and Territory Governments ultimately bear the greatest proportion of risk in the event of a rehabilitation default. As such, they should be the decision maker that determines what level of financial assurance is appropriate for the risk of each project.[15]

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12 *Committee Hansard*, 12 October 2017, p. 14.

13 Minerals Council of Australia, *Submission 50*, p. 38. See also: Chamber of Minerals and Energy of Western Australia, *Submission 23*, p. 5; NSW Minerals Council, *Submission 49*, p. 6; Rio Tinto, *Submission 48*, p. 6; Glencore, *Submission 57*, p. 4.

14 Glencore, *Submission 57*, p. 6; Minerals Council of Australia, *Submission 50*, p. 5; Chamber of Minerals and Energy of Western Australia, *Submission 23*, p. 8; NSW Minerals Council, *Submission 49*, p. 6.

15 *Submission 54*, p. 6.

8.18 BHP did argue, however, that better coordination across jurisdictions in relation to rehabilitation issues is desirable:

> We believe there is an opportunity for State and Territory authorities to more closely coordinate closure and rehabilitation approaches. Greater consistency would make it easier for companies operating in multiple jurisdictions to transfer the expertise they have gained in one jurisdiction to another. Given the relatively small pool of highly experienced rehabilitation practitioners in Australia, this would enhance the ability of these experts to deliver better environmental outcomes across the country.[16]

Reforms to the EPBC Act assessment and approvals process

8.19 Some stakeholders proposed specific changes to the EPBC Act or the way it is being implemented in respect of mine site rehabilitation issues.

8.20 The Lock the Gate Alliance argued that the Commonwealth needs to review the stringency of conditioning provisions under the EPBC Act in order to ensure that approved mines have the lowest possible impact on matters of national environmental significance (MNES). It proposed that specific conditions relating to mine rehabilitation should be included in EPBC Act approvals for these projects, including the following:

- the proponent must submit a full life of mine and closure plan at the approvals stage which includes rehabilitation strategies designed to specifically protect at risk MNES;
- the proponent must submit a progressive rehabilitation plan, including rehabilitation targets designed to enhance the protection of the at-risk MNES during the mine's operational life;
- the Commonwealth should require an independent assessment of the closure cost estimate, based on the closure plan that informs the relevant jurisdiction's level of financial assurance, with specific reference to protecting the MNES; and
- the final landform and land use must reflect the lowest possible residual impact on the at-risk MNES and mandate that voids are backfilled and out of pit waste rock dumps and tailings storage facilities are eliminated where these landforms have a demonstrable residual impact on MNES.[17]

8.21 The Australian Conservation Foundation argued that the Department of the Environment and Energy should develop a nationally consistent approach to setting conditions for the performance and operation of mine rehabilitation for the benefit of matters of national environmental significance, including:

- performance and occupancy criteria for habitat restoration for threatened and migratory species and ecological communities;

16 *Submission 54*, p. 6.

17 Lock the Gate Alliance, *Supplementary Submission 9.1*, p. 4.

- desired environmental outcomes, void infill and landscape repair, make-good arrangements and steady state conditions for water resources; and
- utilisation of bonds or other financial assurances for the rehabilitation of groundwater, air pollution and threatened species and ecological community impacts.[18]

8.22 Environment Victoria argued that the EPBC Act should be reviewed to ensure that rehabilitation plans of mines are always considered during the assessment and approvals process, to ensure that the objectives and principles of the EPBC Act are upheld.[19]

8.23 Greenpeace Australia Pacific argued that the current wording of section 134 of the EPBC Act, which deals with the imposition of approval conditions on projects, needs to be strengthened in order to make it clear that the Minister should take into consideration that conditions may be required to specifically repair or rehabilitate projects that could impact MNES.[20]

8.24 Some stakeholders argued conversely that the EPBC Act assessments and approvals process is largely duplicative and unnecessary, given the regulatory processes already in place at the state and territory level. For example, the Association of Mining and Exploration Companies (AMEC) submitted:

> State and Territory Government agencies manage their own application, assessment, decision making, enforcement and compliance processes through local mining and environment protection legislation.
>
> …
>
> [Additional consideration through the EPBC Act processes] is an inefficient and costly duplication of resources, both from an industry and Government perspective. There are no additional environmental outcomes or benefits from this arrangement.
>
> It is for these reasons that AMEC has been a strong supporter of the proposal to delegate the Commonwealth Minister's assessment and approval powers under the EPBC Act to accredited State and Territory Governments through the bilateral Agreements.
>
> This delegation should also include compliance and enforcement matters, such as remediation, rehabilitation and relinquishment of mining areas.
>
> State and Territory Government agencies already have local, on-the-ground and specialist experience and knowledge of each mining related project, and are in a far better position on which to manage and monitor a remotely located project which could be hundreds of kilometres from the nearest town.[21]

18 *Submission 27*, p. 6.

19 *Submission 15*, pp. 4–5.

20 *Submission 25*, pp. 9–10.

21 *Submission 16*, p. 7.

Chapter 9

Rehabilitation of power station ash dams

9.1 As noted in Chapter 1, the inquiry's terms of reference were amended in March 2018 to incorporate consideration of the rehabilitation of power station ash dams in Australia. The committee received 16 submissions relating to this issue, and held a public hearing at Port Augusta, SA, on 3 September 2018. The committee also conducted a site visit at the Augusta Power Stations on 3 September 2018 to examine the ash dam at that site.

9.2 This chapter provides an overview of power station ash dam production and storage in Australia, and outlines some of the environmental and community impacts that can arise from power station ash dams. It then discusses best practice approaches to managing and rehabilitating these structures, and examines current industry practice and the regulatory framework governing these operations in Australia.

Overview of power station ash production and storage in Australia

9.3 Coal combustion products (CCPs), referred to commonly as 'power station coal ash' or 'coal ash', are the solid particulates that remain after the combustion of coal within the furnace of a coal fired power station.[1] CCPs include many types of non-combustible components, of which fly ash (ash derived from exhaust gas), furnace bottom ash, boiler slag and cenospheres are the most common.[2]

9.4 Statistics provided by the Ash Development Association of Australia (ADAA), an association of coal fired power station ash producers and downstream businesses which promotes the use of coal ash as a valuable secondary resource, show that approximately 12.1 million tonnes of CCPs were produced in Australia in 2016. Of this total, 4.8 million tonnes of CCPs were then utilised for a secondary purpose, while the remainder (approximately 7.3 million tonnes) was placed into onsite storage ponds, also known as 'ash dams'.[3] Approximately 500 million tonnes of CCPs are currently stored in these ash dams around Australia.[4]

9.5 The ADAA forecasts that annual production volumes of CCPs in Australia will continue to exceed 12 million tonnes until 2025.[5] It noted further that more than 1.1 billion tonnes of CCPs were generated globally in 2015, with 687 million tonnes (62 per cent) of that product used beneficially.[6]

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1 Ash Development Association of Australia, *Submission 78*, p. 3.

2 Ash Development Association of Australia, *Submission 78*, p. 3; Greenpeace Australia Pacific, *Supplementary Submission 25.1, Attachment 1*, p. 6.

3 Ash Development Association of Australia, *Submission 78*, p. 3.

4 Ash Development Association of Australia, *Submission 78*, p. 2.

5 Ash Development Association of Australia, *Submission 78*, p. 2.

6 *Submission 78*, p. 2.

9.6 A group of academics from the Department of Civil Engineering at Monash University provided the committee with a research paper outlining current perspectives, challenges and opportunities for fly ash utilisation and ash dam reclamation in Australia (the Monash University paper).[7] The paper stated that Australian coal has a relatively low fly ash content of 10–15 per cent, and that Australia produces the largest amount of ash per capita amongst major coal producing countries. Table 9.1 shows ash production and utilisation rates of several major coal producing countries in recent years.

Table 9.1: Fly ash production and utilisation of major coal producing countries

Country	Ash Produced (Million tonnes)	Percentage Utilised	Year	Ash Produced per million people (Tonne)
Australia	10.96	44.34%	2016	466.04
India	176.74	61%	2016	131.98
China	580	69%	2014	41.61
Russia	26.6	18.79%	2010	411.49
USA	43.5	55.07%	2016	184.74
UK	4.63	70.33%	2014	69.96

Source: Tushar Gupta, Alec Miller and Mohan Yellishetty, *Current Perspective, Challenges and Opportunities for fly ash utilisation and pond reclamation in Australian scenario*, included in *Supplementary Submission 74.2*, p. 4.

Power station ash dams in Australia

9.7 Aurecon, an engineering firm currently providing dam safety and management services to 15 large ash dams and storage areas, including nine in New South Wales and Queensland, provided an overview of the role of power station ash dams:

> Ash dams are storage [or] containment structures, constructed as part of the key infrastructure for any coal fired power station. As the name suggests, it is a dam that stores the ash generated from the burning of coal, over the life of the station. This ash typically arrives at the dam in the form of a slurry mix, roughly 30% ash to 70% water, pumped via a dedicated pipeline. There are however a small number of ash storage facilities that are operated as a 'dry' facility, where solid ash is transported to the containment area via a trucking (or conveyor) operation, and moved [or] compacted into place using bulldozers, broadly similar to a typical landfill operation.[8]

7 Tushar Gupta, Alec Miller and Mohan Yellishetty, *Current Perspective, Challenges and Opportunities for fly ash utilisation and pond reclamation in Australian scenario*, included in *Supplementary Submission 74.2*, pp. 3–33.

8 *Submission 85*, pp. 1–2.

9.8 Aurecon noted that very few of the current generation of coal fired power stations in Australia have reached the end of their design life, meaning that there are not many precedents for the rehabilitation of power station ash dams in Australia.[9] It stated further that ash dams are generally older than mine tailings dams in Australia.[10]

9.9 The only example noted in the Australian context where an ash dam has been substantively rehabilitated is the dam associated with the Tallawarra Power Station, located on the South Coast of New South Wales. This site was decommissioned in the 1990s and is subject to ongoing monitoring, with no environmental issues of note arising since decommissioning.[11]

Port Augusta ash dam site

9.10 The ash dam site associated with the Augusta Power Stations near Port Augusta has been of significant interest to the committee during this phase of its inquiry. The three coal-fired Augusta Power Stations were commissioned between the 1950s and 1980s, and were privatised in 2000. It was announced in June 2015 that the stations would cease operations in May 2016, with decommissioning, site demolition and rehabilitation to occur thereafter.[12]

9.11 The Port Augusta site includes a 273 hectare ash storage dam, with the nearest residential properties located approximately 400 metres from the dam.[13] The site is one of the first ash dam sites in Australia to enter the closure and rehabilitation phase, and significant community and environmental concerns have been raised since the power stations ceased operations (discussed further below).

Environmental and health impacts associated with ash dams

9.12 The committee heard various concerns from submitters and witnesses about the negative environmental and community impacts that may arise when power station ash dams are poorly managed.

Pathways of environmental contamination

9.13 The Monash University paper provided to the committee outlined the environmental impacts that can be caused by the storage of power station ash in ash dams. These impacts include effects on surrounding water sources (hydrological route) and effects on human and environmental health via airborne dust (particulate route), as shown in Figure 9.1.

9 *Submission 85*, p. 2.

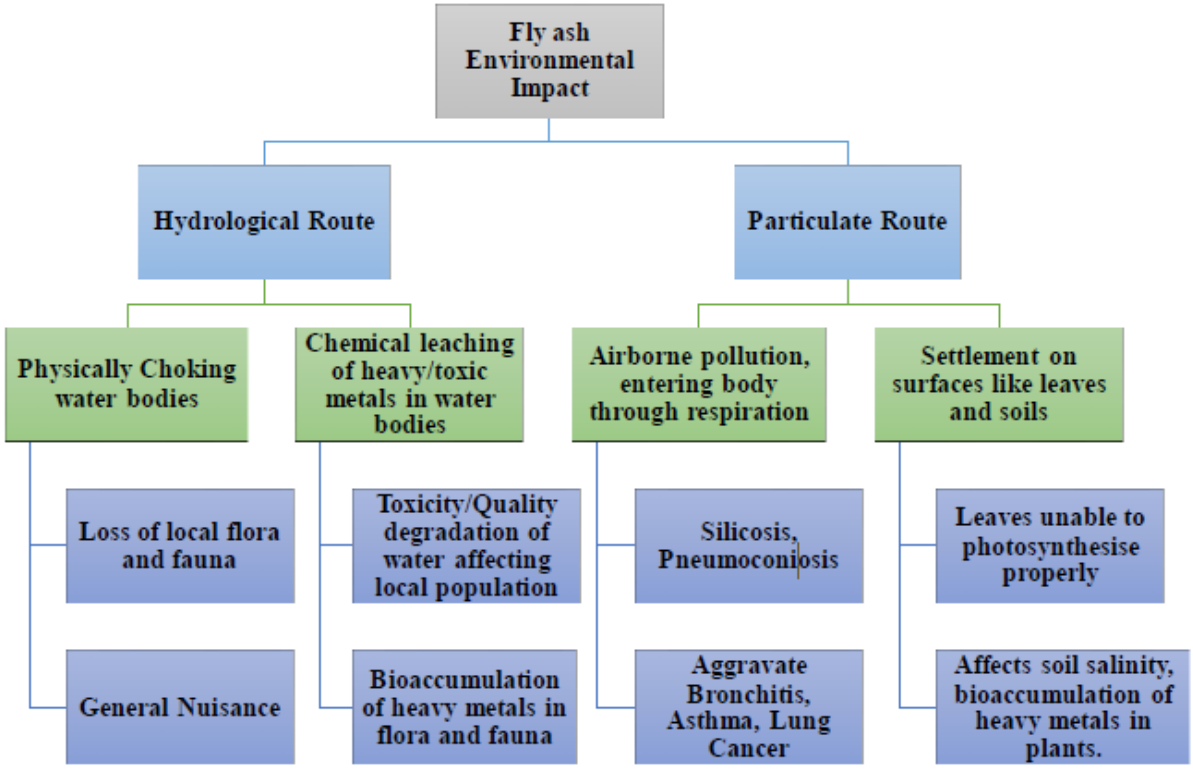
10 *Submission 85*, p. 3.

11 Mr Matthew Ludeke, Dams Engineer, Aurecon, *Committee Hansard*, 3 September 2018, p. 39.

12 Flinders Power, *Submission 89*, p. 6.

13 Flinders Power, *Submission 89*, p. 2.

Figure 9.1 Environmental impact of fly ash[14]



Leaching and water contamination impacts

9.14 The Monash University paper commented on how environmental contamination can occur through the leaching of toxic compounds into surrounding surface and groundwater bodies:

> Dumping fly ash into ash ponds often requires slurry formation and pumping of the ash slurry to the ash pond. This water slowly seeps out of the pond but is contaminated with the heavy metals and other toxic elements present in the ash itself.
>
> This contaminated water is highly detrimental to local water bodies and [the] underground water table, making the local water unsuitable for drinking. This effect has been seen in many studies on local water quality near ash ponds.[15]

9.15 The paper cited specific examples from the Latrobe Valley in Victoria where elevated environmental levels of heavy metals have been demonstrated due to coal ash leaching, as well as international examples in India where local rivers and associated fish populations had experienced problems due to the leaching of ash contaminated water.[16]

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14 Source: Monash University, *Supplementary Submission 74.2*, p. 14.

15 *Supplementary Submission 74.2*, p. 13.

16 *Supplementary Submission 74.2*, p. 13.

Impacts of ash particulate dust

9.16 The Monash University paper observed that dumped fly ash can be a source of local dust pollution, because it can easily become airborne and its fine particle size makes it a hazardous air pollutant.[17] It stated that prolonged inhalation of fly ash particles can 'lead to diseases such as silicosis, and can aggravate the conditions of bronchitis, asthma, and even lung cancer'.[18] Ash particulate contamination also may cause effects on the surrounding environment, including reduced vegetation health, impacts on soil salinity and bioaccumulation of heavy metals in plants.[19]

Toxicity of chemicals found in coal ash

9.17 The committee heard concerns about the toxicity of chemicals found in coal ash. For example, Ms Bronya Lipski, Solicitor at Environmental Justice Australia, stated:

> Coal ash waste contains the same toxic substances found in coal burnt in power stations, including arsenic, lead, mercury, cadmium, chromium and selenium. Globally, coal ash is recognised and managed as a toxic health hazard. The US [Environmental Protection Authority] found that living next to a coal ash waste site can increase the risk of cancers, and the USA's Physicians for Social Responsibility describe coal ash exposure as a grave risk to health as it can contribute to a range of adverse health impacts, including lead poisoning, heart damage, lung disease, respiratory problems, birth defects, developmental issues in children, kidney disease, cognitive deficit and behavioural problems.[20]

9.18 Not all stakeholders to the inquiry shared these concerns. For example, Mr Maroun Rahme, Managing Director of Nu-Rock, told the committee that ash found in storage dams is non-hazardous, and is classified as such by regulatory bodies in the United States and Australia.[21]

9.19 Specifically in relation to the Port Augusta ash dam site, Mr Peter Georgaris, Chief Executive Officer of Flinders Power, stated that the dam is 'largely bottom ash, an inert, non-toxic by-product from coal combustion' that 'does not contain unsafe levels of metals or other toxins that cause human or environmental harm'.[22]

9.20 Ms Lipski argued, however, that bottom ash contained the same toxicity as other forms of ash:

> It's combusted coal. It's got the same toxicity that would otherwise go into the atmosphere or elsewhere. I think calling it 'inert' when there is an

17 *Supplementary Submission 74.2*, p. 14.

18 *Supplementary Submission 74.2*, p. 14.

19 *Supplementary Submission 74.2*, p. 14.

20 *Committee Hansard*, 3 September 2018, p. 9. See also: Mr Trevor Robertson, Private capacity, *Committee Hansard*, 3 September 2018, p. 20.

21 *Committee Hansard*, 3 September 2018, p. 16.

22 *Committee Hansard*, 3 September 2018, p. 23.

> enormous body of work that proves globally that it's not inert is quite misleading… [T]he World Health Organization and others have described this as a 'toxic health hazard'.[23]

Best practice approaches to managing and rehabilitating power station ash dams

9.21 Aurecon submitted that all ash dam sites are unique, and as such require different approaches to decommissioning and rehabilitation. It stated that the method adopted for any site will depend on various factors, including:

- the impact on surrounding receptors (both natural, such as receiving surface water bodies, and human receptors, such as neighbouring residential and commercial);
- the effectiveness of the original dam design, and its construction quality;
- the manner in which the dam was operated over its lifetime;
- the natural topography and location;
- availability of local resources;
- groundwater conditions;
- the condition of the ash; and
- prevailing and future climatic / weather conditions.[24]

9.22 Mr Matthew Ludeke, Dams Engineer at Aurecon Australasia, told the committee that cap-and-cover approaches to rehabilitating ash dam sites are the industry standard worldwide.[25] At a basic level this approach involves putting an earth-filled layer over the top of the dam surface to encapsulate the ash, with appropriate vegetation then introduced to the site.[26]

9.23 Mr Ludeke explained further that best practice rehabilitation involves progressively capping and covering the ash dam site, rather than waiting until the power station has ceased operations to commence rehabilitation measures:

> [I]t's best practice at the moment to be progressively rehabilitating these dams as you go. You're left with a much smaller problem at the end of the day. Particularly with dust emissions—I'll use that as an example—when you operate these ash dams they're normally operated as a wet slurry sort of mix. The ash is pumped out as a wet slurry. While the ash remains wet and the ash dam is being operated—24 hours a day, seven days a week, slurry being sent out there—the ash deposit stays relatively wet and the dusting

23 Ms Bronya Lipski, Solicitor, Environmental Justice Australia, *Committee Hansard*, 3 September 2018, pp. 13-14.

24 *Submission 85*, p. 3.

25 *Committee Hansard*, 3 September 2018, p. 40.

26 Mr Matthew Ludeke, Dams Engineer, Aurecon, *Committee Hansard*, 3 September 2018, pp. 39-40; Aurecon, *Submission 85*, p. 4.

> issues can be managed by keeping the deposit wet. As soon as the ash pumps get turned off, at the station closure, the ash and dust start to dry out, and the issues can be insurmountable if it's all left as one large deposit, hectares and hectares. So simply by capping and rehabilitating as you go, revegetating, you're reducing the surface area and the potential for dust. That's one of many examples. Whether it's that, surface water or groundwater, you're reducing your risk as you go.[27]

Factors that need to be considered in rehabilitation plans

9.24 Aurecon provided an overview of the typical issues that need to be considered when decommissioning and rehabilitating an ash storage dam, outlined below.[28]

Dam safety

9.25 Dam safety should be considered throughout the rehabilitation process to ensure the ash dam will never be at risk of breaching and placing downstream lives and environment at risk.

Impact upon groundwater

9.26 Ash dams are typically also large repositories of water, as the ash is normally completely saturated behind the dam wall. This is because the ash is normally transported from the power station to the dam as a slurry mix, pumped via a pipeline. As part of any remediation, consideration must be given to how this ash water can be removed, treated or contained to ensure it does not impact upon local groundwater resources.

Dust emissions

9.27 As ash deposits dry out over time, they have the potential to emit airborne dust, which poses a risk to neighbouring communities. A self-sustaining cover is required to prevent exposure to wind gusts. This cover will typically need to be implemented in stages, starting with an initial cover to prevent ash dust and create a stable working platform, followed by the construction of successive layers to:

- prevent upwards migration of salts from the ash deposit through the cover;
- prevent downwards infiltration of rainfall (if the project deems its required); and
- enable a suitable growing medium for the selected vegetation regrowth, to prevent dusting of the cover layer.

Recycling potential

9.28 Consideration should be given to the reuse and recycling of coal ash, which has been found to be very beneficial in some circumstances (see further below).

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27 Mr Matthew Ludeke, Dams Engineer, Aurecon Australasia, *Committee Hansard*, 3 September 2018, p. 41. See also: Mr Loni Karabesinis, Technical Director, Aurecon Australasia, *Committee Hansard*, 3 September 2018, p. 40.

28 *Submission 85*, p. 4.

Surface water

9.29 In the early stages of rehabilitation, before vegetation is established on the ash dam cover, sediment transport in rainfall runoff can be problematic and needs to be managed appropriately.

Vegetation

9.30 Appropriate vegetation must be selected. This will depend upon the goals and constraints of the rehabilitation, taking into consideration:

- vegetation that will not threaten the integrity of the dam, or any of its safety features;
- vegetation suitable with the selected end use of the site;
- vegetation that may thrive in the resulting environmental conditions (acknowledging that it may not always be possible to entirely restore the site to its original condition); and
- use of vegetation that is self-sustaining and does not require ongoing intervention.

Ongoing monitoring

9.31 Any ash dam rehabilitation project will be a long-term undertaking, likely requiring the ongoing monitoring of:

- safety of the dam structure, and performance against design predictions;
- vegetation regrowth against predictions;
- surface and groundwater quality improvements over time; and
- dust emission reductions over time.[29]

Utilising power station ash as a secondary resource

9.32 Evidence received by the committee emphasised that the ash stored in coal ash dams is a resource that has multiple potential uses, and that increasing its use in secondary industries can reduce the burden of rehabilitating ash storage sites.[30] For example, Mr Loni Karabesinis, the Technical Director of Aurecon Australasia, noted that even if ash dams are closed and rehabilitated, the ash is still an available resource:

> I see all ash dams as a future resource that could be used when some technology comes along. So, in capping and covering and in decommissioning and rehabilitating these ash dams, they're still a source that could one day be mined to be reused…[31]

29 Aurecon, *Submission 85*, p. 4

30 Mr Maroun George Rahme, Managing Director, Nu-Rock Australia Pty Ltd and Nu-Rock Technology Pty Ltd, *Committee Hansard*, 3 September 2018, p. 15; Beyond Zero Emissions, *Submission 86: Attachment 1*, p. 81.

31 Mr Loni Karabesinis, Technical Director, Aurecon Australasia Pty Ltd, *Committee Hansard*, 3 September 2018, p. 41.

9.33 Most of the coal ash utilised for secondary purposes is fly ash, although bottom ash can also be utilised to create geopolymer cements.[32] Fly ash can be used as a product in, for example:

- cement and concrete products, such as bricks and masonry;[33]
- soil beneficiation to improve soil pH due to the alkaline nature of fly ash, particularly in areas where soil is acidic because of, for example, acid mine drainage;[34]
- backfilling, reclamation and stabilisation operations;[35]
- road and embankment construction;[36]
- landfill and levelling operations;[37]
- ceramic and glass raw material;[38]
- metal recovery/extraction, depending on the amount of metals in the ash;[39] and
- adsorbents, filters and other forms of water treatment.[40]

9.34 Mr Maroun Rahme, the Managing Director of Nu-Rock Australia, explained the process involved in his company's method of converting fly ash to blocks used in building construction:

> [W]e take the ash as it's produced from the bag houses, and it's blown straight into our silos on our plant. The bottom ash and the pond ash is trucked in and tipped into hoppers that feed straight into our plant. Then we make sand and aggregate out of the ash, and from the sand and aggregate we make a building material. It can be a roof tile, a block, a brick, a

32 Beyond Zero Emissions, *Submission 86: Attachment 1*, pp. 68 and 81; Ash Development Association of Australia (ADAA), *Submission 7*, p. 1.

33 Monash University, *Supplementary submission 74.2*, pp. 6–7, 19; Ash Development Association of Australia, *Submission 78*, p. 2; Nu-ROCK, *Submission 84*, p. 4; Beyond Zero Emissions, *Submission 86: Attachment 1*, p. 81.

34 Monash University, *74.2: Supplementary to submission 74*, pp. 19, 24.

35 Monash University, *74.2: Supplementary to submission 74*, pp. 7, 19; Ash Development Association of Australia, *Submission 78*, p. 3.

36 Ash Development Association of Australia (ADAA), *Submission 78*, p. 2; Aurecon, *Submission 85*, p. 4; Beyond Zero Emissions, *Submission 86: Attachment 1*, p. 81.

37 Monash University, *Supplementary submission 74.2*, p. 7.

38 Monash University, *Supplementary submission 74.2*, p. 19.

39 Monash University, *Supplementary submission 74.2*, p. 20.

40 Monash University, *Supplementary submission 74.2*, p. 20.

retaining wall block, a seawall block, panels, plasterboard replacement or pipes.[41]

9.35 The Ash Development Association of Australia argued that the utilisation of coal ash has many environmental benefits, such as reduced use of non-renewable materials in building and construction and lowered emissions by replacing raw materials with coal ash.[42] Beyond Zero Emissions echoed this sentiment, contending that Australia has enough fly ash stockpiled to produce zero and low carbon cements for 20 years.[43] It highlighted the potential for this to grow into a new industry and position Australia as a global leader in alternative, zero carbon cements.[44]

9.36 Despite the beneficial uses of fly ash, it remains relatively underutilised.[45] This may be because of transportation costs, limited research into how the ash can be utilised, the large quantity of ash produced, and a lack of regulatory incentives for industry to use ash or to consider it as anything other than waste material.[46] Beyond Zero Emissions stated in a report provided to the inquiry that although rates of fly ash utilisation have been increasing, currently utilisation is only around 20 per cent.[47]

Concerns about current industry practice in Australia

9.37 Various concerns were raised with the committee about current industry performance in Australia regarding ash dam management and rehabilitation.

9.38 Environmental Justice Australia (EJA) cited several examples of environmental harm caused by problems with ash dams in Australia, including cases involving fly ash discharge into local waterways, groundwater contamination and airborne dust pollution events.[48]

9.39 EJA expressed concerns at a basic level with the 'cap-and-cover' approach to ash dam rehabilitation. It stated that the depth of soil cover proposed for these sites in Australia varies across sites (for example, the Port Augusta site reportedly covered by only 10–15 centimetres of topsoil in some areas, while other sites in New South Wales are covered to a depth of 40–50 centimetres). EJA argued that 'covering a massive volume of coal ash with shallow fill presents several risks', including that fill can wash

41 Mr Maroun George Rahme, Managing Director, Nu-Rock Australia Pty Ltd and Nu-Rock Technology Pty Ltd, *Committee Hansard*, 3 September 2018, pp. 15–16.

42 Ash Development Association of Australia (ADAA), *Submission 78*, p. 3.

43 Beyond Zero Emissions, *Submission 86*, p. 3.

44 Beyond Zero Emissions, *Submission 86*, p. 2.

45 Monash University, *74.2: Supplementary to submission 74*, p. 8; Beyond Zero Emissions, *Submission 86: Attachment 1*, p. 71.

46 Monash University, *74.2: Supplementary to submission 74*, pp. 17–18.

47 Beyond Zero Emissions, *Submission 86: Attachment 1*, p. 81.

48 *Supplementary Submission 26.1*, pp. 3 and 6–7.

away or blow away, re-exposing the toxic ash to the elements, and that shallow fill provides limited opportunity for plant growth.[49]

9.40 EJA also questioned what subsequent land uses would be deemed acceptable for ash dam sites:

> Near some of Australia's largest coal ash dumps, urban populations are growing rapidly. What future land use options will be condoned on 'rehabilitated' areas? The NSW Central Coast is a case in point. This is one of the fastest growing urban populations in NSW, with growing competition for vacant land. Our dialogue with the Lake Macquarie and Central Coast local government authorities confirmed that neither council had considered this question, nor ruled out future residential development over coal ash dumps… These risks warrant careful consideration and strong regulation to avoid future health impacts.[50]

Concerns relating to Port Augusta power stations site

9.41 The committee heard significant environmental and community concerns relating to the Port Augusta ash dam site, centred around issues relating to airborne dust contamination arising from the site.

9.42 Port Augusta City Council submitted that continual wind-erosion of the ash dam has generated many dust events that have impacted the community, both before and after the 2016 closure of the power station.[51] It explained:

> During 60 years of operation, the Port Augusta power station has been subject to numerous dust control methods. This included use of sprinkler systems, paper mulch, controlled use and drift-net fencing. However, the predominant form of control for many years has been a seawater flooding technique. This comprised regular application of a slurry of ash and water to provide moisture on the surface of the storage area, allowing a salt crust to form on the ash surface and preventing dust being emitted in windy conditions.
>
> Following the closure in May 2016, the active slurrying operation ceased and the ash storage area dried out.
>
> On the frequent windy days, for which Port Augusta is known, large plumes of dry ash were emitted from the site. When the prevailing wind blows from the south, ash plumes were blown over the residential areas of the township.[52]

9.43 Flinders Power, the owner of the site, explained that after the closure of the power station, the initial dust mitigation strategy at the site was to continue seawater flooding the site, without the ash content that had previously formed the seawater slurry:

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49 *Supplementary Submission 26.1*, p. 8.

50 *Supplementary Submission 26.1*, p. 8.

51 *Submission 88*, p. 6.

52 Port Augusta City Council, *Submission 88*, p. 6.

> [I]t was expected that continual flooding with sea water would retain the existing characteristics of the ash dam, including the salt crust. In fact, without the ash slurry the crust did not remain stable which resulted in episodic ash dust lift-off during strong winds.[53]

9.44 In November 2016, the site was covered with a liquid chemical dust suppressant designed to form a surface coating on the ash dam. Significant rainfall in December 2016 severely damaged this suppressant cover, resulting in a major dust event occurring over two days on 1–2 January 2017.[54] Port Augusta City Council commented:

> Despite these weather events being forecast well in advance, Flinders Power appeared unprepared, with no dust suppressant or means for aerial re-application on standby and no warning to the community to prepare for potentially hazardous conditions.
>
> The pollution events had a significant flow-on effect across the community. Health services were stretched to the limit and local pharmacies ran out of asthma medication. There is no doubt lives were put at risk.[55]

9.45 Two local Port Augusta residents described the dust event as follows:

> Our lives were changed forever on December 30th 2016 for 3 days this community was battered and endured a horrific event which to say the least was preventable and should never have occurred. The dust was never-ending, burning your face and body as we tried to go about our daily business, but our concerns were falling on deaf ears… Firstly we lost our main employer at very short notice and then we were slammed with an event that many described as a feeling like the end of the world.[56]

9.46 These residents commented further on the health issues experienced in the community in the aftermath of this event:

> Many people were concerned with the increase of illness, from respiratory problems to skin irritations and also eye irritation. Those who already had chronic illness were subjected to further complications. The local pharmacies noted an increase in the sale of inhalers over the months. People were voicing concerns to their local GP's and also on social media, enquiring as to the responses from the government and also where they should go to have their concerns recorded.
>
> SA Health [provided] free health checks at the local hospital, this was serviced through the Port Augusta Hospital Emergency Department but was poorly advertised creating confusion among the residents. Many did not attend due to the long wait at the hospital, but also as they felt it was not an

53 Flinders Power, *Submission 89*, p. 3.

54 Flinders Power, *Submission 89*, pp. 3 and 15.

55 *Submission 88*, p. 7.

56 Name Withheld, *Submission 87*, p. 2. See also: Cr Sam Johnson, Mayor, Port Augusta City Council, *Committee Hansard*, 3 September 2018, pp. 6–7.

> Emergency therefore they chose to see their local GP, and of course no statistics are available as none were kept.[57]

9.47 Flinders Power advised that following this dust event, it applied further dust suppressant to the site, and has commenced implementation of a rehabilitation plan that involves:

> …covering the ash surface with soil and seeding it with species of native chenopod, samphire and grasses best suited to the site and collected from across the region. The soil cap provides protection against ash dust lift-off, provides a suitable initial substrate for germination and growth, and over time salt will be flushed through the profile, and organic carbon and nutrients will increase as the ecosystem function develops.[58]

9.48 Mr Peter Georgaris, Chief Executive Officer of Flinders Power, provided an update of progress at the committee's Port Augusta public hearing on 3 September 2018:

> We sincerely regret the unpleasant impact that occurred on the local residents as a result of this unprecedented series of weather events [in December 2016 and January 2017]. A vast amount of soil, in the order of 650,000 cubic metres, which equates to approximately a million tonnes of topsoil, has since been placed over the ash dam. This soil cap, together with controls, has totally eliminated the risk of any ash dust generation.
>
> Two years of well-below average rainfall has been experienced across many regions of Australia and, at our location, has significantly slowed the revegetation process, but the progress is promising and we believe that it will get to the point that it needs to be. We maintain extensive monitoring and contingency plans, both proactive and reactive, based on weather monitoring that we undertake…
>
> Flinders has met, and will continue to meet, all obligations. Our aim, as stated, is a safe, stable, self-sustaining revegetation area. Pleasingly, independent ecologists and agronomists believe that this is achievable given sufficient rain over time. In our view, the rehabilitation of the entire site will produce a world-class outcome. However, it is a reality of the size of the dam and the climate that this will take time.[59]

9.49 Flinders Power's optimism at the long term rehabilitation outlook for the ash dam was not shared by other local stakeholders, including Port Augusta City Council, which noted that further dust events had occurred in December 2017, and submitted:

> The resounding view of the Port Augusta community… is that remediation efforts have so far failed.
>
> It is acknowledged that the Port Augusta ash dam presents a very challenging site for rehabilitation. The existing plan of spreading a very thin

57 Name Withheld, *Submission 87*, p. 3.

58 Flinders Power, *Submission 89*, p. 3.

59 *Committee Hansard*, 3 September 2018, pp. 23 and 24.

> amount of soil on a hostile surface and hoping that plants will thrive and thereby prevent further erosion and dust incidents, appears tenuous. Furthermore, the extent of contamination of the soil, surface and groundwater at the site is not yet known.
>
> We fully concur with the view that if further actions are not taken to improve the rehabilitation plan and ensure that it is fully funded, there is a high risk of negative impacts to human health and/or the environment in the future.[60]

Additional concerns raised in relation to the Port Augusta case

9.50 In addition to the specific concerns relating to the ongoing management of the environmental issues at the site, submitters and witnesses also commented on broader issues that have affected the Port Augusta community in relation to the power station site. These included:

- general concerns about the adequacy of steps taken by the South Australian EPA in order to safeguard the environment and community around the site;[61]
- specific concerns about the adequacy of air monitoring measures in place to ensure that ongoing dust impacts are recognised and managed appropriately;[62]
- concerns that community consultation and engagement during the closure of the power station and around the time of the most significant dust events was inadequate;[63] and
- a perceived lack of support from the state and federal governments to assist the community's economic transition following the closure of a major employer.[64]

Regulatory framework for rehabilitation of power station ash dams

9.51 Regulation of the rehabilitation of power station ash dams is primarily undertaken at the state and territory level. The committee received some evidence from submitters and witnesses on the regulatory requirements imposed in Victoria, New South Wales, South Australia, and Queensland (although no submissions on these matters were received directly from state governments in these jurisdictions). Comparisons between these requirements and the system of federal regulations in place in the United States were also discussed.

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60 *Submission 88*, p. 7.

61 Cr Sam Johnson, Mayor, Port Augusta City Council, *Committee Hansard*, 3 September 2018, p. 3; Name Withheld, *Submission 87*, pp. 4–5.

62 Port Augusta City Council, *Submission 88*, p. 14; Name Withheld, *Submission 87*, p. 4.

63 Mr Peter Georgaris, Chief Executive Officer, Flinders Power, *Committee Hansard*, 3 September 2018, pp. 24 and 25; Mr Tony Circelli, Chief Executive, South Australia Environment Protection Authority, *Committee Hansard*, 3 September 2018, p. 32.

64 Port Augusta City Council, *Submission 88*, pp. 3–5; Cr Sam Johnson, Mayor, Port Augusta City Council, *Committee Hansard*, 3 September 2018, pp. 2–3.

Victoria

9.52 Environmental Justice Australia (EJA) stated that ash ponds are classified as landfill and are scheduled premises under the *Environment Protection (Scheduled Premises) Regulations 2017* (Vic). Further:

> The [Victorian Environmental Protection Authority] states that there [are] no formal documents obliging or guiding best practise pollution prevention for groundwater contamination from ash ponds, but considers that the best practise for landfills receiving municipal waste largely applies to preventing this type of pollution.[65]

9.53 EJA noted in its submission that financial assurances for ash dumps in Victoria are required as part of the power station's license to operate; however, the details of these mechanisms are unclear:

> The calculation of FAs [financial assurances] for ash dumps is determined in consultation between the power station operators and the Victoria EPA. We have been informed that this determination is complicated by the fact that the power station operators that are required to hold FAs for ash dumps are also required to pay a bond for mine rehabilitation, and the EPA does not want to "double-dip" on requiring rehabilitation bonds where these are already imposed by the mining regulator.
>
> The FA determination process otherwise lacks transparency. The amount of these financial assurances is unknown, and when we have attempted to find out from the EPA how much these FAs are, we have been told that this information is confidential. We cannot determine the adequacy of the FAs held in Victoria. Nor is it clear whether or not FAs have been finalised in Victoria for Loy Yang, Yallourn or Hazelwood.
>
> We have been informed by the Victoria EPA that an "adequate" FA is held for the Anglesea power station, but have not been provided with a figure.[66]

New South Wales

9.54 Aurecon noted in its submission that an ash dam owner in New South Wales needs to 'consult and obtain endorsement from several regulatory stakeholders when both operating and decommissioning ash dams,' including:

- the New South Wales Dam Safety Committee (which reviews and endorses dam rehabilitation plans for all significant dams in the state from a public safety standpoint);
- the relevant Local Council;
- the New South Wales Department of Planning and Environment; and
- the New South Wales Environmental Protection Authority.[67]

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65 Environmental Justice Australia, *Supplementary Submission 26.1*, p. 4.

66 Environmental Justice Australia, *Supplementary Submission 26.1*, pp. 4–5.

67 Aurecon, *Submission 85*, p. 2.

9.55 Aurecon explained further in its submission:

> The Local Council or NSW Department of Planning and Environment will typically be the main approval body for any given ash dam in NSW, setting the minimum standard required for the site's rehabilitation. This will typically be administered through a set of approval conditions, specific to the site. The relevant approval pathway for each rehabilitation project is affected by the site's original development consent and the actual works required. Projects that require significant earthworks, [are] located in sensitive areas, or were originally approved under state significant or major project approval pathways typically require approval at a state government level. While other projects with smaller impacts can be approved by the local council, or even undertaken without development consent.[68]

9.56 A representative from Aurecon informed the committee that for the sites it manages in New South Wales, each has an ash management plan in place that covers both how the ash dam will be operated in the near term, as well as planning for the closure and rehabilitation phase.[69] Overall, Aurecon expressed the view that 'a reasonably robust regulatory environment exists in NSW' for the decommissioning of dams.

9.57 EJA commented that under the *Protection of the Environment Operations Act 1997* (NSW), the New South Wales Environmental Protection Authority can:

- impose financial assurances on a pollution licence to ensure that adequate funds are available for necessary works, such as a rehabilitation plan; or
- impose a condition that power stations hold insurance cover for the payment of clean-up costs or damages resulting from pollution caused in connection with a power station.

9.58 EJA noted, however, that these options have not been imposed on any of the power station licences operating in New South Wales, and submitted:

> It appears that the practice in NSW is to require an operator to submit a remediation plan when a power station is decommissioned, to be approved by the NSW EPA, who may impose a financial assurance on the subsequent pollution licence for the rehabilitation phase, including the rehabilitation of ash dumps. Ultimately, however, the power to impose financial assurances is discretionary and something that the EPA does not impose on pollution licences for power stations that should include ash dumps.[70]

Queensland

9.59 EJA noted that under the *Environmental Protection Act 1994* (Qld), the Queensland Department of Environment and Heritage Protection can impose a financial assurance on a power station environmental licence to ensure compliance

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68 *Submission 85*, p. 2.

69 Mr Matthew Ludeke, Dams Engineer, Aurecon Australasia, *Committee Hansard*, 3 September 2018, p. 40.

70 *Supplementary Submission 26.1*, p. 5.

with licence conditions and to cover potential rehabilitation costs that arise as a result of electricity production. It will only impose such a condition, however, if satisfied this is justified 'in light of the degree of environmental harm, the likelihood that the rehabilitation work will be necessary, and the environmental record of the environmental authority'.[71]

9.60 EJA stated further that power station operators in Queensland must apply to surrender their license, and that these applications must contain a rehabilitation report if any rehabilitation activities are required. EJA noted that the Stanwell and Gladstone power stations, two of the largest such operations in Queensland, hold environmental authorities containing conditions relating to ash dam rehabilitation; however, no financial assurance mechanisms have been imposed on these sites.[72]

South Australia

9.61 In relation to South Australia, the committee heard evidence primarily in relation to the regulations governing the rehabilitation of the Port Augusta ash dam site.

9.62 Flinders Power, owner of the Port Augusta power station site, submitted that it has compliance obligations relating to the ash dam rehabilitation process under several pieces of state and Commonwealth legislation.[73] Flinders Power holds a licence with the South Australian EPA under the *Environment Protection Act 1993* (SA), and developed final closure and dust management plans through 2015 and 2016, which were signed off by the EPA in late 2016.[74]

9.63 It was noted in evidence to the committee that no financial assurance mechanism was in place for the Port Augusta site prior to its closure, but that financial assurance arrangements were negotiated between the state government and the site operator at the time of closure.[75] Flinders Power submitted that the financial provision made for closure was subject to independent external financial audit, was fully funded, and 'was subject to a further independent audit initiated by the SA Government and supported by Financial Assurances through Bank Guarantees'.[76]

9.64 Flinders Power argued that the state regulatory arrangements in South Australia had largely worked effectively in relation to the ongoing rehabilitation of its ash dam site at the former Augusta Power Stations.[77] It did comment, however, that there should be a requirement for companies to ensure that site closure plans are kept

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71 Environmental Justice Australia, *Supplementary Submission 26.1*, p. 5.

72 Environmental Justice Australia, *Supplementary Submission 26.1*, p. 5.

73 Flinders Power, *Submission 89*, p. 9.

74 Flinders Power, *Submission 89*, pp. 9–11; Port Augusta City Council, *Submission 88*, p. 6.

75 Mr Tony Circelli, Chief Executive Officer, South Australia EPA, *Committee Hansard*, 3 September 2018, p. 36.

76 *Submission 89*, p. 24.

77 Mr Peter Georgaris, Chief Executive Officer, Flinders Power, *Committee Hansard*, 3 September 2018, p. 24.

current, ready to implement, and regularly subject to re-endorsement by regulators.[78] Flinders Power noted that in the case of the Augusta Power stations, the initial closure plan developed in 2000 required significant amendment following the site's closure in 2016.[79]

9.65 The South Australian EPA advised that due to the regulatory framework governing the Port Augusta site, it was unable to direct Flinders Power in relation to closure planning and rehabilitation of the site until after the power station had ceased operations in 2016:

> The Port Augusta site is subject to the *Electricity Corporations (Restructuring and Disposal) Act 1999* [SA]. This Act was created to enable the power stations' privatisation, and allowed for an Environment Compliance Agreement (ECA). The ECA included clauses which effectively acted as exemptions from some of the requirements of the *Environment Protection Act 1993 (EP Act)* during power station operations. This Act also contained clauses relating to the closure and remediation of the site. Importantly, this effectively meant that remediation of the ash dam or clean-up of site contamination caused by disposal of ash into the ash dam was not required by Flinders Power whilst the power station was operational and the EPA was unable to require action by Flinders Power in this regard. This also prevented the EPA from using powers under the EP Act to establish financial assurance or a bond for environmental matters.[80]

9.66 Mr Tony Circelli, Chief Executive of the South Australian EPA, commented that this requirement, combined with the short notice period given before the closure of the power station, created some of the issues that subsequently occurred on the site:

> [T]here should have been some pre-thought and progressive rehabilitation at that site… [T]he decision to close came quickly. The site was meant to operate to 2025. But nor were we able to actually require any licence, any thought, any preplanning or any preparation really for closure. So, as soon as we became aware that they were about to close, in October 2015, we were left with a situation to then say, 'Well, by the way, we can now direct by licence, and we will direct by licence, that you develop a dust management plan, a site closure plan and a site contamination plan.' All of those things weren't available to us until… they closed in May 2016.
>
> I think that's the lesson. We really need to make sure that there's no impediment for regulators to get on the front foot with some of these large facilities and start preparing. If we were able to give them five years' notice that they needed to start reducing the scale of their ash dam, they could have closed off part of their ash dam and started rehabilitating part of the ash dam. But what faced us was trying to manage a 220 hectare surface all

78 Mr Peter Georgaris, Chief Executive Officer, Flinders Power, *Committee Hansard* , 3 September 2018, pp. 24 and 25.

79 Mr Peter Georgaris, Chief Executive Officer, Flinders Power, *Committee Hansard* , 3 September 2018, pp. 23–24.

80 South Australian Environmental Protection Authority, *Response to Submission 94*, p. 2.

> at the one time. To expect that that was going to happen without any issues is quite naive.[81]

9.67 The EPA noted that South Australia has put in place whole-of-government level closure requirements across a range of industries to help address this issue.[82]

United States regulations relating to ash dams

9.68 As an international comparison, Environmental Justice Australia pointed to federal regulations governing ash dam management in the United States. Rules introduced by the United States Environmental Protection Agency in 2015 have set national requirements for the disposal of 'coal combustion residuals' (CCRs) including fly ash and bottom ash. These requirements include:

- location restrictions, to ensure there is no reasonable probability of adverse effects on health or the environment from ash waste;
- liner design criteria to help prevent contaminants in CCR from leaching from CCR units and contaminating groundwater;
- structural integrity requirements to prevent damages associated with structural failures;
- operating criteria, including for air criteria, run-on and run-off controls, hydrologic and hydraulic capacity requirements for surface impoundments, and periodic assessment requirements;
- requirements for groundwater monitoring to detect contaminants, with corrective actions mandated to be taken where contaminants are found to exceed groundwater protection standards;
- closure and post-closure requirements, obligating all facilities to close in accordance with specified standards and to monitor and maintain the facilities for a period of time after closure; and
- administrative requirements, including that operators are to maintain a publicly accessible website for information about ash dams.[83]

9.69 Mr Maroun Rahme, Managing Director of Nu-Rock Australia, commented:

> The American EPA standards are very, very clear. You are not allowed to have an ash dam unlined, because you've got to stop the water getting into the watertable. You're not allowed to use water to pump the ash onto the ash dam anymore; it has to be dry. Duke Energy was just fined $70 million for not complying with their state legislation of controlling their

81 *Committee Hansard*, 3 September 2018, p. 36.

82 South Australian Environmental Protection Authority, *Response to Submission 94*, p. 3; Mr Tony Circelli, Chief Executive Officer, South Australia EPA, *Committee Hansard*, 3 September 2018, p. 32.

83 *Supplementary Submission 26.1*, p. 9.

> 300 million tonnes of ash…[T]he American EPA has become very tough on all of the 658 coal-fired power stations in America.[84]

Submitter and witness views on regulatory reforms in Australia

9.70 The committee heard a range of views about the adequacy of the existing regulatory framework for ash dam rehabilitation in Australia, and as well as specific proposals for change.

9.71 Ms Bronya Lipski from Environmental Justice Australia noted several concerns about the regulatory arrangements currently in place:

> We are concerned with the deficiencies we've seen in current state regulatory regimes for ash management, including where these dumps are situated; the adequacy of monitoring contamination to surface and groundwater; the clean-up requirements where these exist; lack of bonds or financial assurances; closure requirements; and inadequate enforcement.
>
> … There is a general lack of transparency around how these [sites] are managed, and the standard industry approach to rehabilitation is an inadequate safeguard against long-term land and groundwater contamination. There is little public knowledge about the risks communities are exposed to by inadequate management and inadequate remediation. This environmental injustice is borne by communities who have already suffered the toxic impact of coal-fired power stations. Poor remediation of land threatens future land use planning and growing areas.[85]

9.72 Contrastingly, representatives from Aurecon expressed the view that the regulatory framework in some Australian jurisdictions is well developed:

> Our experience in New South Wales is that there's a fairly mature regulatory body in place which seems to be doing a good job. They're good to deal with across all the technical aspects of ash dams. In Queensland, likewise, their dam safety groups are fairly mature and understand ash dams fairly well.[86]

National standards relating to ash dam rehabilitation

9.73 Several submitters and witnesses suggested that some kind of national standards are required in order to improve overall industry practice in relation to ash dam rehabilitation. For example, Environmental Justice Australia recommended that best practice regulations be established at a national level governing the construction, management and rehabilitation of ash dams.[87] It argued that these regulations could be

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84 *Committee Hansard*, 3 September 2018, p. 16.

85 *Committee Hansard*, 3 September 2018, p. 9.

86 Mr Matthew Ludeke, Dams Engineer, *Committee Hansard*, 3 September 2018, p. 41; Aurecon, *Submission 85*, p. 5.

87 *Supplementary Submission 26.1*, p. 10. See also Cr Sam Johnson, Mayor, Port Augusta City Council, *Committee Hansard*, 3 September 2018, p. 8.

similar to those implemented in the United States, and that in Australia this outcome could be achieved under a National Environment Protection Measure (NEPM).[88]

9.74 The South Australian Environment Protection Authority recommended that consideration be given to developing national risk-based guidance for ash dam closure, which could be progressed through the national environmental protection act and associated NEPMs.[89] Mr Tony Circelli, Chief Executive of the South Australia EPA, commented:

> I believe there is a need to consider a national risk based guidance for closures of this nature. They will all need to be developed in accordance with the particular circumstances that face each side. The solution for Port Augusta may not be the solution for sites in the eastern states, and vice versa.[90]

9.75 Aurecon submitted that it may be very difficult to establish a prescriptive regulatory process governing the management and rehabilitation of ash dams, due to the large variability across ash dam sites. It stated that to achieve the best possible long-term solution, dam owners 'will need some flexibility to investigate all alternatives available to them'.[91]

Working towards regulatory harmonisation

9.76 The Australian Energy Council (AEC), representing businesses responsible for the vast majority of electricity generation in Australia, commented that the Commonwealth Government may be able to provide leadership in this area by encouraging standardisation and harmonisation of regulations across states:

> Opportunities do exist to streamline processes, reduce regulatory confusion and achieve better environmental outcomes. The AEC would welcome any recommendations from the Committee to State regulators that relieve regulatory confusion across jurisdictions. For example, the Committee could recommend establishment of Commonwealth chaired working groups of State regulators aiming towards harmonisation.
>
> Furthermore any recommendations that can reduce duplication of responsibilities between regulators within states would also be welcome. Reforms should always be done in consultation with the States, power station operators, communities and stakeholders.[92]

88 *Supplementary Submission 26.1*, p. 9.

89 *Timeline of key events and recommendations*, tabled by South Australia's Environment Protection Authority at a public hearing in Port Augusta on 3 September 2018.

90 *Committee Hansard*, 3 September 2018, p. 31.

91 *Submission 85*, p. 5.

92 *Submission 79*, p. 1.

9.77 The AEC also argued it is critical that any changes or recommendations by the Commonwealth should not materially affect rehabilitation projects in progress or retrospectively affect ash ponds that have already been successfully rehabilitated.[93]

Need for national technical coordination

9.78 Mr Matthew Ludeke, Dams Enginner at Aurecon, noted that there is a national organisation in place that deals with issues relating to safety and dam management for water dams in Australia at a national level, the Australian National Committee on Large Dams (ANCOLD). Mr Ludeke observed that ANCOLD produces guidelines and technical documents that form a framework for building, constructing, operating, managing and decommissioning water dams in Australia, and suggested that a similar national body might be useful in relation to ash dams to inform the development of appropriate decommissioning regulations.[94]

Financial assurance mechanisms and community engagement

9.79 The South Australia EPA also recommended that financial assurances should be a prerequisite for any facility that has a substantial post-closure responsibility. Mr Circelli stated:

> These should also be transparent and be open for public scrutiny. This should also include strengthening financial disclosure legislation to disclose the financial provisions made for rehabilitation, commensurate with the likely final costs of rehabilitation over the life of the facilities.[95]

9.80 The South Australia EPA also recommended that site management plans for ash dam operators include requirements around adequate community consultation and engagement.[96]

Increasing the utilisation of power station ash as a secondary resource

9.81 Several stakeholders to the inquiry stressed the importance of government assisting in ensuring that power station ash is increasingly utilised as a secondary resource.

9.82 Monash University suggested that governments should give fly ash utilisation a higher priority.[97] Beyond Zero Emissions recommended that financial incentives should be introduced to encourage energy companies to find markets for fly ash, or that there should be disincentives to discourage companies from stockpiling fly ash.[98]

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93 *Submission 79*, p. 2.

94 *Committee Hansard*, 3 September 2018, p. 41.

95 *Committee Hansard*, 3 September 2018, p. 31.

96 Mr Tony Circelli, Chief Executive, South Australia Environment Protection Authority, *Committee Hansard*, 3 September 2018, pp. 31 and 32.

97 Monash University, *74.2: Supplementary to submission 74*, p. 26.

98 Beyond Zero Emissions, *Submission 86: Attachment 1*, p. 71.

9.83 The Australian Energy Council and Aurecon emphasised that it is important that regulation governing rehabilitation of ash dams takes into account the possibility that future generations may seek to use the ash stored in dams.[99]

9.84 The Ash Development Association of Australia recommended that the Commonwealth could chair a working group of state regulators and key industry bodies to harmonise the current regulatory framework and encourage the recovery and use of power station ash that balances economic, social and environmental objectives. It recommended further that the Commonwealth:

- consult with states and territories to establish a national framework for ash dam management and mechanisms (financial incentives) or pathways (mandatory use) to increase utilisation of ash products which promote economic efficiencies and conserve finite natural resources;
- foster resource recovery opportunities to recover ash from ash dams which would exploit the product's homogeneous nature and location for major construction materials markets; and
- avoid regulation which seeks to limit future access to stored ash.[100]

99 Australian Energy Council, *Submission 79*, p. 1; Aurecon, *Submission 85*, p. 4.

100 Ash Development Association of Australia, *Submission 78*, p. 4.

Chapter 10

Committee views

10.1 Throughout this inquiry the committee has heard a wide range of evidence examining issues associated with the rehabilitation of former and current mining and resources projects in Australia, as well as power station ash dams. It is clear that there are issues of significant environmental and social concern arising from legacy mining sites in Australia, some of which the committee visited during its inquiry. It is also clear that there are improvements that can be made to current industry practice and the regulatory framework underpinning mine rehabilitation in this country.

10.2 The committee has not, however, been able to reach agreement on a unanimous set of recommendations to guide the way forward for regulating the rehabilitation of mining and resources projects in Australia. As such, the views and proposed recommendations of committee members are presented separately in additional comments attached to this report.

Senator Janet Rice

Chair

Chair's Additional Comments

1.1 Over the course of this committee's deliberations, it has become clear that the status quo for mining rehabilitation policy has not worked, and that substantial Commonwealth intervention is needed to ensure that community expectations are met when it comes to protecting our environment and human health from the negative impacts of both abandoned and closing mine sites.

1.2 It is disappointing that despite nearly two years of submissions, site visits and hearings, that the committee has not been able to arrive at a set of agreed recommendations. The Australian Greens would like to thank everyone who contributed to the inquiry and hope that despite disagreement over the final recommendations, that this inquiry serves as a useful evidence base for the critical reforms that must happen in this space.

1.3 The following comments and recommendations serve as the Australian Greens' interpretation of the evidence presented to the committee and the best pathway forward to address the challenge of mine rehabilitation.

Scale of the challenge

1.4 There is a significant lack of consistent, publicly available information at a national level relating to mine rehabilitation issues and mine operations more broadly. The variances in data collection and publication across state and territory jurisdictions mean that it is near impossible to gain a true picture of how many mine sites in Australia are currently at the various stages of the mine life, including in final rehabilitation and closure. A similar lack of information about abandoned mines in Australia is also a key concern.

1.5 As such, Commonwealth leadership and funding is needed to address the gaps in the data currently available. In developing a complete national inventory of current and abandoned mine sites in Australia, the Commonwealth should have regard to the work already being done by state and territory governments and by academics working in this area.

Recommendation 1

The Australian Greens recommend that the Commonwealth Government coordinate and provide funding towards a complete national inventory of current and abandoned mine sites in Australia, including consistent national information about mines in the final closure phase and sites in care and maintenance.

Final landforms

1.6 There are significant issues relating to some of the mining industry's current practices utilised during mine site closure and rehabilitation. In respect of many of these issues, the current regulatory framework has led to a worrying inconsistency in the standards required of mining companies across different state and territory

jurisdictions in Australia. A strong set of national minimum standards is required to ensure that a baseline of good practice is achieved across the industry.

1.7 The Greens acknowledge that many mine operators are undertaking excellent work in their rehabilitation and closure planning and execution. There are undoubtedly operators, however, who are falling well short of what is required in order to ensure sustainable environmental and community legacies once their operations cease. Strengthening the regulatory requirements at a national level will ensure that all operators are held to the same high standard and lead to increased community confidence in the industry.

1.8 The issue of final landform design of a mining operation is of paramount importance to the long term legacy that a site will leave after closure. A national policy is required to improve practice in this area.

Recommendation 2

The Australian Greens recommend that the Commonwealth Government develop a national policy on final landforms for mine site rehabilitation, covering issues including the use of open pit voids, out of pit waste dumps and above ground tailings storage facilities, to ensure that the public's expectations are met in regards to minimising the long-term impacts of mining.

Pit voids

1.9 In respect of final pit voids, the Australian Greens are of the view that in almost all cases, these features are environmentally detrimental relative to other final landform design options. In many cases, final pit voids will cause significant environmental harm over the long term. As such, a national policy on final landform design should contain a default requirement that all final pit voids must be filled unless a safe, non-polluting alternative which has the support of local residents is identified.

Recommendation 3

The Australian Greens recommend that the national policy on final landforms include a requirement that all final pit voids must be filled unless a safe, non-polluting alternative which has the support of local residents is identified.

Progressive rehabilitation

1.10 Some parts of the mining industry are making good progress in ensuring that rehabilitation works occur progressively over the mine life, and that some state and territory jurisdictions are in the process of strengthening their regulatory requirements relating to progressive rehabilitation. The Commonwealth can leverage the good work being done by these jurisdictions in developing national standards to ensure that all operations in Australia are improving practice in this area.

Recommendation 4

The Australian Greens recommend that the Commonwealth Government design enforceable national progressive rehabilitation targets for mining operations, aimed at maximising the area of rehabilitation during a mine's operational life.

Closure planning requirements

1.11 Most Australian jurisdictions require the submission of standalone site closure plans as part of the mining lease approval process, in accordance with best practice guidance issued by the International Council on Mining and Metals and industry guidance produced in Australia. This requirement should be implemented nationally.

Recommendation 5

The Australian Greens recommend that the Commonwealth Government introduce national regulations to mandate the submission of stand-alone closure plans as part of the mining lease approval process for all mining projects in Australia, in accordance with International Council on Mining and Metals and local industry mine closure planning guidance.

Care and maintenance

1.12 The Australian Greens are concerned that mine operators in Australia are currently able to place sites in 'care and maintenance' mode with little or no restriction on how long this status may be retained without rehabilitation works being undertaken. While we acknowledge there may be instances in which a site's operations may need to be temporarily suspended, there must be clear parameters around how this occurs to ensure that sites are not being placed into perpetual care and maintenance mode in order to avoid site rehabilitation liabilities. Standards around care and maintenance are best developed at a national level to ensure consistency across jurisdictions.

Recommendation 6

The Australian Greens recommend that the Commonwealth Government develop enforceable national standards that limit the ability of mining companies to place sites into perpetual 'care and maintenance' to avoid rehabilitation obligations.

Mine waste products and tailings storage

1.13 Good work is currently being undertaken by industry and academia to seek innovative secondary uses for mine waste materials, including through undertaking improved mineral deposit characterisation and reprocessing mine tailings. However greater funding is required to drive scientific innovation in this area and help the industry to move towards a 'zero-waste mine' paradigm, The Commonwealth is well placed to act as a catalyst in this area.

Recommendation 7

The Australian Greens recommend that the Commonwealth provide additional funding for scientific research into initiatives seeking to improve the characterisation of mine waste materials and identify possible treatment options and future use for these materials.

Tailings storage at uranium mines

1.14 The Australian Greens agree with concerns raised by stakeholders about the potential environmental hazards associated with the storage of radioactive tailings from uranium mines in Australia. The regulatory standard in place for tailings storage at the Ranger uranium mine should be applied to all current and prospective uranium mining operations in Australia.

Recommendation 8

The Australian Greens recommend that the regulatory standard in place at the Ranger uranium mine, requiring mine tailings to be isolated from the environment for a minimum of 10,000 years, be applied to all other current and any future uranium mining operations in Australia.

Site restoration practices

1.15 The mining industry is not currently equipped to deliver appropriate ecological restoration outcomes as part of the post closure strategies employed in Australia. Full ecological restoration is a goal that should be aimed for wherever possible at mine sites in Australia, and while some excellent partnerships are developing between industry and academia to improve practice in this area, additional funding and visibility of these issues are required.

Recommendation 9

The Australian Greens recommend that the Commonwealth provide funding for research into further strategies and tools for the restoration of native ecosystems and the reintroduction of threatened plants and animals at mine sites in Australia.

Abandoned Mines

1.16 Abandoned mines in Australia represent a significant and unquantified environmental and social liability. Current abandoned mines management programs at the state and territory level are falling well short of what is required to tackle these liabilities in a meaningful way. As such, it is clear that significant effort and funding is required on the part of the Commonwealth Government as well as state and territory governments in order to start fully addressing the issues associated with abandoned sites.

1.17 The lack of clear national data around the number and nature of abandoned mine features is striking. Some excellent work is already being done in academia to attempt to redress the gaps in the data in respect of abandoned mines, and the

establishment of a national inventory of current and abandoned mines in Australia would be able to help address this issue further.

1.18 A national initiative in the form of a National Abandoned Mines Commission is required to provide direction and coordinate the work being done on abandoned mines legacies in Australia. Existing COAG processes have proved ineffective to deliver sustained progress in this area, and the time for a properly equipped national body has well and truly come. Canada's National Orphaned/Abandoned Mine Initiative model was endorsed by many stakeholders to the inquiry. This would serve as an excellent starting point from which to develop a model in Australia.

1.19 The new commission would be tasked initially with establishing the full extent of liabilities across Australian jurisdictions resulting from abandoned mines, and identifying a set of national priority sites towards which governments can then direct resourcing.

Recommendation 10

The Australian Greens recommend that the Commonwealth Government lead the establishment of a National Abandoned Mines Commission. The commission is to be a multi-stakeholder advisory panel with an operating model based on Canada's National Orphaned/Abandoned Mine Initiative.

Recommendation 11

The Australian Greens recommend that the newly established National Abandoned Mines Commission be immediately tasked to:

- **undertake a national review to establish the full extent of liabilities across Australian jurisdictions resulting from abandoned mines; and**
- **identify a set of national priority abandoned mine sites that require the most urgent attention and funding for remediation activities.**

Recommendation 12

The Australian Greens recommend that the Commonwealth Government commit to provide funding to assist states and territories in remediating the most urgent national priority sites identified by the National Abandoned Mines Commission.

Accounting for abandoned mines liabilities

1.20 The Australian Greens agree with the view expressed by submitters and witnesses that liabilities arising from abandoned mines should be reflected in state and territory government accounts. Governments are ultimately responsible for addressing these liabilities, and greater transparency as to their magnitude is necessary to ensure that remediation works are appropriately prioritised and funded.

Recommendation 13

The Australian Greens recommend that the Commonwealth Accounting Standards be amended to ensure that liabilities arising from abandoned mines are reflected in state and territory government accounts.

Environmental standards relating to pollution from abandoned mines

1.21 Any decision on the part of state and territory governments to address pollution and other environmental issues arising from abandoned mine sites is entirely discretionary, rather than being required when particular environmental thresholds are breached. The Commonwealth Government should commit to working with jurisdictions to ensure that these environmental contaminants are being adequately managed in line with established criteria.

Recommendation 14

The Australian Greens recommend that the Commonwealth Government work with state and territory governments to ensure that the environmental consequences of abandoned mines are responsibly managed, including through the setting of clear environmental standards and thresholds which, if breached, would require immediate remedial action be taken by the relevant jurisdictions.

Alternate uses for abandoned mine sites

1.22 Developments such as the Kidston former gold mine project in northern Queensland, which is being redeveloped into a large scale hydro pumped storage project and solar farm, are encouraging. Kidston will use the two large adjacent mining pits at the site as the upper and lower reservoirs for the proposed hydro-electricity project.

Recommendation 15

The Australian Greens recommend that the Commonwealth Government conduct a review of the potential value of alternate uses for existing abandoned mine sites (for example, as renewable energy generation sites), and what regulatory and practical measures can be taken by all levels of government to promote these alternate uses.

Financial responsibility

1.23 Financial responsibility for mining rehabilitation should always rest with the mining operator, not the taxpayer. Unfortunately, many case studies in Australia have demonstrated that the financial assurance mechanisms implemented by state and territory governments to ensure that liability remains with the operator have been inadequate. Continued reform is required to ensure that these mechanisms are strengthened and there are no further instances of mine operators defaulting on their rehabilitation obligations.

Types of financial assurance mechanisms

1.24 A variety of financial assurance mechanisms are now utilised in the different jurisdictions across Australia. While pooled fund approaches such as the MRF in Western Australia and the new regulatory model in Queensland have some appealing features, the Australian Greens are of the view that bond-based mechanisms are still required to ensure that mine operators have sufficient incentive to complete all required rehabilitation works.

1.25 Rehabilitation bond amounts must be set at the full cost of rehabilitation for the site (as is currently the case in New South Wales, South Australia and the Northern Territory). Estimates of these rehabilitation costs must be robust and able to be verified by independent parties unrelated to the mining company.

Recommendation 16

The Australian Greens recommend that national standards be introduced to require mining operators to provide financial assurance through bonds that are: based on high-quality evidence; set at the full cost of rehabilitation for the site; and verified by open and transparent means, including independent audit.

National Principles for Managing Rehabilitation Financial Risks

1.26 There has been recent work undertaken by the COAG Energy Council's Resources and Engagement Working Group, and the resultant publication of the National Principles for Managing Rehabilitation Financial Risks. If implemented fully, these principles will provide an important baseline standard for the regulation of mine rehabilitation financial risks in Australia. The Australian Greens consider that the Commonwealth Government should take a leading role to ensure that the National Principles are implemented across Australia.

Recommendation 17

The Australian Greens recommend that the Commonwealth Government take a leading role in ensuring the full implementation of the National Principles for Managing Rehabilitation Financial Risks recently developed by the COAG Energy Council's Resources and Engagement Working Group.

Regulations around purchasing of mine operations

1.27 As noted in Chapter 4, concerns have been raised about the regulatory mechanisms available to state and territory governments to ensure that companies purchasing existing mine sites have the financial and technical capacity to discharge their site rehabilitation responsibilities. In light of these concerns, the Australian Greens believe that the Commonwealth Government should review the adequacy of these mechanisms and, if necessary, work with state and territory governments to strengthen them.

Recommendation 18

The Australian Greens recommend that the Commonwealth Government review the adequacy of existing regulatory mechanisms utilised by state and territory

governments to ensure that companies purchasing existing mine sites have the financial and technical capacity to deliver their site rehabilitation responsibilities.

Company reporting of site liabilities

1.28 The Australian Greens are concerned that mining companies are not required to thoroughly report publicly on their expected rehabilitation and closure costs, particularly because the current accounting standards do not require enough specificity in disclosure of liabilities for mine site rehabilitation. Clearer financial reporting of rehabilitation liabilities by mining companies would enable governments to make an accurate assessment of a company's financial position and level of risk when reviewing and setting security deposits.

1.29 Following consideration of this issue by the COAG Energy Council's Resources and Engagement Working Group, the Australian Accounting Standards Board has agreed to future consideration of options to upgrade closure and rehabilitation reporting requirements in the Australian Accounting Standards at an aggregate level. In the view of the Australian Greens, aggregate level reporting is insufficient; it is only through reporting at a site-specific level that the community can fully assess the ability of mine operators to fulfil their rehabilitation obligations.

Recommendation 19

The Australian Greens recommend that the *Corporations Act 2001* (Cth) and Commonwealth Accounting Standards, as necessary, be amended to ensure that mining companies account for and report on mine closure liabilities on a site by site basis. Site-specific information should be included in annual financial statements and as an individual line item in company balance sheets.

Involvement of indigenous Australians in mine planning and rehabilitation

1.30 Aboriginal communities can be impacted particularly negatively by poor mine planning and rehabilitation processes. For example, the committee heard that the potential positive benefits to Aboriginal people, by way of employment and revenue streams in negotiated agreements, may be far outweighed by the long-term negative impacts of abandoned or poorly rehabilitated mine sites. The Commonwealth Government can be a proactive player in creating better outcomes in this area, both by dealing with issues it specifically has responsibility for (in relation to uranium mines in the Northern Territory), and by ensuring that native title processes fully support traditional owners where mining operations are involved.

Rum Jungle

1.31 The committee received evidence in relation to the Rum Jungle former mine site. In particular, this evidence outlined that the unremediated site has had a devastating impact on the surrounding land, with significant problems still ongoing following more than three decades of attempts to fix the area. It is fundamentally important that the Commonwealth Government include Traditional Owners as equal partners along with the Northern Territory Government in any future partnership agreements made in relation to the Rum Jungle former mine site. Further, both

governments should work constructively to resolve the dispute between the Northern Territory Mines Department and the Rum Jungle Traditional Owner Liaison Committee.

Recommendation 20

The Australian Greens recommend that the Commonwealth Government include Traditional Owners as equal partners along with the Northern Territory Government in any future partnership agreements made in relation to the Rum Jungle former mine site.

Recommendation 21

The Australian Greens recommend that the Commonwealth Government work constructively with the Northern Territory Government to resolve the dispute currently ongoing between the Northern Territory Mines Department and the Rum Jungle Traditional Owner Liaison Committee.

Native title processes

1.32 The committee heard evidence that native title processes are not currently serving native title holders and claimants well in respect of mine site rehabilitation occurring on native title land. State and territory government policies and processes relating to mine rehabilitation do not adequately take native title issues into account; the National Native Title Tribunal does not necessarily consider mine rehabilitation and closure issues in making determinations; and native title holders and claimants need greater support when negotiating agreements relating to major mining projects.

Recommendation 22

The Australian Greens recommend that the Commonwealth Government ensure native title interests are fully recognised and protected in relation to mine rehabilitation and closure, the first step of which should be the undertaking of a comprehensive review of state and territory policies and related legislation.

Recommendation 23

The Australian Greens recommend that the National Native Title Tribunal ensure that when a determination is made that a mining lease should be granted on native title land, conditions relating to mine rehabilitation and closure must be imposed as part of that determination.

Recommendation 24

The Australian Greens recommend that the Commonwealth Government provide additional support to native title holders and claimants in the process of negotiating native title agreements in relation to major mining projects, in order to ensure that such agreements deal comprehensively with mine closure, rehabilitation, and post-closure issues.

Ranger Uranium Mine

1.33 The committee also heard specific concerns in evidence that the closure and rehabilitation plans at the Ranger uranium mine may require further work to ensure that they accord with the aspirations of the site's Traditional Owners.

Recommendation 25

The Australian Greens recommend that the Commonwealth Government review the adequacy of current closure and rehabilitation plans at the Ranger mine in Kakadu and act to ensure that Commonwealth frameworks and forums accurately and fully reflect the aspirations of the region's Mirrar Traditional Owners.

Employment opportunities relating to mine rehabilitation works

1.34 Communities transitioning away from reliance on local mines are presented with both challenges and opportunities. Work needs to be undertaken to better understand the employment opportunities in secondary industries related to mine rehabilitation. There is a growing skills gap in the mine closure planning industry—for example, the need for greater technical expertise to conduct ecological restoration programs at mine sites. The Commonwealth can play a role in these areas to ensure that better outcomes are being achieved.

Recommendation 26

The Australian Greens recommend that the Commonwealth Government undertake detailed analysis into the potential for new employment in secondary industries related to mine rehabilitation, and implement measures to support these industries in communities transitioning away from reliance on local mines.

Recommendation 27

The Australian Greens recommend that the Commonwealth Government work with state and territory governments to facilitate education and training initiatives in order to address skills gaps in the mine closure planning industry.

National Mine Rehabilitation Commission

1.35 Broader reform options at the Commonwealth level were raised during the committee's inquiry and the evidence indicates that federal oversight is required to provide a co-ordinated approach to mining rehabilitation. A National Mine Rehabilitation Commission would oversee national regulation, facilitate information sharing between states and territories and promote best practice. This body would facilitate the implementation of some of the Greens' other recommendations. The proposed national body on abandoned mines recommended above could also potentially be housed within the broader National Mine Rehabilitation Commission.

Recommendation 28

The Australian Greens recommend that the Commonwealth Government establish a National Mining Rehabilitation Commission to oversee national regulation, facilitate information sharing and drive best practice in this area.

Reforms to the EPBC Act

1.36 The Australian Greens consider that it is crucial that the rehabilitation plans of mines are considered during the assessment and approvals process, to ensure that the objectives and principles of the EPBC Act are upheld and that approved mines have the lowest possible impact on matters of national environmental significance. For these reasons, the Commonwealth Government should amend the EPBC Act to provide that rehabilitation conditions must be applied to mining projects during consideration under the Act.

Recommendation 29

To ensure that approved mines have the lowest possible impact on matters of national environmental significance (MNES), the Australian Greens recommend that the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) be amended to mandate that rehabilitation related conditions must be applied to mining projects during consideration under the EPBC Act. This would include the following conditions:

- **the proponent must submit a full life of mine and closure plan at the approvals stage which includes rehabilitation strategies designed to specifically protect at risk MNES;**
- **the proponent must submit a progressive rehabilitation plan including rehabilitation targets designed to enhance the protection of the at risk MNES during the mine's operational life;**
- **a requirement for an independent assessment of the closure cost estimate of the mine, based on the closure plan that informs the relevant jurisdiction's level of financial assurance with specific reference to protecting the MNES; and**
- **the approved final landform and land use must:**
    - **reflect the lowest possible residual impact on the at risk MNES; and**
    - **mandate that voids are backfilled and out-of-pit waste rock dumps and tailings storage facilities are eliminated where these landforms have a demonstrable residual impact on MNES.**

Power station ash dams

1.37 The management and rehabilitation of power station ash dams will continue to have a significant impact on communities across Australia. For example, there are ongoing challenges facing the Port Augusta community following the closure of the Port Augusta Power Stations. It is incumbent on government and industry to ensure that the type of environmental and social damage inflicted on the Port Augusta community as a result of severe ash dust events is not repeated at other sites in Australia where ash dams are closed.

1.38 As such, the Australian Greens consider that national standards should be developed to govern the management and rehabilitation of power station ash dams.

The national standards should include requirements for progressive rehabilitation of dam sites before closure, as well as the requirement that ash located in storage dams is made available for future use as a secondary resource.

1.39 It is important that the costs associated with ash dam closure and rehabilitation are met by power station operators and not borne by the taxpayer. For this reason, power station operators should provide financial assurance to state and territory regulators.

1.40 Finally, many stakeholders to the inquiry acknowledged that ash stored in coal ash dams is a rich resource that has multiple potential uses. Such use can reduce the burden of rehabilitating ash storage sites and provide significant economic value. To harness these benefits, the Commonwealth Government should encourage secondary uses of coal ash and remove any impediments to its use.

Recommendation 30

The Australian Greens recommend that the Commonwealth Government work with state and territory governments to develop national standards governing the management and rehabilitation of power station ash dams, including: requirements for progressive rehabilitation of dam sites prior to closure; and requirements that ash located in storage dams remains available for potential future use as a secondary resource.

Recommendation 31

The Australian Greens recommend that the Commonwealth Government work to ensure that all power station operators are required to provide adequate financial assurance to state and territory regulators, in order to guarantee that the full costs of ash dam closure and rehabilitation are covered and will not be passed onto taxpayers.

Recommendation 32

The Australian Greens recommend that the Commonwealth Government investigate options to incentivise the use of power station ash dam as a secondary resource (by, for example, providing Research & Development or other grant funding for innovative technologies), and ensure that any regulatory impediments in this area are removed.

Senator Janet Rice

Chair

Government Senators' additional comments

1.1 Australia maintains robust environmental regulations over our resources sector with world leading environmental practices. These regulations allow Australia to differentiate itself from other global competitors. Because of these strong environmental protections, the Australian resources sector has developed world-class strengths in ecological restoration, remedial actions and biodiversity offsets. This has led to the development of an innovative environmental management and restoration economy, allowing the techniques and practices developed for Australian environmental management to be exported globally through our world leading mining services.

1.2 The primary responsibility for abandoned mines, and for ensuring that mining companies comply with their rehabilitation obligations, which predominately exist in onshore locations, rests with state and territory governments.

1.3 Unless there is a clear nexus with a 'matter of national environmental significance' as defined under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), Commonwealth responsibilities are limited to those of offshore activities or uranium mines in the Northern Territory.

1.4 This is why almost every state has either undertaken reviews or made amendments to the legislation and regulations that govern closure processes, mine rehabilitation and financial assurance systems in order to address community concerns and perceptions regarding this issue.

1.5 Onshore mining approvals are a state responsibility. States approve and collect royalties for the operations that occur within their borders. Part of the reason for the collection of these resources is remediation costs. It is the responsibility of the State to ensure that they have adequate and enforceable financial assurance mechanisms that meet the purpose for which they have been established.

1.6 All state and territory governments have systems in place to ensure miners fulfil their rehabilitation requirements before relinquishing mining leases. This is either through a system of bonds and bank guarantees, a pooled fund or a combination of the two.

1.7 Attempts to establish a national policy can only succeed with the cooperation of the States with the Commonwealth. The appropriate avenue to develop this is through the COAG Energy Council.

1.8 Proposals that potentially place a retrospective obligation upon existing resources operations put at risk the continuing operation of Australia's resources sector. The December 2018 Resources and Energy Quarterly, compiled by the Department of Industry, Innovation and Science, stated that total resources and energy exports are expected to earn a record $264 billion in 2018–19, generating more than half the total value of Australia's exports.

1.9 This risk was further reinforced during the Queensland Government's introduction and passage of the *Mineral and Energy Resources (Financial*

Provisioning) Bill 2018 (Qld) where considerable effort was undertaken to ensure any changes were not imposed on existing operations or activities already approved. A report prepared by Ernst and Young found that such retrospective changes would impose a potential $104 billion bill on existing mines and imperil further investment opportunities.

1.10 Furthermore, imposing additional requirements on operations that have already undergone significant and rigorous approval processes without careful consideration, can create significant issues regarding sovereign risk to existing operating resources projects.

1.11 The previously noted *Mineral and Energy Resources (Financial Provisioning) Bill 2018* (Qld) is a recent demonstration of the resources sector working with a state government to deliver a major program of reform of the mine rehabilitation and financial assurance regime. These changes, developed appropriately at the relevant state level, can better protect the environment, taxpayers, and encourage jobs, investment and growth in the resource sector. Attempts to impose an additional regulatory regime over the top of the existing state-based programs would duplicate existing processes and would not achieve the desired outcome of improving environmental outcomes.

Senator Jonathon Duniam

Deputy Chair

Senator for Tasmania

Labor Senators' additional comments

1.1 Labor Senators thank all organisations and individuals that made submissions to this inquiry, gave evidence at hearings and supported site visits, as well as the Secretariat for their ongoing research and administrative support.

1.2 Labor Senators note that the Committee report outlines concerns with mine rehabilitation practice and regulation, management of abandoned mines, financial assurance mechanisms, reporting and inventories, Indigenous engagement, and rehabilitation of power station ash dams.

1.3 Labor Senators note that state and territory governments are primarily responsible for regulating the rehabilitation of mining and resources projects. Commonwealth jurisdiction over mining rehabilitation is limited to the regulation of matters of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), uranium mines in the Northern Territory, the Christmas Island phosphate mine and offshore petroleum activities in Commonwealth waters.

1.4 Labor Senators note that where there are inconsistencies between jurisdictions, it is prudent for the Commonwealth to demonstrate greater national leadership to harmonise and improve regulations and standards. However, Labor Senators note that the mining industry and state and territory governments are continuously improving rehabilitation work practices and closure planning. Where the Commonwealth Government sees a need for national leadership it should ensure industry and stakeholders are actively consulted.

1.5 Labor has a policy to reform Australia's environmental law and introduce an Australian Environment Act to protect Australia's environment and provide industry with certainty in regard to environmental law. Labor has also committed to establishing an independent Federal Environmental Protection Agency, with the mission to protect Australia's natural environment. This agency will be guided by the best available scientific advice, ensure compliance with environmental law, and have the ability to conduct public inquiries on important environmental matters. Labor Senators also note that a legislated review of the EPBC Act is due to commence in 2019. Labor Senators consider that the question of whether rehabilitation related conditions should be applied to mining projects during consideration under the EPBC Act should be included in the consultation process for the legislated review of the EPBC Act and/or Labor's processes to reform environmental laws. Labor is leading reform to modernise environmental law which has not been updated for almost twenty years.

Recommendation 1

Labor Senators recommend that as a part of the upcoming legislated review of the EPBC Act and/or Labor's commitment to reforming environmental laws, the Commonwealth Government include in the consultation process the proposal to mandate that rehabilitation related conditions, as well as provisions regarding 'care and maintenance', must be applied to mining projects during consideration under the

EPBC Act to ensure that approved mines have the lowest possible impact on matters of national environmental significance and to ensure approved mines are not left for extended periods of time in perpetual 'care and maintenance' while not being managed and monitored to avoid rehabilitation obligations.

Senator Anne Urquhart
Senator for Tasmania

Senator Anthony Chisholm
Senator for Queensland

Senator Kristina Keneally
Senator for New South Wales

Additional Comments by Senator Rex Patrick

Don’t Just Bury the Ashes

The work of the committee

1.1 I thank the committee for the work it has done in relation to this inquiry.

1.2 The inquiry was referred to the committee well before I filled the casual vacancy created by the resignation of former Senator Xenophon. As such I have not participated in the full inquiry process for this reference; rather, I became involved after the Senate agreed on 18th March 2018 to extend the inquiry's terms of reference to cover the rehabilitation of power station ash dams. The Senate did so in response to a motion moved by me after listening to constituents in Port Augusta suffering the effects of the closure of the Port Augusta Power Stations.

1.3 Accordingly I will only provide additional comments relating to ash dam rehabilitation.

We must do better

1.4 As stated in the committee's report, approximately half a billion tonnes of ash is currently stored in power station ash dams around the country.

1.5 The management and rehabilitation of power station ash dams will continue to have a significant impact on communities across Australia. The ongoing challenges facing the Port Augusta community following the closure of the Port Augusta Power Stations have shown this. It is incumbent on government and industry to ensure that the type of environmental and social damage inflicted on the Port Augusta community as a result of severe ash dust events is not repeated at other sites in Australia where ash dams are closed.

Under-utilised

1.6 Much of the ash generated by power stations just sits there serving as an environmental eyesore and irritant, despite there being uses for it. The committee detailed how fly ash can be used in products:

- cement and concrete products, such as bricks and masonry;
- soil beneficiation to improve soil pH due to the alkaline nature of fly ash, particularly in areas where soil is acidic because of, for example, acid mine drainage;
- backfilling, reclamation and stabilisation operations;
- road and embankment construction;
- landfill and levelling operations;
- ceramic and glass raw material;
- metal recovery/extraction, depending on the amount of metals in the ash; and
- adsorbents, filters and other forms of water treatment.

1.7 But it is not being used. This is because governments have taken a rather perfunctory attitude towards ash dams. This needs to change.

1.8 The Director of Nu-Rock, a NSW company that uses a cold (low energy) process to convert power station ash into building bricks and tiles, described what a Nu-Rock operation might look like at Port Augusta, and what that would do for the local economy (in addition to cleaning up the ash dam) in his evidence to the committee:

> **Senator PATRICK:** Okay. Give me a picture of what Port Augusta would look like if you were here.
>
> **Mr Rahme:** If we were to set up our four modules on Port Augusta and use a million tons of ash a year out of that ash dam, with, say, one plant we would be producing 30 million 200-series blocks a year. Another plant could be producing 200 million bricks a year, with another plant producing pipes and another one producing roof tiles. They would create in the order of about 500 jobs locally, directly, including transport, not to count the enormous amount of jobs that we'd create in the building industry through the fact that we are able to reduce the cost of construction substantially.
>
> **Senator PATRICK:** So you can have 500 jobs here in Port Augusta consuming—
>
> **Mr Rahme:** A million tonnes of ash a year, so we'd have 26 years supply of ash ready for us.[1]

1.9 There are win-win opportunities being missed.

Recommendations

1.10 The committee has drawn out shortfalls in the way governments approach power station ash dams. These include shortfalls in standards on how to deal with ash dams, shortfalls in requirements related to financial guarantees, and in governments providing incentives to encourage commercial entities to utilise ash as a secondary resource.

1.11 With that in mind I make the following recommendations:

Recommendation 1

The Commonwealth Government needs to work with state and territory governments to develop national standards governing the management and rehabilitation of power station ash dams. The rules introduced by the United States Environmental Protection Agency in 2015, which have set national requirements for the disposal of 'coal combustion residuals' (see paragraph 9.68 of the main report), would serve as a suitable template.

1 Mr Maroun Rahme, Managing Director, Nu-Rock, *Committee Hansard*, 3 September 2018, p. 17.

Recommendation 2

The rehabilitation of dam sites should occur on a "clean as you go" basis, with a requirement that ash located in storage dams remains available for future use as a secondary resource.

Recommendation 3

The Commonwealth Government should ensure that all power station operators are required to provide adequate financial assurance to state and territory regulators, in order to guarantee that the full costs of ash dam closure and rehabilitation are covered and will not be passed onto taxpayers.

Recommendation 4

The Commonwealth Government should incentivise (including the use of grant funding to seed activities) the use of power station ash dam as a secondary resource and ensure that any regulatory impediments in this area are removed. Port Augusta should serve as a first site for any incentive arrangements.

Senator Rex Patrick
Senator for South Australia

Appendix 1

Submissions, additional information, tabled documents and answers to questions on notice

Submissions

1 Department of the Environment and Energy
2 Alcoa of Australia Limited
2.1 Supplementary to Submission 2
3 Closure Planning Practitioners Association
4 Environment Council of Central Queensland
5 Public Health Association of Australia
6 Naturally Spatial
7 Maules Creek Branch of the Country Women's Association of NSW
8 Doctors for the Environment Australia
9 The Lock the Gate Alliance
9.1 Supplementary to Submission 9
10 Construction, Forestry, Mining and Energy Union
11 The AusIMM
12 AGL
13 The Australia Institute
13.1 Supplementary to Submission 13
14 Western Australian Biodiversity Science Institute
15 Environment Victoria
16 Association of Mining and Exploration Companies Inc.
17 Conservation Council WA
18 Mackay Conservation Group
19 Hunter Communities Network
20 Mr Gregory Hancock and Mr Gary Willgoose
21 Environment Centre of the NT
22 New England Greens
23 The Chamber of Minerals and Energy of Western Australia
24 Environmental Defenders Offices of Australia
25 Greenpeace Australia Pacific
25.1 Supplementary to Submission 25

26 Environmental Justice Australia
26.1 Supplementary to Submission 26
27 Australian Conservation Foundation
28 Australia ICOMOS
29 Mr Simon Smith
30 Mr Ian Little
31 Dr Jason Tuckwell
32 Mr David Marlow
33 Ms Judith Leslie
34 Ms Helen Upward
35 Ms Georgina Coggins
36 Ms Robyn Charlton
37 Ms Corinne Unger
38 Mr David Noonan
39 Name Withheld
40 Professor David Mulligan
41 Mr Jack Green and Mr Gadrian Hoosan
42 Friends of Big Hill Stawell
43 Mineral Policy Institute
44 Western Australian Government
45 Australian Tyre Recyclers Association
46 Maules Creek Community Council Inc
47 Peabody Energy
48 Rio Tinto
49 NSW Minerals Council (NSWMC)
50 Minerals Council of Australia
51 Mr Garry Reed
52 Mr Philip Spark
53 Northern Territory Government
54 BHP Billiton
55 Department of Industry, Innovation and Science
56 East Kimberley Chamber of Commerce and Industry
57 Glencore
58 South Australian Government
59 Mr Frank Hooke

60 Ms Vanessa Richardson

61 Mr Jim Leggate

61.1 Supplementary to Submission 61

62 Mr Chris Bilsland

63 Ms Wies Schuiringa

64 ARC Centre for Mine Site Restoration

65 Mr Volker Pfannenberg

66 Mr Robert Kent

67 Government of Victoria

68 Government of Tasmania

69 Mr Peter Coggins

70 Name Withheld

71 Bendigo and District Environmental Council

71.1 Response to Submission 71 from GBM Gold Ltd

72 Mr Andrew Helps

72.1 Response to Submission 72 from City of Greater Bendigo

72.2 Response to Submission 72 from GBM Gold Ltd

73 Mr Wayne Hamilton

73.1 Response to Submission 73 from Hilgrove Resources

73.2 Response to Submission 73 from Mr Adam Marshall, Member for Northern Tablelands

74 Monash University

74.1 Supplementary to Submission 74

74.2 Supplementary to Submission 74

74.3 Supplementary to Submission 74

74.4 Supplementary to Submission 74

75 Mr Frank Batini

76 Bushwalking WA

77 Mr Harley Lacy

78 Ash Development Association of Australia (ADAA)

79 Australian Energy Council

80 Mr David Watkins

81 Mr David Grogan

82 Dr Rebecca Lawrence

83 Name Withheld

84 Nu-ROCK

85 Aurecon

86 Beyond Zero Emissions

87 Name Withheld

88 Port Augusta City Council

89 Flinders Power

90 Rum Jungle Traditional Owner Liaison Committee

91 The Hon Wilson Tuckey

92 Mr Rod Bourchier

93 Mr Trevor Robertson

93.1 Response to Submission 93 from the South Australian Environmental Protection Authority

93.2 Response to Submission 93 from Flinders Power

Tabled documents

1 Diagram from forthcoming book 'Mining in the Asia Pacific: Risks, Challenges and Opportunities', tabled by Ms Corinne Unger at a public hearing in Brisbane on 12 July 2017.

2 'British Columbia Crown Contaminated Sites Program, 2016 Biennial Report', tabled by Ms Corinne Unger at a public hearing in Brisbane on 12 July 2017.

3 'US Public Law 95-87: Surface Mining Control and Reclamation Act of 1977', tabled by Dr Peter Erskine at a public hearing in Brisbane on 12 July 2017.

4 Opening statement, tabled by Mr Jim Leggate at a public hearing in Burnie on 12 October 2017.

5 'Development of a textural index for the prediction of acid rock drainage', tabled by Dr Anita Parbhakar-Fox at a public hearing in Burnie on 12 October 2017.

6 'A critical review of acid rock drainage prediction methods and practices', tabled by Dr Anita Parbhakar-Fox at a public hearing in Burnie on 12 October 2017.

7 'Assessing geo-environmental risk using intact materials for early life-of-mine planning – a review of established techniques and emerging tools', tabled by Dr Anita Parbhakar-Fox at a public hearing in Burnie on 12 October 2017.

8 'Waste is a design flaw', tabled by Dr Anita Parbhakar-Fox at a public hearing in Burnie on 12 October 2017.

9 'Enquiry into Mining Rehabilitation Submission from Waratah Wynyard Council', tabled by Mr Bill Walker at a public hearing in Burnie on 12 October 2017.

10 'Mineral Resources – the Legacy', tabled by Mr Harley Lacy at a public hearing in Perth on 7 March 2018.

11 'Cumulative Environmental Impact Assessment Industry Guide', tabled by Minerals Council of Australia at a public hearing in Perth on 7 March 2018.

12 'Investing in Better Decisions', tabled by the WA Biodiversity Science Institute at a public hearing in Perth on 7 March 2018.

13 ‘Documentation provided by Flinders Power in December 1998', tabled by Port Augusta City Council at public hearing in Port Augusta on 3 September 2018.

14 'Documents relating to Augusta Power Stations Dust Management Plan', tabled by Port Augusta City Council at a public hearing in Port Augusta on 3 September 2018.

15 'Documents relating to Augusta Power Stations Closure Plan', tabled by Port Augusta City Council at a public hearing in Port Augusta on 3 September 2018.

16 'Timeline of key events and recommendations', tabled by the SA Environment Protection Authority at public hearing in Port Augusta on 3 September 2018.

Additional information

1 'Future Hazards: Will the Adani Carmichael Coal Mine Meet Mining Industry Rehabilitation Standards?', provided by Lock the Gate Alliance following a public hearing in Brisbane on 12 July 2017.

2 'Adani Carmichael Mine: Baseline Closure Cost and Financial Assurance Estimation', provided by Lock the Gate Alliance following a public hearing in Brisbane on 12 July 2017.

3 Additional information provided by the TJ Ryan Foundation received 28 July 2017.

4 FOI Documents released by the NT Department of Mines and Energy in relation to the McArthur River Mine, provided following a public hearing in Darwin on 30 October 2017.

5 Additional information provided by Ms Corinne Unger following a public hearing in Brisbane on 12 July 2017.

6 'Borroloola: Standing Up for Country', short film shown at a public hearing in Borroloola on 31 October 2017.

7 'Mine Tailings Storage: Safety is no accident', provided by the Mineral Policy Institute at a public hearing in Perth on 7 March 2018.

8 'Research Plan 2017-2020', provided by WA Biodiversity Science Institute following a public hearing in Perth on 7 March 2018.

9 'CRC - Resource Sector Environmental Management Bid Prospectus', provided by WA Biodiversity Science Institute following a public hearing in Perth on 7 March 2018.

10 Presentation slides, provided by Alcoa following committee visit to Huntly mine on 6 March 2018.

11 Presentation slides, provided by Malabar Coal following committee visit to Maxwell Infrastructure on 14 March 2018.

12 Presentation slides, provided by Glencore following committee visit to Mangoola mine on 14 March 2018.

13 Site rehabilitation brochure provided by Glencore following committee visit to Mangoola mine on 14 March 2018. .

14 'SA Water Regulatory Business Proposal 2013: Attachment E.2 – SA Water Wastewater Treatment Plants and Catchments', provided by Mr Trevor Robertson following a public hearing in Port Augusta on 3 September 2018.

15 Presentation slides, provided by Rio Tinto following committee visit to Yandicoogina mine on 11 July 2018.

Answers to questions on notice

1 Answer to question on notice received from the Minerals Council of Australia following a public hearing in Brisbane on 12 July 2017.

2 Answer to question on notice received from Mineral Resources Tasmania following a public hearing in Burnie on 12 October 2017.

3 Answers to questions on notice received from the Environmental Defenders Office QLD following a public hearing in Brisbane on 12 July 2017.

4 Answer to question on notice received from the Department of Industry, Innovation and Science following a public hearing in Canberra on 14 February 2018.

5 Answers to questions on notice received from the Department of the Environment and Energy following a public hearing in Canberra on 14 February 2018.

6 Answer to a question on notice received from the Conservation Council of WA following a public hearing in Perth on 7 March 2018.

7 Answers to questions on notice received from the Minerals Council of Australia following a public hearing in Perth on 7 March 2018.

8 Answers to questions on notice received from the WA Department of Mines, Industry Regulation and Safety following a public hearing in Perth on 7 March 2018.

9 Answers to written questions on notice received from the Department of Industry, Innovation and Science following a public hearing in Canberra on 14 February 2018.

10 Answers to questions on notice received from the SA Environment Protection Authority following a public hearing in Port Augusta on 3 September 2018.

11 Answers to questions on notice received from Flinders Power following a public hearing in Port Augusta on 3 September 2018.

12 Answer to question on notice received from Environmental Justice Australia following a public hearing in Port Augusta on 3 September 2018.

Appendix 2

Public hearings

Wednesday, 12 July 2017 – Brisbane

Queensland Treasury

Mr Adrian Noon, Special Advisor - Strategic Commercial
Ms Cecilia Christensen, General Counsel

Ms Corinne Unger, private capacity

Dr Peter Erskine, private capacity

Mackay Conservation Group (via teleconference)

Mr Peter McCallum

Ms Georgie Spreadborough, private capacity

Lock the Gate Alliance

Mr Rick Humphries

Environmental Defenders Office Queensland

Ms Revel Pointon

Mr Trond Smith, private capacity

Mr Kane Booth, private capacity

Capricorn Conservation Council (via teleconference)

Mr Michael McCabe

Minerals Council Australia (via teleconference)

Mr Chris McCombe, Senior Advisor - Environment

Thursday, 12 October 2018 – Burnie

Mr Jim Leggate, private capacity

ARC Transforming the Mining Value Chain Research Hub, University of Tasmania

Dr Anita Parbhakar-Fox, Research Fellow in Geoenvironmental Studies

Copper Mines of Tasmania

Mr Peter Walker, General Manager, Care and Maintenance
Mr Geoff Cordery, Environment Manager

Waratah-Wynyard Council

Mr Bill Walker, NRM Coordinator

Bob Brown Foundation

Mr Scott Jordan, Campaigner

Mineral Resources Tasmania

Ms Jennifer Parnell, Manager Scientific Services
Mr Lachlan Brown, Lease and Licence Officer

Environmental Protection Authority Tasmania (via teleconference)

Mr Wes Ford, Director
Ms Alison Hughes, Project Manager Remediation
Mr John Langenberg, Section Head Industrial Operations
Mr Darryl Cook, Manager Environmental Operations South

Monday, 30 October 2017 – Darwin

Mr David Morris, private capacity (via teleconference)

Northern Land Council

Ms Rhonda Yates, Manager, Minerals and Energy Branch

Australian Conservation Foundation (via teleconference)

Mr Dave Sweeney, Nuclear Free Campaigner
Mr James Trezise

Environment Centre NT

Mr Justin Tutty

Kungarakan Culture & Education Association

Ms Helen Bishop, Chairperson
Mrs Kathleen Mills, Senior Elder

Lock the Gate Alliance

Mr Rick Humphries

Supervising Scientist

Mr Keith Tayler, Supervising Scientist and Assistant Secretary Supervising Scientist Branch

Northern Territory Government

Mr Armando Padovan, Executive Director Mines Division
Mr Mike Fawcett, Director Mining Remediation
Ms Tania Laurencont, Principal Mining Scientist

Tuesday, 31 October 2017 – Borroloola

Mr Casey Davey, private capacity

Ms Josephine Davey, private capacity

Mr Nicholas Fitzpatrick, private capacity

Mr Jack Green, private capacity

Mr Gadrian Hoosan, private capacity

Mr John Keighran, private capacity

Mr Bruce King, private capacity

Ms Nancy (Yukuwal) McDinny, private capacity

Ms Lauren Mellor, Community Campaigner, Environment Centre Northern Territory

Mr Phillip Riley, private capacity

Wednesday, 7 March 2018 – Perth

Conservation Council WA

Ms Mia Pepper, Campaigner

Mr Harley Lacy, private capacity

Mineral Policy Institute

Mr Charles Roche, Executive Director
Dr Martin Brueckner, Senior Lecturer, Murdoch University

Minerals Council of Australia

Dr Gavin Lind, Director Workforce and Health, Safety, Environment and Communities

The Chamber of Minerals and Energy of Western Australia

Ms Bronwyn Bell, Manager – Natural Resources

ARC Centre for Mine Site Restoration

Professor Kingsley Dixon, Centre Director

Western Australian Biodiversity Science Institute

Dr Guy Boggs, Node Leader
Professor Mick Poole AM, Board Chair
Mr Vern Newton, Board Member

Western Australian Government

Dr Phil Gorey, Acting Deputy Director General, Resource and Environmental Regulation, Department of Mines, Industry Regulation and Safety
Ms Karen Caple, Acting Executive Director, Resource and Environmental Compliance, Department of Mines, Industry Regulation and Safety

Monday, 3 September 2018 – Port Augusta

Port Augusta City Council

Cr Sam Johnson, Mayor

Environmental Justice Australia (via teleconference)

Ms Bronya Lipski, Solicitor

Nu-ROCK

Mr Maroun Rahme, Managing Director

Mr Trevor Robertson, private capacity

Flinders Power

Mr Peter Georgaris, Chief Executive Officer
Mr Bradley Williams, Program Director
Mr Ryan Shaw, Director

South Australian Environmental Protection Authority

Mr Tony Circelli, Chief Executive
Mr Peter Dolan, Director Regulation

Aurecon (via teleconference)

Mr Matthew Ludeke, Senior Dams Engineer
Mr Loni Karabesinis, Technical Director

Responses to certain evidence given during public hearings

1 Correspondence from the Queensland Government Department of Environment and Heritage Protection – response to certain evidence given during a public hearing on 12 July 2017.

2 Correspondence from the Queensland Government Department of Natural Resources and Mines – response to certain evidence given during a public hearing on 12 July 2017.

3 Correspondence from the South Australia Environment Protection Authority – correction of evidence given during a public hearing on 3 September 2018.

APPENDIX 3

Summary of committee site visits

This appendix contains summaries of the committee's site visits undertaken during the inquiry. These were visits to:

- Copper Mines of Tasmania mine site in Queenstown, Tasmania on 11 October 2017;
- Savage River Mine, at Savage River, Tasmania on 11 October 2017;
- McArthur River Mine in the Northern Territory on 31 October 2017;
- Ranger Uranium Mine in the Northern Territory on 1 November 2017;
- Huntly Alcoa Mine in Western Australia on 6 March 2018;
- Maxwell Infrastructure (formerly Drayton coal mine), near Muswellbrook, New South Wales, on 14 March 2018;
- Mangoola Coal Mine, near Muswellbrook, New South Wales, on 14 March 2018;
- BHP Northern Tenements area, in the Pilbara region of Western Australia, on 10 July 2018;
- Yandicoogina mine, in the Pilbara region of Western Australia, on 10-11 July 2018; and
- Port Augusta Power Stations, South Australia, on 3 September 2018.

Site visits to Copper Mines of Tasmania, Queenstown TAS, and Savage River Mine, Savage River TAS

On Wednesday 11 October 2017, Senators Rice, Duniam, Chisholm and Urquhart travelled to Queenstown, Tasmania, and participated in a site visit at Copper Mines of Tasmania's Mt Lyell mine site. They then travelled by car to Savage River and participated in a site visit at the Savage River Mine.

Copper Mines of Tasmania, Mt Lyell

The Mt Lyell mine consists of a large underground mine and concentrator on the historic Mount Lyell mining field. Mining operations have occurred in the area since the 1880s making it one of the most long-lived mining fields in Australia.

The current site operator, Copper Mines of Tasmania (CMT), took over the site in 1995. CMT is a subsidiary of global natural resources company Vedanta.

The site has significant legacy environmental problems resulting from historical mining activities. Primary among these is acid mine drainage runoff from exposed pyritic waste rock, which continues to be discharged into the King and Queen Rivers, causing major impacts to the ecosystems of these rivers. Other issues include severe

depletion of the natural vegetative cover, erosion, and surface level pollution at various parts of the site.

When CMT took over the lease for the site it was indemnified by the Tasmanian Government for any environmental impacts caused by historical operations.

CMT's mining and concentrator operations have been under care and maintenance since January 2014. CMT management confirmed during the committee's visit that the company is considering recommencing operations in the near future.

Site visit

During the visit, the committee was provided a briefing about the site's history and current activities by Mr Peter Walker, General Manager Care and Maintenance at CMT, and Mr Geoff Cordery, Environment Manager at CMT.

The committee then inspected various areas of the Mt Lyell site, including:

- the historical waste rock dump, consisting of approximately 80 million tonnes of waste rock sitting exposed above ground (and responsible for most of the site's acid mine drainage issues);
- areas of the site where historical open cut mining activities took place, including heritage-listed infrastructure;
- the current waste rock storage site utilised by CMT in accordance with modern practices; and
- CMT's tailings storage dam, located next to the mine site and consisting of approximately 42 million tonnes of tailings, stored underwater at considerable depth.

CMT representatives noted that the company's rehabilitation liabilities for its operation are in the range of $15-20 million; however, to fully rehabilitate the legacy aspects of the site could cost in the order of hundreds of millions of dollars. CMT informed the committee it is seeking to work with State and Local Government over a 20-30 year timeframe to help address some of the legacy issues on the site.

Historically mined areas at the Mt Lyell Copper Mine, including an old tyre dump (centre).

Savage River Mine, Savage River TAS

The Savage River iron ore mine is currently owned and operated by Grange Resources. The mine has produced magnetite concentrate since 1967. The concentrate is pumped 83km via a pipeline to the Port Latta Pelletising Plant, 60km west of Burnie, where the concentrate is formed into pellets ready for shipping.

The mine is located in remote terrain surrounded by areas of high wilderness value. It comprises three principal open pits, reaching depths of over 350 metres, accompanied by processing facilities. The mine is Australia's largest integrated iron ore mining and pellet production facility, and has an expected life of mine to 2034.

Operations during the first 30 years of the mine's existence created severe environmental damage to approximately 30km of Savage River, which runs through the mine lease area. The degradation was caused primarily due to acid mine drainage from approximately 200 million tonnes of waste rock in several dumps around the site.

In 1997 ownership of the site was transferred to new operators (Australian Bulk Minerals, which subsequently merged with Grange Resources in 2009), with a rehabilitation project commencing at this time to deal with legacy pollution issues. The Savage River Rehabilitation Project (SRRP) commenced as a cooperative project between the operator and the Tasmanian Government, underpinned by specific legislation outlining the legal and funding arrangements.

Site Visit

During the visit, the committee was provided a briefing by Mr Ben Maynard, General Manager Operations of Grange Resources Tasmania, and other Grange Resources staff. The briefing outlined the site's current operations, as well as its future life of mine planned activities, including the eventual closure and rehabilitation plan for the mine. The committee heard that under the SRRP, significant improvements in environmental performance from legacy issues have been realised, with downstream water quality significantly improving.

Following the briefing, the committee inspected various areas of the Savage River Mine, including:

- the North Pit and Centre Pit operations;
- tailings storage facilities;
- revegetated areas surrounding a section of Savage River; and
- the slurry pipeline bridge over Savage River that transports iron ore concentrate from the mine site to the Port Latta processing facility.

The role of the South Deposit Tailings Storage Facility was highlighted during the site visit. This facility has the capacity to capture legacy seepage from historic waste rock dumps and co-treat it with fresh tailings from mining operations in order to neutralise the acid mine drainage.

Senators Rice, Urquhart, Chisholm and Duniam with Grange Resources staff, overlooking current pit operations at Savage River mine.

Site visit to McArthur River Mine, NT

On Tuesday 31 October 2017, a subcommittee consisting of Senators Rice and Chisholm travelled to McArthur River in the Northern Territory and conducted a site visit at the McArthur River Mine.

Background

The McArthur River Mine (MRM) is located in the Gulf of Carpentaria, approximately 900km southeast of Darwin, and has been operating since 1995. MRM produces zinc, lead and silver from an open cut mine, which is then processed and stored onsite before being transported 120km by road to Bing Bong port loading facility, from where it is shipped to global customers.

The mine site is approximately 65 kilometres southeast of the township of Borroloola. The committee held a public hearing in Borroloola following its site visit to McArthur River Mine in order to discuss the mine with local community representatives.

The mine started as an underground operation, and was expanded to an open cut mine from 2007. This expansion involved diverting a section of the McArthur River into a new channel around the proposed open cut site. Global resources firm Glencore is the current owner and operator of the mine, having acquired control from Xstrata in 2012. In 2013 the NT Government approved an expansion of the mine, to double its size, increase its production rate, produce 500 million tonnes more waste rock, and extend the mine life to 2038.

Various environmental concerns have been raised about the McArthur River site in recent years, including waste dump seepage and acid drainage issues, pollutants entering the McArthur River system leading to elevated lead levels in local species, and significant spontaneous combustion of the waste rock dump at the site in 2013.

An Environmental Impact Statement (EIS) and approval process is currently in place in relation to the long term management of the waste rock dump at the MRM. Glencore released a draft EIS in March 2017, which is now subject to approval by both the NT Government, as well as the Commonwealth Government (in respect of EPBC Act issues).

Site Visit

During the visit, committee members were provided a briefing by Mr Sam Strohmayr, General Manager, McArthur River Mining, and Greg Ashe, Chief Operating Officer of Glencore's Zinc Assets Australia. The briefing covered aspects including the historical and current operations of the mine, rehabilitation initiatives and Glencore's proposed plans for mine closure and rehabilitation.

Following the briefing, the committee inspected various areas of the McArthur River Mine, including:

- the plant nursery where a variety of species are established for use in revegetation of the river diversion channel;
- the southern point of the McArthur River diversion channel, showing current revegetation activity;

- the open cut mining pit;
- the Northern Overburden Emplacement Facility (waste rock pile); and
- the tailings storage facility.

Site Visit to Ranger Uranium Mine, NT

On Wednesday 1 November 2017, a subcommittee consisting of Senators Rice and Chisholm travelled to Jabiru in the Northern Territory and participated in a site visit at the Ranger Uranium Mine.

Background

The Ranger Uranium Mine is entirely surrounded by the world heritage listed Kakadu National Park, and is located about 260km east of Darwin. The mine is owned and operated by Energy Resources of Australia (ERA), which is 68 per cent owned by Rio Tinto.

The mine commenced operations in 1980, and active mining at the site ceased in 2012. Processing of stockpiled ore from previous mining continues, and under ERA's lease conditions this activity must be finalised by January 2021, with rehabilitation activities to be completed by 2026. The mine is subject to strict environmental conditions, requiring it to be rehabilitated to a standard where it may be incorporated into the Kakadu National Park.

The mine consists of two primary open cut pits; Pit 1, which was depleted in 1994, and the larger Pit 3 which was depleted in 2012. Processing facilities onsite transform the mined ore through various process into uranium oxide powder, which is then stored onsite before transport from the mine site to port for shipping.

Site Visit

Senators were provided a briefing by Mr Paul Arnold, ERA Chief Executive & Managing Director, and other ERA staff. The briefing covered Ranger's historical and current operations, and the closure and rehabilitation plans for the site.

The committee then inspected various aspects of the site, including:

- Pit 3, which is currently being progressively filled with tailings from the processing mill and tailings dam as part of its rehabilitation plan;
- heaped stockpiles of mined ore (for processing) and waste rock (for use in pit backfill and final landform construction);
- crushing and processing facilities used in the uranium extraction process;
- Pit 1, which has been partially filled with tailings then covered with geo-fabric to allow for the gradual layering of waste rock material from 2012 until 2018. The placement of the final layer of waste rock, contouring to final landform and revegetation will commence in 2019 pending regulatory approval;
- the Tailings Storage Facility, from where tailings material is currently being dredged and transferred into Pit 3; and

- the trial landform area, where four different combinations of surface materials and many species have been trialled in order to determine the optimal approach to constructing the final landforms for Pits 1 and 3 once backfilling has been completed.

Senators Chisholm and Rice inspecting Pit 3 at Ranger Uranium Mine.

Site Visit to Huntly Alcoa Mine, WA

On Tuesday 6 March 2018, Senators Rice, Lines and Reynolds travelled to Huntly Mine near Dwellingup, Western Australia to participate in a site visit.

Background

Huntly Mine is situated in Western Australia's jarrah forests in an area previously subject to timber logging. The mine is the second largest bauxite mine in the world and was established in 1976. Bauxite ore from Huntly and the nearby Willowdale mine, also managed by Alcoa, is used to produce around 43 per cent of Australia's alumina and 20 per cent of Australia's aluminium. Mining of bauxite occurs to a depth of 4 metres. On average, 650 hectares of land have been cleared per year.

Rehabilitation of Huntly mine has been a graduated process, with some rehabilitation beginning several decades ago, and notably following the respective trends in mining rehabilitation of each period. To date, only a small area of land in the nearby town of Jarrahdale has been formally handed back to the state government. Alcoa noted in documents provided to the secretariat that it was the first mining company in the world to achieve 100 per cent plant species richness in its rehabilitated mine site areas.

The final landform of rehabilitated areas is around 2–6 metres lower than surrounding areas. Plantings are carried out at the beginning of rehabilitation and then at ten years into the rehabilitation, with in-between plantings found not to be as successful. The region has issues with the pathogen phytophthora dieback. Ground ripping in rehabilitation areas has increased drainage, and allowed some measure of control of dieback prevalence in dieback infested areas.

Rehabilitation of Huntly has included some limited habitat reconstruction. Local fauna species include quokkas, quolls, carpet pythons and black cockatoos. Alcoa stated that it has avoided clearing active habitat trees for the rare forest red-tailed black cockatoos.

Site visit

Mr Luke Gossage, Alcoa's Bauxite Senior Environmental Scientist, provided an overview of Huntly mine and its rehabilitation, including changes in rehabilitation practice over time.

Following the briefing, the committee inspected various aspects of the site with information provided by Ms Moira Oliver, Alcoa Community Education Officer, and Mr Cameron Richardson, Alcoa WA Bauxite Environmental Improvement Specialist. The areas inspected included:

- an area of active mining at the site;
- a revegetated area where rehabilitation commenced in 2014, featuring low-level growth (photo below);
- a revegetated area where rehabilitation commenced in 2011; and
- a lookout in an area rehabilitated in 1992, which featured 1000 stems per hectare to support potential timber harvesting for future land use (photo below).

Senators Rice and Reynolds inspecting a site where rehabilitation commenced in 2014.

Senators Rice, Lines and Reynolds at a lookout in a Jarrah forest area where rehabilitation commenced in 1992.

Site Visits to Maxwell Infrastructure site, and Mangoola Coal Mine, Hunter Valley NSW

On Wednesday, 14 March 2018, Senators Rice and Chisholm travelled to the Upper Hunter Valley region of New South Wales and conducted site visits to the Maxwell Infrastructure site and the Mangoola Coal Mine.

Maxwell Infrastructure site

Malabar Coal announced the acquisition of various assets associated with the Drayton Open Cut Mine in May 2017, with the site now known as Maxwell Infrastructure. The site is located approximately 10 kilometres south of Muswellbrook.

Malabar Coal has taken on responsibility for rehabilitating the open cut mine, which was operated by Anglo American plc prior to the site's sale and ceased operations in October 2016. Malabar also plans to use infrastructure from the Drayton site to service future underground coal mines at the Maxwell and Spur Hill projects.

Malabar formally took control of the Drayton mine on 26 February 2018, several weeks prior to the committee's visit. While on site, the committee received a briefing from Wayne Seabrook, Chairman of Malabar Coal, and other senior site officers. Following the briefing, the committee surveyed the Maxwell Infrastructure site.

Rehabilitation of the Drayton open cut mine is occurring in two phases. The first phase, which is expected to take around two years, involves shaping the land and establishing vegetation on the overburden emplacement areas. The second stage of the rehabilitation will involve works to improve the final landforms for the site, which will include pit voids. Malabar representatives noted that it is planning to use waste rock from its future underground operations to backfill the pit voids.

During the committee's briefing, officials emphasised the high level of community support for Malabar's proposed underground mining operations, noting that the company's current development application provides for approximately 25 years of underground mining. Given the substantial underground metallurgical coal resources, the production of export coal for steel-making could be expected to continue well beyond this point.

Mangoola Coal Mine

Mangoola open cut coal mine is located in the Wybong area, 20 kilometres west of Muswellbrook. The mine is operated by Glencore and has been producing coal since 2011, with 11.3 million tonnes of coal extracted in 2017.

The committee received a briefing presentation from Mr Tony Israel, Operations Manager at the Mangoola site, and other Glencore staff. Following the briefing, the committee undertook a tour of the Mangoola site, including viewing current mining operations, as well as two areas of rehabilitated land on the site.

The open cut mine is being progressively rehabilitated as mining operations proceed. More than 1500 hectares of land have been disturbed by the mine site, with just over 420 hectares of this under active rehabilitation at the end of 2017. Rehabilitation involves landform shaping of mined areas, followed by seeding and revegetation

measures revegetation, as well as the installation of stag trees and nesting boxes to encourage fauna habitation.

Glencore noted that it used Geographic Information System mapping to monitor rehabilitation progress at the site. It further noted that it has also introduced rehabilitation targets into the Key Performance Indicators and performance bonus schemes for site managers to drive performance in this area.

Senators Rice and Chisholm with Glencore staff, viewing open cut operations at Mangoola Coal Mine.

Senators Rice and Chisholm with Glencore staff, examining rehabilitated areas at the Mangoola Coal Mine.

Site visit to BHP Northern Tenements area, WA

On Tuesday 10 July 2018, Senators Rice, Urquhart and Reynolds travelled to the BHP Northern Tenements region of the Pilbara, Western Australia, to participate in a site visit of several rehabilitation areas managed by BHP.

Background

The BHP Northern Tenements area is located in the remote Pilbara region of WA. BHP's iron ore mine, rail and port operations are spread across approximately 19,000 hectares of the region. The Northern Tenements includes a number of iron ore mines, including the Yarrie mine, Cattle Gorge and the former mining town of Shay Gap. The Yarrie mine operated from 1993 to 2014. The town of Shay Gap serviced surrounding iron ore mine sites from the 1970s until 1994 when it was closed, with its buildings sold, demolished or relocated to Yarrie.

Rehabilitation activities in the Northern Tenements involve active weed management, creation of habitats for native species and regular monitoring, depending on the stage of rehabilitation. The mine sites eventually will be returned to pastoralists for low-level grazing, as in the case in most of the Pilbara. As a result, mine rehabilitation is tailored to meet this objective, with one notable exception: pastoralists do not consider the introduced buffel grass to be problematic, as it is a source of food for stock, while BHP staff noted that they will not be encouraging this species in their rehabilitation work.

BHP has had some consultation with traditional owners, such as conversations before mining activities began about what is important to Indigenous groups in the area. BHP staff mentioned that ethno-flora research has been carried out in the Central Pilbara into the local names for particular species and the meanings attached to these. This research found that traditional owners emphasised the importance of continued food sources and access to areas following mine rehabilitation.

A key environmental issue in the area is herds of wild camels and, to a lesser extent, donkeys and horses. Challenges for mining rehabilitation include the region's arid climate, fluctuations in rainfall caused by cyclones and thunderstorms, and difficulties arising from seed propagation. The predominant shrub is spinifex which, because of local conditions, had a germination rate as low as 2–3 per cent for some plants, before BHP carried out collaborative research with the Botanic Gardens and Parks Authority and the University of Western Australia, resulting in a drastically improved germination rate of up to 40–50 per cent in some instances.

Because of the nature of iron-ore mining, the final rehabilitated areas will feature open-void pits. Depending on the environmental impact, BHP may decide to partially backfill these voids to a level above the water table, if the water is particularly salty, for example.

Site visit

BHP staff involved in mine site rehabilitation across BHP's holdings provided the committee with an overview of BHP's general rehabilitation principles and practices, research activities and local conditions. Staff who gave the briefing included Mr Gavin Price, the Head of Environment, Mr Stephen White, Principal Environment, Ms

Rebecca Wright, Manager Closure, Mr Ross Hernan, Lead Project Delivery and Mr Tony Webster, Superintendent HSE.

They then showed the committee several rehabilitated areas:

- Y10 rehabilitation and Cattle Gorge, where rehabilitation is expected to continue over the next five years; and
- the former town site of Shay Gap, now fully rehabilitated.

A view overlooking some rehabilitated areas of former iron ore mine sites in the BHP Northern Tenements area.

Senators Rice, Urquhart and Reynolds with BHP staff at the former mining town site of Shay Gap, where rehabilitation commenced after its closure in 1994.

Site visit to Rio Tinto Yandicoogina mine, WA

On the afternoon of Tuesday 10 July 2018, Senators Rice, Urquhart and Reynolds travelled to the Rio Tinto Yandicoogina mine, located in the Pilbara region of Western Australia. The committee spent the night in accommodation at Yandicoogina village and conducted a site visit the following day.

Background

Yandicoogina is an active iron ore mine mid-way through its operations, with most rehabilitation not yet fully underway given that extraction continues. The mine was commissioned in 1998, with some pit closures commencing in 2015. Rio Tinto negotiated a land use agreement with the local Aboriginal corporation (Gumala Aboriginal Corporation) in 1997.

The iron ore at Yandocoogina is located in an aquifer channel. Current production is approximately 58 million tonnes per annum. The mine depth is 45-50 metres, with pumps removing water where activities extend below the water table. Rio Tinto staff informed the committee that vegetation in the area is not exclusively reliant on groundwater from the local channel iron deposit (CID) aquifer. The CID aquifer has been lowered to facilitate mining activities because the mining activities are located in this aquifer channel. Monitoring to date demonstrates that the CID aquifer is isolated from the regional aquifer.

Rio Tinto is a founding member of The Pilbara Rehabilitation group, an industry initiative consisting of 15 mining companies in the region established in 2013. This initiative involves collaborative efforts and projects (such as how to best manage erosion in rehabilitation), as well as seminar presentations outlining each company's respective work in rehabilitation.

Site visit

Ms Zara Fisher, Vice President, HSE, Ms Mariette Bylsma, the General Manager of Yandicoogina, and other Rio Tinto staff gave a comprehensive overview of Yandocoogina operations, rehabilitative work done to date, regulatory requirements and the mechanics of planned rehabilitative work.

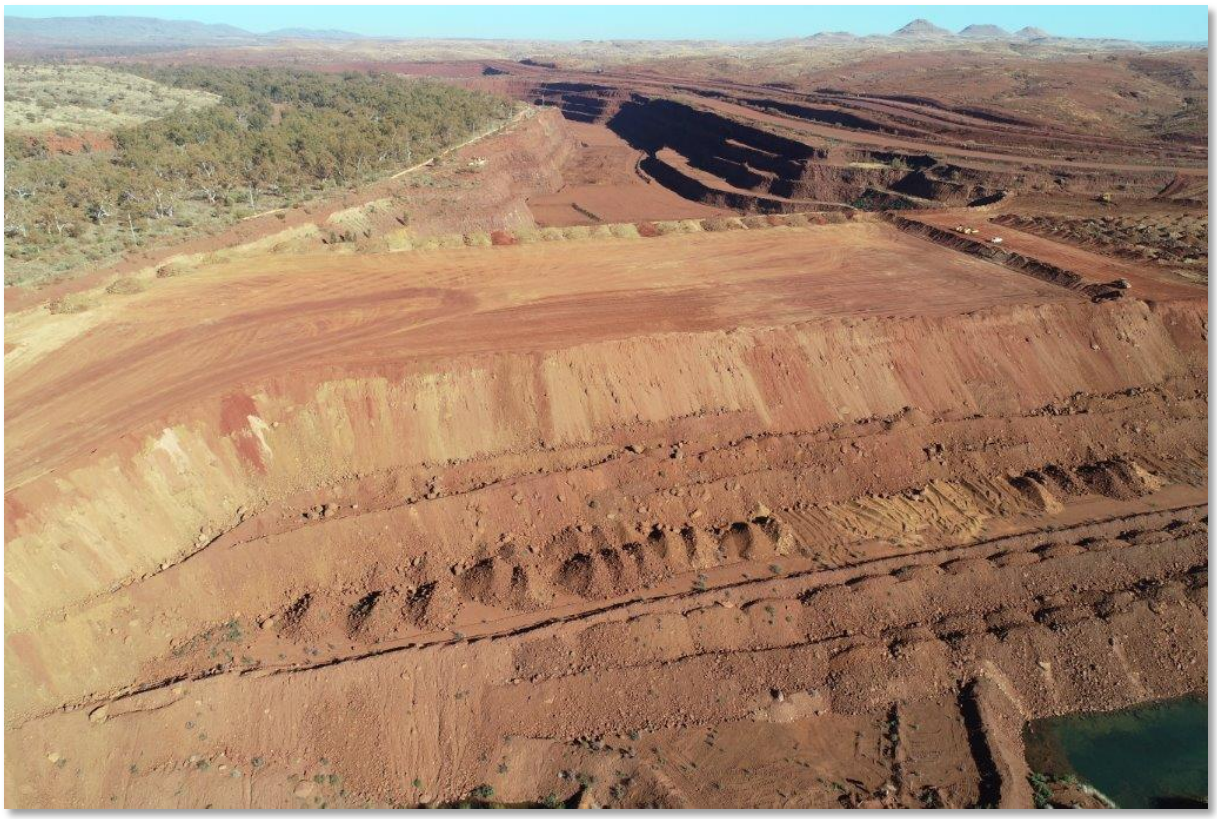
The committee examined 3D models of different proposed rehabilitation plans for the site and bags of seed that will be used in rehabilitation, with staff explaining that the seed is picked in the area, sold to native seed companies and then sold to Rio Tinto.

The committee were told that in general, around 80 per cent of the cost of iron ore mining rehabilitation is in earthworks. Conceptual closure costs require ongoing review and revision, as industry experience has been that cost estimates often increase during the life of a mine. Rio Tinto staff outlined its rigorous internal study process designed to ensure that closure planning and provisioning occurs with increasing specificity from ten years prior to closure. Because of the quantity of material extracted, staff said, it would not be possible to backfill every pit without taking further material from elsewhere. Rio Tinto's pit modelling suggested that there would not be a detrimental environmental impact resulting from these pit voids. Staff stated that rehabilitation will involve creating the deepest pit lakes possible with the smallest possible surface area to limit surface evaporation of water.

Rehabilitation trials at Yandicoogina to date have included trialling different plant species, and planting seeds in top soil and non-top soil areas (with top soil areas found to be the most effective). This work is a component in the planning for how the mine will close. Rehabilitation will involve a significant amount of loading and hauling to shape landforms, ripping, and hand and machinery seeding.

Rio Tinto staff showed the committee some areas where preliminary rehabilitation was underway or rehabilitation was expected to commence, including:

- a land bridge across a completed pit area, to reinstate a tributary creek line;
- a backfill and topsoil stockpiling area; and
- an area where a rehabilitation trial had begun.



A view of active operations at Yandicoogina mine (supplied, Rio Tinto).

Site visit to Port Augusta Power Station site, SA

On the morning of Monday 3 September 2018, Senators Urquhart and Patrick travelled to the decommissioned Port Augusta Power Stations to conduct a site visit.

Background

Flinders Power currently manages the rehabilitation of Port Augusta Power Stations, including the Ash Dam, the focus of this site visit. The rehabilitated dam covers an area of around 273 hectares. The dam is located in close proximity to dwellings in the nearby city of Port Augusta, with some homes only 400 metres away.

The Ash Dam was created to store bottom ash left over from the operations of the surrounding coal-fired power stations. From the 1960s until the stations ceased operating, the bottom ash was mixed with seawater to form a slurry and deposited in the ash dam.

The Port Augusta Power Stations ceased operating in May 2016, with most remaining infrastructure demolished or scheduled for demolishment by the time the committee carried out the site visit. The ash dam has been covered with topsoil and dust suppressant. It has been the subject of recent community concern that wind has led to the spread of topsoil dust and ash particles from the dam into surrounding areas.

Site visit

Representatives from Flinders Power, including the company's Chief Executive Officer, Peter Georgaris, took the committee by bus to look at the ash dam site, areas where Flinders Power had commenced revegetation, and demolition sites. They explained that significantly below average rainfall across the area meant that revegetation growth was hampered. They also showed a site where vegetation had naturally returned direct into the ash substrate, despite the company not applying topsoil.

Flinders Power explained that technical experts had been engaged as well as the South Australian Environment Protection Authority (EPA). A range of dust management measures were demonstrated to the committee (including cover crops, surface roughening, watercarts and suppressant). The extent of community engagement in the project was also discussed with the committee.

Flinders Power representatives outlined the company's obligations under its EPA license, and emphasised that the ash dam is comprised mostly of heavy bottom ash, not the much lighter fly ash. They stated that three monitoring stations on-site and two in the nearby community have been established to determine wind-speed and the level of dust particles in the atmosphere.

Senators Urquhart and Patrick examine revegetation on top of the former ash dam, with representatives from Flinders Power.