

# House of Representatives Standing Committee on Environment and Energy

## Inquiry into the prerequisites for nuclear energy in Australia

Submission from the Government of South Australia

September 2019



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## Summary

The South Australian Government supports the Standing Committee on the Environment and Energy's inquiry into the circumstances and prerequisites necessary for any future government's consideration of nuclear energy generation in Australia.

In doing so, the South Australian Government recognises that regulation of prescribed nuclear activities in Australia is a Commonwealth responsibility and that the generation of nuclear power is specifically prohibited under section 140A of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth). Any future consideration to amend or remove the legislative prohibition on nuclear power is a matter for the Commonwealth Parliament.

The South Australian Government submission to the Committee's inquiry highlights findings from the South Australian Nuclear Fuel Cycle Royal Commission which we believe can contribute to an open and transparent investigation of issues associated with nuclear power generation in Australia.

The submission also highlights the role South Australia plays in providing safe and secure supply of uranium for peaceful purposes in countries with which Australia has bilateral nuclear cooperation agreements. The submission makes recommendations to further support safe and reliable uranium exploration and mining activities in South Australia through the removal of existing regulatory duplication.

The South Australian Nuclear Fuel Cycle Royal Commission was established in 2015 to undertake an independent investigation into the potential for increasing South Australia's participation in the nuclear fuel cycle including:

- Expanded exploration, extraction and milling of minerals containing radioactive materials;
- Further processing of minerals and processing and manufacture of materials containing radioactive and nuclear substances;
- Use of nuclear fuels for electricity generation; and
- Establishment of facilities for the storage and disposal of radioactive and nuclear waste.

The Royal Commission's final report was publicly released in May 2016 and provides detailed findings on the feasibility, viability, risks and opportunities associated with a potential expansion of the nuclear fuel cycle from the perspective of the environment, the economy and the community.

The full report and the South Australian Government response can be found at <https://nuclear.yoursay.sa.gov.au/>.

## NUCLEAR POWER GENERATION

The Royal Commission's report specifically recognised the need to significantly reduce carbon emissions and as a result to decarbonise Australia's electricity sector. In this context, key findings related to nuclear power generation from the Royal Commission's report are summarised below:

### Safety

The Royal Commission examined nuclear reactor safety issues and reviewed international studies of major nuclear power plant accidents at Three Mile Island in 1979, Chernobyl in 1986, and Fukushima Daiichi in 2011, noting that:

*The lessons learned from the design, siting and cultural factors that contributed to these accidents have been applied to new developments [of nuclear power plants].*

Based on these lessons learned the report concluded that the "risk of nuclear accident should not of itself preclude the consideration of nuclear power as a future electricity generation option."

### Feasibility

The Royal Commission's report acknowledged that the development of other low carbon technologies will influence whether nuclear power will be required to meet Australia's future energy needs, finding that:

*Nuclear power is a mature, low carbon electricity generation technology. Its deployment is characterised by large upfront capital costs and long periods of construction and operation. It offers high capacity and reliability but does not efficiently follow the peaks and troughs of a highly variable demand profile.*

### Viability

The Royal Commission conducted an analysis of the factors required to construct and operate a nuclear power plant in South Australia. Issues considered included construction based on a proven design with comprehensive safety measures, future electricity demand scenarios, and the ability to dispatch electricity at a price that generates a profit. Based on this analysis, The Royal Commission concluded that:

*On present estimate of costs and under current market arrangements nuclear power would not be commercially viable to supply baseload electricity to the South Australian subregion of the NEM from 2030 (being the earliest date for its possible introduction).*

Since the Royal Commission, South Australia's energy mix has continued to evolve, with a greater interest in generation that better compliments a highly variable demand profile and variable renewable energy output. This means that nuclear power remains unviable now and into the foreseeable future.

In reaching this conclusion however, the Royal Commission report suggested that nuclear power may be viable in other jurisdictions in Australia based on different demand scenarios. The Royal Commission also heard evidence of the future

potential for reductions in the cost of nuclear power including for large plants and new small modular reactors (SMR) which could improve their commercial viability.

Conceptually, an SMR should offer benefits by being able to be deployed further from the coast and to be able to assist with edge-of-grid or off-grid settings to power existing and new loads.

Benefits could include providing alternative ways of powering remote communities and industries, allowing for developments which avoid grid augmentations or renewals. Thin-grid connections at existing edge-of-grid locations could allow for multiple values to be realised by engaging in the broader energy market.

South Australia has a number of prospective mineral regions which are not connected to the electricity network or exist at its edges. These areas generally do not have access to significant fresh surface water.

Should the technology advance in the future, it may be applicable in remote mining situations as a way of avoiding the costs and logistics of power generators by diesel generators whilst facilitating desalination of water for use in processing.

Other logistic challenges would occur from remote deployment, however, requiring the skills and processes to provide sufficient confidence in consumer and environmental protection. In addition, end-of-life disposal or recycling of SMR's would have to be considered to secure a social licence to operate.

A secondary benefit to South Australia would be to encourage more demand for our significant uranium deposits, providing additional regional growth opportunities and increased royalties.

Such a concept would require significant advances over coming years to deploy pilot systems, demonstrate the technology at scale in willing host communities and subsequently bring down the cost of deployment to be competitive with existing alternatives. At this stage, the timeline for such learnings cannot be demonstrated to a point where it is relevant to current decision-making in South Australia. However, it would be sensible to consider soon what legislative and regulatory changes would be required if the use of SMR's is likely to be beneficial in the future.

Innovations in the use of renewable energy in edge-of-grid and off-grid settings are offering a promising alternative to diesel. Whilst initially deployment has focused on reducing reliance on diesel by incorporating power from local renewable energy resources, there is now a focus on deploying energy storage with batteries and with hydrogen to provide firming renewables to predominantly or fully displace diesel.

At this stage, South Australia is actively exploring opportunities to increase the use of renewable energy and advance the development of small and grid scale storage technologies for application in regional and remote locations.

## Social Consent

The Royal Commission emphasised the critical importance of social consent to the adoption of any new nuclear activity (including nuclear power) finding that:

*Efforts over recent decades internationally to develop nuclear projects by focusing on technical considerations without an equal or even greater emphasis on systematic engagement with the community have commonly failed.*

Further, the Royal Commission's report identified several key characteristics of successful processes that had sought community consent for new types of nuclear facilities. These characteristics included:

- Transparency of decision making;
- Willingness to accept long community engagement timeframes;
- Early and deep engagement with local communities to build knowledge and understanding; and
- Availability of scientific evidence and where necessary, multiple corroborating bodies of evidence to demonstrate the effectiveness of steps taken to address risks.

## **Uranium exploration and mining activities**

Safe and secure uranium exploration and mining is critical to the peaceful civilian use of nuclear energy for electricity generation. In South Australia, uranium exploration and mining economic activity provides jobs and delivers royalties to the State.

South Australia has approximately 25 per cent of the world's known uranium resources, and more than 80 per cent of Australia's total uranium resources. The state possesses leading expertise in the regulation and safe management of uranium exploration and mining activities. South Australia is a major exporter of uranium oxide to the world, and currently attracts many companies (including global majors) exploring, developing and mining uranium.

South Australia has long experience with technologies for processing uranium ore, developed from the state's uranium mines. It also has a proven safe uranium handling and transportation systems (>30 year record), and hosts one (Port Adelaide) of only two Australian ports approved for uranium exports.

## **Duplication of state and national regulation**

The Royal Commission's report found that the administrative and legislative processes that manage current uranium exploration and mining operations were sufficient to support a safe expansion of activity. The regulatory approval processes for new uranium mines however, were found to have been unnecessarily duplicative at the state and federal levels.

The South Australian Government considers that the removal of this duplication will not diminish existing standards of regulation safety and compliance and will increase

efficiency, reduce costs borne by industry, and enhance South Australia's status as a favourable investment destination.

The *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (*EPBC Act*) is the principal environmental Commonwealth Act. It focuses on matters of national environmental significance (known as 'triggers'), which then require project assessment and approval by the Commonwealth Environment Minister.

Approvals for new mines are usually handled exclusively by the relevant state or territory government. However, because the *EPBC Act* refers to uranium mining as a 'nuclear action', Commonwealth approval is also required. This leads to duplication of processes and may lead to duplication of conditions of operation applied.

South Australia has an assessment bilateral agreement in place with the Australian Government; however this only removes part of the duplication as South Australia is not accredited to approve such actions. South Australia intends to continue pursuing full accreditation for its assessment and approval processes, including through the upcoming 2019 review of the *EPBC Act*. It is envisaged this step will promote more development and better outcomes whilst still maintaining existing standards of safety compliance and regulation.

There are also options for legislative reform that should be considered during the upcoming statutory review of the *EPBC Act* in 2019.

### **State regulation of mining activities**

South Australia's regulatory framework (see Figure 1 below) ensures that the uranium mining industry is sustainable from environmental, safety and economic perspectives. Assessment and regulation under the *Mining Act 1971* (SA), the *Radiation Protection and Control Act 1982* (SA) and the *Environment Protection Act 1993* (SA), have provided decades of confidence to the community and industry in the safe conduct of uranium mining and transportation.

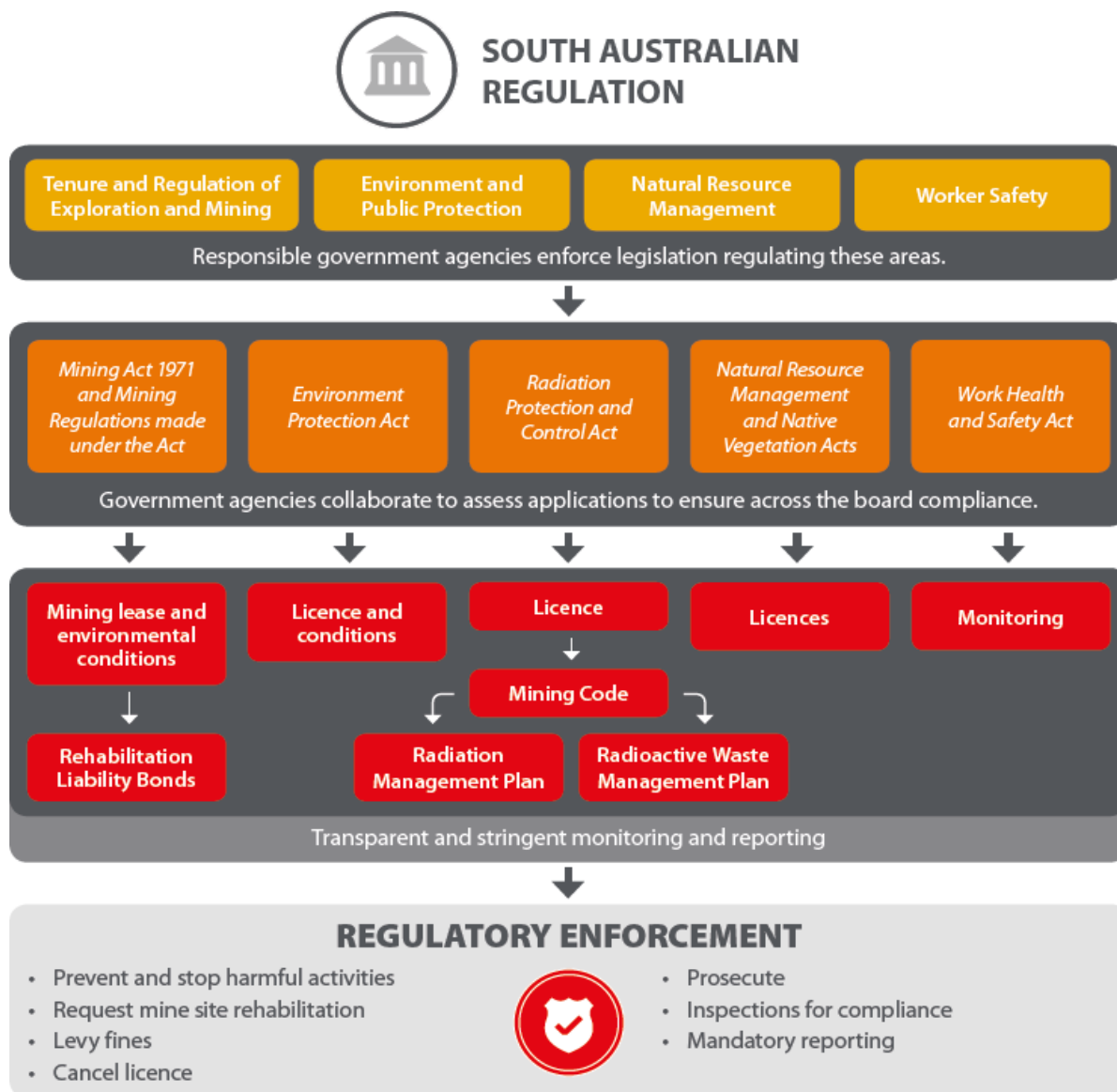


Figure 1. South Australia’s regulatory framework

For an efficient co-regulatory environment, the responsible South Australian Government agencies maintain close working relationships to ensure facilities have clear performance expectations, with minimisation of regulatory duplication. These agencies are the Department for Energy and Mining (DEM), Environment Protection Authority (EPA), and Safework SA. The most effective regulatory tools are applied to achieve required control with the minimum burden to operators.

A highly regarded regulatory framework underpins South Australia’s reputation as a safe and secure supplier of uranium. To maintain the highest standards for safety, expert regulators thoroughly assess and monitor uranium projects in this State. For more than 30 years, South Australia has demonstrated its ability to apply these regulatory processes. The resources sector and its regulators have demonstrated adherence to a whole of chain of custody for the safe handling and transport of uranium. The Government publishes online resources demonstrating the performance of the sector to ensure no harm comes to workers, members of the public, and the environment.

Regular site inspections and incident investigations by DEM and EPA, quarterly reporting and presentations by all three responsible agencies, annual compliance reporting (available on websites), uranium incident reporting (following public reporting protocols), and six monthly environmental consultative committee meetings between the state, national government and operator, are all part of the oversight process.

Transport of Uranium Oxide Concentrate (UOC) within Australia has an excellent safety record with no incidents occurring which have threatened the safety of workers, the community, or the environment. Low specific activity radioactive material such as UOC has been routinely transported in Australia since the 1980s using road, rail, and marine transport modalities. The State and Australian Governments have adopted transport regulations produced by the International Atomic Energy Agency (IAEA). These regulations have been adopted around the world to ensure requirements are consistent across different jurisdictions.

South Australia applies international best practice standards that are trusted by the community and appropriate to manage risks associated with a facility. Our radiation protection framework is based upon national standards developed by the Radiation Health Committee and published by the Commonwealth body, ARPANSA. These standards are based on the IAEA safety standards and guides.

### **Uranium mines captured under the nuclear action trigger**

As explained above, currently any new uranium mines in Australia trigger automatic adherence to the *EPBC Act*. This is known as the ‘nuclear action trigger’. The requirement for joint assessment and approval of new uranium mining activities by State and Commonwealth regulators is a significant barrier to the viability of new uranium mine developments in South Australia, because of the inefficient regulatory duplications those arrangements cause.

Because the Act has a ‘uranium mining and milling’ trigger, this discriminates against the uranium mining industry by making an exception of uranium mining when its conduct and environmental impacts are no different to other forms of mining. Whilst extra requirements for community engagement are necessary, special legislative treatment beyond existing radiation protection protocols and uranium exporting controls is not required.

Aspects such as nuclear proliferation and radiation are already extensively dealt with through existing Commonwealth and State legislation, agreements, and established regulatory systems.

### **Non-uranium mines potentially captured under the nuclear action trigger**

The potential capture of non-uranium mines under the nuclear action trigger is of significant concern to South Australia due to the natural formation of its mineral deposits.

The definition of a nuclear action under the *EPBC Act* includes “establishing a large scale disposal facility for radioactive waste”. For non-uranium mines with elevated concentrations of naturally occurring radioactive minerals (NORMs), it is possible



that this criteria is triggered for higher volume waste systems such as tailings storages facilities (TSFs).

Most recently, the Carrapateena copper-gold project, an approximately \$916 million mine in the state's far north, was determined to be a controlled action under the nuclear actions trigger (in addition to potential impact on a threatened species).

Whilst a TSF for a copper mining and processing operation would not normally be considered a "nuclear action", the Carrapateena TSF will receive tailings that contain elevated concentrations of naturally occurring radioactive minerals. The South Australian Environment Protection Authority (EPA), the agency principally responsible for regulation of radiation impacts in South Australia, considered that the Carrapateena proposal would not have a significant impact on the environment, as there would be no radiation exposures exceeding 1 mSv and no impact on plants or animals due to radiation.

However, as the radiation resulting from the uranium and thorium content exceeded the activity values and activity concentration value specified in the *EPBC Act* regulations, the proposal was declared a controlled action under the nuclear actions trigger. This interpretation could also potentially capture a number of mineral sands, rare earth and other mining projects that have naturally occurring radioactive minerals. These critical minerals are essential to the transition and development of the Australian economy, and will be used in a range of emerging high-tech applications across a variety of sectors.<sup>1</sup>

It is recommended the 'Significant Impact Guidelines' are revised in relation to the application of the *EPBC Act* to non-uranium mining projects. This would mean specifically excluding 'operations for the recovery of mineral sands or rare earths' and other mining projects which have naturally occurring radioactive minerals. The Explanatory Memorandum (EM) for the *EPBC Act* explicitly notes that nuclear actions include mining or milling uranium ore, but does not include operations for the recovery of mineral sands or rare earths. Where this situation occurs with mineral sands or rare earths, assessment and adherence to the proven and trusted SA regulatory framework is sufficient.

## Recommendations

To support expanded uranium exploration and mining activity, the South Australian Government recommends:

1. Simplifying state and federal mining approval requirements to deliver a single assessment and approvals process.
2. Investigating the removal of the 'uranium mining and milling' component from the ambit of the nuclear action trigger in the *EPBC Act*.
3. Amending the *EPBC Act* to ensure the exclusion of non-uranium mining projects from the nuclear action trigger.

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<sup>1</sup> The Australian Government's Critical Minerals Strategy 2019 aims to capitalise on opportunities for Australia to develop its reserves of these much needed minerals.

## Further details

For further information in relation to this submission, please contact the Department of Energy and Mining at [REDACTED].