NUCLEAR CITIZENS' JURY

What are the parts of the Nuclear Fuel Cycle Royal Commission's Report that everyone needs to discuss?

This report is the work of South Australia's first Nuclear Citizens' Jury. This report reflects our best work to identify the issues arising from the Nuclear Fuel Cycle Royal Commission Report, that everyone needs to discuss. This report was finalised by the Jury on the 10th July 2016 in Adelaide.

About the Jury

Purpose and role

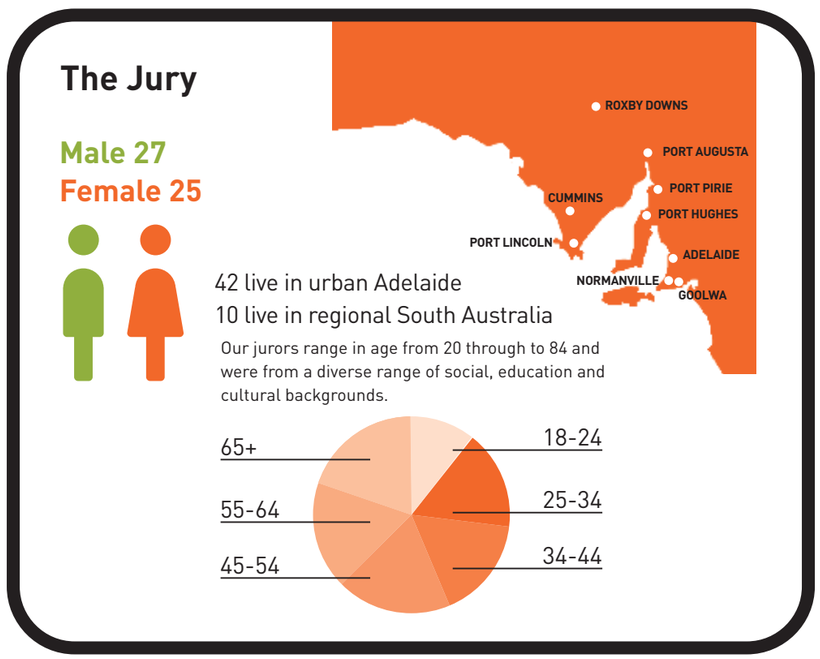
We, the Nuclear Fuel Cycle Citizens' Jury (the Jury) were engaged to review the Nuclear Fuel Cycle Royal Commission's (the Commission's) report and summarise it into an independent guide. Our goal: to help every South Australian understand the opportunities and risks of increasing South Australia's involvement in the nuclear fuel cycle as identified by the Commission.

Who we are

The process to select the members of our Jury was random. 25,000 invitations were sent to randomly selected addresses across the state using an Australia Post database. A total of 1121 respondents indicated that they were willing to participate in the Jury. Of these 1121 people, a jury of 52 was randomly selected to align with census data for age, gender and geographical location.

The figure below details the diversity of our Jury.

The jury was provided with a copy of the Royal Commission report and access to information and a diverse range of witnesses of our choosing enabling an informed discussion. Details about the individual witnesses we spoke to can be found at http://yoursay.sa.gov.au/nuclear/citizens-juries/citizens-jury-one



Nuclear Fuel Cycle

What is the nuclear fuel cycle?

The nuclear fuel cycle can be summarised into four areas.

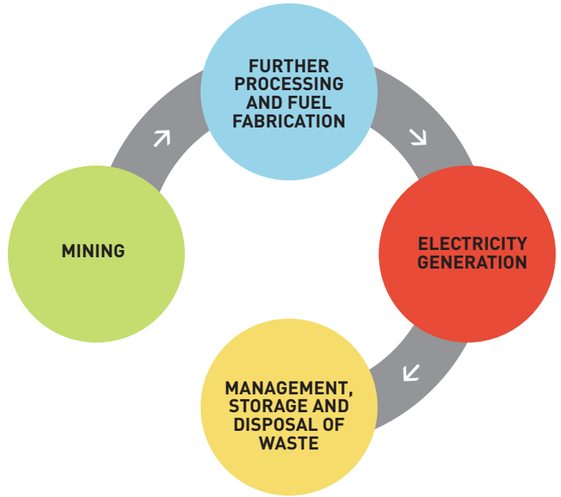
1. Mining and milling
2. Enrichment and fuel fabrication
3. Electricity generation
4. Management storage and disposal of waste

The Nuclear Fuel Cycle Royal Commission looked closely at the storage of international used fuel (high level waste) in addition to the storage of Australian produced low and intermediate level nuclear wastes.

What is nuclear waste?

Radioactive or nuclear waste is a by product from nuclear reactors, fuel processing plants, hospitals and research facilities. There are three broad classifications – high, intermediate and low level waste. High level waste is primarily used fuel removed from reactors after producing electricity. Intermediate waste is also generated while decommissioning and dismantling nuclear reactors and other nuclear facilities. Low level waste comes from reactor operations and from medical, academic, industrial and other commercial uses of radioactive materials.

The Royal Commission Report recommends:



The recommendations can be found in the Royal Commission Report chapter 10

Mining – Continue involvement. Investigate reduction of 'red tape' and undertake further geophysical surveys encouraging further private investment.

Further processing and fuel fabrication – There is currently no international market for additional services in these areas. Remove legislative prohibitions to enable further processing activities and fuel leasing should a market appear. Promote and support increased use of the existing cyclotron at SAMHRI.

Electricity generation – Nuclear power generation is not commercially viable in SA under current market rules, but could be considered as a future low carbon energy source to contribute to national emissions reduction targets. Remove existing prohibitions for nuclear power generation.

Management, storage and disposal of waste – There is potential for economic benefit in providing a storage and disposal facility* for internationally generated used fuel (high level waste). Remove existing prohibitions and complete thorough analysis and discussion on the opportunity to establish a used fuel facility* in South Australia.

**A facility to store, manage and dispose of used nuclear fuel (high level waste) and intermediate level waste.*

Focus for Citizens' Jury

Over four days of deliberation in June and July 2016, the Jury discussed all stages of the nuclear fuel cycle.

Following the initial education and awareness sessions, we spent the majority of our time focused on the main recommendation; to pursue the opportunity to establish an international used fuel (high level waste) storage facility.

We recognise there are potential **economic benefits**, but there are also **substantial risks** to consider. There is a degree of uncertainty around both the benefits and risks associated with establishing such a facility.

Significant additional research, economic analysis and public engagement are still required before South Australians will be in a position to make an informed decision if this is in the best interest of the state.

Stages

The decision making process to determine whether to go ahead and consider the establishment of a used fuel (high level waste) storage facility involves many stages. The first stage was the Nuclear Fuel Cycle Royal Commission. Following the two Citizens' Juries and community engagement process, which is currently underway, the government will make a decision on whether to proceed to the next stage. The South Australian community will be involved at every stage.

Principles

The Jury considered the principles we believe are important when discussing South Australia's involvement in the Nuclear Fuel Cycle. In our view these are:

- → **Legitimacy** – a legitimate decision must include all people
- → **Inclusivity** – there must be continual community consultation
- → **Transparency** - all sources of information must be freely available
- → **Consequences** – due consideration must be given to people, our economy and our environment
- → **Accountability** – decision makers are accountable to the community
- → **Consider the future** – further considerations and more debate of other options. We must also consider future generations of South Australians through all stages
- → **Distribution** - Potential economic benefits must be shared and accessible to everyone
- → **Ethical** – all decisions should be ethically and morally sound - what's good, what's right, what matters.

Call to Action

"Everyone's choice...everyone matters"

The Jury, **calls on YOU**, our fellow South Australians, to join us and be part of the Nuclear conversation.

This is a unique opportunity to be involved in a decision making process to shape the future of South Australia. Any decision about the nuclear industry in our state will involve a long term commitment and have long term consequences. The decision will affect not just us, but future generations.

We encourage you to get involved and participate with an open and enquiring mind.

Your voice will shape the future of our State and for our descendants.
Have your say.

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Key issues to consider

The following sections outline the key issues that we believe South Australians need to discuss from the Nuclear Fuel Cycle Royal Commission Report.

We draw these issues to your attention to assist you in formulating your own view and provide feedback as part of the community engagement process being undertaken by the government.

SAFETY

What the report recommends

Safety is an important consideration because of the potential impact from radiation on people, the environment and the long term hazardous nature of the used fuel (high level waste).

We have read the Commission's report and quizzed many expert witnesses. Many safety and security considerations have been presented and discussed. The considerations include but are not limited to geology, seismic activity, acts of terrorism, health, and transport.

The Commission's report suggests that the management of used fuel can be done safely. See Chapter 5 on page 80-91.

We unanimously agree that all South Australians need to feel confident in all of the regulatory processes for the safety of themselves, the environment and for future generations. It is important to discuss safety and security because of the time scale of the proposal to develop a used fuel (high level waste) storage facility and the long term hazardous nature of high level waste.

Health

The Commission's report examines the effect of radiation exposure on humans throughout all stages of the nuclear fuel cycle. (Chapter 7)

We heard testimony from expert scientific and technical witnesses on topics surrounding the various stages of the nuclear fuel cycle: transport, health, security and safety. The Commission's report addresses the effect of radiation exposure on humans and most of the expert witnesses were agreed on the relative safety of the storage containers.

There is some uncertainty around the impacts on flora and fauna of radiation, which warrant further study as is done in Finland.

Seismic and Geological

The report recognises that many parts of South Australia are remarkable with regards to geological and seismic stability which are well suited for a geological disposal of used fuel (high level waste).

Nuclear waste storage

Part of the process of establishing a used fuel (high level waste) storage facility is to store each cask of used fuel above ground for 20-30 years in specialised containers before it is transferred to the geological disposal facility. The Commission's report concluded that the storage containers created for this purpose have been rigorously designed. If you are interested in more information on the safety of the geological disposal facility, refer to Appendix I page 245.

The public needs to be confident in an independent, transparent regulator, particularly in light of regulatory failures both internationally and locally. This is emphasised in the report in Chapter 9, page 156. There are International Standards, research data and experiences that can be used to support introducing an Australian regulator to ensure lessons learned abroad would be included in our safety regime. The exact nature of a regulator would be determined at a later stage.

The Commission's report looks at many different activities at different stages of the nuclear fuel cycle. Each stage comes with its own set of risks and opportunities. The report looks in detail at risks associated with mining (pg 9-17), further processing (pg 29-31), power generation (pg 43-47) and waste management (pg 73-79, 80-91). It is important to note that the most well known incidents are associated with power generation, and the report does not recommend power generation in South Australia at this time.

The report finds that there is minimal impact on the public and workers as a result of the recommended activities . The expected doses are far below natural levels of background radiation that we are all exposed to daily. The diagram on pg 133 explains this well.

Transport

Transport of used fuel is already done internationally using specialised casks which are designed to withstand extreme impacts including deliberate attacks and accidental damage. The report finds that nuclear material is transported routinely and safely. Accidents during transport have occurred, but there has been no breach of packages or release of harmful radiation (pg 153). There is more information in chapter 9. The Jury found the diagram on page 309 of the report useful.

Used fuel (High level waste) are fuel rods that have been pulled out from a nuclear reactor and have been cooled down in wet ponds and then stored above ground for around 20-30 years. Nuclear waste requires permanent storage as its radioactivity can be harmful for hundreds of thousands of years. More information can be found on this at pg 80-83.

Informed Community Consent is Valued

The Commission's report highlights that there needs to be both broad social informed consent, and specific community consent obtained for any new nuclear activity to start in South Australia.

The report states that social consent is ongoing public support that is necessary for an activity to be undertaken in a society. Social consent is not given once but is ongoing for the life of the activity. This is referenced in Chapter 6, pg 121.

Your opinion is valued.

Our challenge is to be educated so that we can make an informed decision. Each community should have the opportunity to invite expert witnesses, view facilities, and be provided with a translator if required to enable your community to make an informed decision. (pg 122 -127).

The Jury also believes in the importance of Aboriginal and local community engagement and consent which is referenced on pg 128.

It is important that the community is aware that the law needs to change for any new nuclear activity to be developed in South Australia. We need to ensure that government is accountable and transparent in this process (pg 121 Finding 96).

Lack of community consent inevitably leads to failure of these projects. This is referenced in Finding 99 pg 122, and the Jury would like to point to case study 6 pg 237.

Questions for consideration include:

How is the community's consent measured and made?

How can each and every South Australian be involved?

We recommend you read...

- → The NFCRC Report
- → The Reports' Summary pg xiii
- → Basic information about radiation risks pg 133 and Disposal of Nuclear Waste from pg 73 Findings 55 -58 and from pg 80, Findings 66-71
- → The recommendations Chapter 10, pg 169

Trust, Accountability and Transparency are vital

The Commission's report states that we have a choice as South Australians, as to whether or not we want to further engage in the Nuclear Fuel Cycle. (Chapter 5 pg 73).

Factors that promote trust and transparency need to be built into the design of any regulatory systems.

The decision we make to go ahead (or not) with the storage of used fuel will affect both future generations of South Australians and options for other nations for the management of their used fuel (high level waste).

In coming to your own view on whether we should pursue a storage facility for used fuel you need to consider that moral and ethical responsibilities are central to the ownership and integrity of our decision. Do we think these actions are good? Do we think they are the right decisions?

It is an international principle of radioactive waste management (pg 79) that the society that generates the waste is responsible for managing it. Those nations that are unable to manage their own waste within their borders are permitted[1] to contract the radioactive waste management to another country. Ought we do this?

Our challenge is to build and maintain trust by avoiding repeating past mistakes such as the lack of engagement and communication that occurred during (and prior to) the atomic weapons' testing at Maralinga. Finding 102 on page 125.

The Commission recommends that clauses from South Australia's legislation[2] be removed which currently prohibit public money being used to encourage or finance construction or operation of a nuclear waste storage facility. Further investigation cannot proceed without changing this legislation. (Recommendation 12 page 169)

The Commission recommends removal at the State Level and/or federal level of existing prohibitions in law on the licensing of Uranium processing activities to enable commercial developments such as nuclear fuel leasing, and existing prohibitions on nuclear power generation.

Questions for consideration include...

- → What do we as a community need to do, to ensure that any measures put in place are what we want?
- → Will the public have the opportunity to review any proposed changes to legislation?

1. The Joint Convention on the safety of Spent Fuel Management and on the Safety of Radio Active Waste Management.
2. Specifically Section 13 of the Nuclear Waste Storage Facility (Prohibition) Act (2000) SA – the objects of this Act being: The objects of this Act are to protect the health, safety and welfare of the people of South Australia and to protect the environment in which they live by prohibiting the establishment of certain nuclear waste storage facilities in this State.

Economics and the benefits/risks for our State

Recommendations 1,2,3,4,5, and 11 should be taken into account for assessing the economic benefits from the nuclear fuel cycle.

The Commission recommends that we pursue the opportunity to establish used nuclear fuel and intermediate level waste storage and disposal facilities in South Australia (Recommendation 11). This facility has the potential to provide a significant income for our state. There are risks and uncertainties with this endeavour that require more research. This research requires further financial commitment by South Australia, in order to make an informed decision about whether this project is to go ahead to pre-commitment negotiation with client nations.

There is the possibility that further research may determine that this project is not viable. However, the Commission's report suggests that there is a strong possibility that this project will be viable in the future and provide a significant income for South Australia.

Should this project go ahead, the Commission's report recommends the project to be funded by a client nation with a pre-commitment payment that will cover all expenditure costs. This is to ensure that there is no possibility of client nations withdrawing from the project. "Through pre-commitment from client countries the state would not need to assume significant commercial risks in incurring capital costs to develop the project." (pg 103).

Given the intergenerational nature of this project it is important to ensure any economic benefits are ongoing. Chapter 5, Finding 90 pg 106-107 discusses the necessity of establishing a state wealth fund to benefit the state in future.

There were varying views between expert witnesses on the economic viability of this project and therefore questions remain relating to the economic modelling in the Commission's Report before we can feel comfortable progressing to further involvement. Page 102, table 5.9 (projected net present value of a real, pre-tax basis) discussed this. Whilst this is a first step, there are many more questions that must be answered before we will be comfortable progressing to the next phase.

Questions for consideration include...

There are many things that South Australians still need to discuss. These include:

- What benefits can be made available to South Australia now and in future generations?
- How can we be sure that the economic analysis completed by the Commission is robust?
- How will the South Australian 'brand' or external reputation be affected and how will this have an effect on tourism and trade? (pg 163 Finding 145, pg 231-234)
- What reliance is there on other countries to 'pre-commit' to storing high level nuclear waste at a fixed price?
- How will the benefits be realised and how will the wealth be distributed?
- How do we incorporate rapid change in future technologies such as nuclear fuel recycling in the next generation of Nuclear fuel reactors? (pg 291)
- What are the workforce opportunities, skills, training and research? (pg 161-163)

We recommend you read

There is real opportunity for South Australians to increase their knowledge of and participation in the nuclear fuel cycle to better understand the potential benefits and risks. Refer to pg 292, Table J.2 (current and forecast stockpiles of used fuel and intermediate level waste from other countries).

The Jury suggest that South Australians read Appendix J pg 290 – Analysis of viability and economic impacts. If there is further interest, read chapter 5 - Management, storage and disposal of nuclear and radioactive waste.

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