



**AUSTRALASIAN RADIATION PROTECTION SOCIETY INC  
– SOUTH AUSTRALIAN BRANCH (ARPS SA)**

**SUBMISSION TO THE NUCLEAR FUEL CYCLE  
ROYAL COMMISSION**

**23 JULY 2015**

## Introduction

The Australasian Radiation Protection Society (ARPS), incorporated in South Australia, is a professional society of members engaged in one or more aspects of radiation protection including safety support of medical, industrial, scientific and uranium mining activities. The primary objective of the Society is to promote the principles and practice of radiation protection, with the goal of protecting people and the environment from the harmful effects of radiation, while allowing the beneficial activities which might give rise to radiation exposure.

While ARPS is a national organisation extending into New Zealand and Australasia, South Australian members have a special interest in the conduct and outcomes of the current Royal Commission. We are located here in South Australia and advise and liaise with South Australian-based employers, government agencies, professional organisations and members of the public who might participate in or be affected by any expansion of the nuclear fuel cycle.

The South Australian Branch of the Australasian Radiation Protection Society (ARPS SA) welcomes the conduct of this Royal Commission. We fully support the investigation and the rigorous methodology being adopted.

ARPS SA is confident that, whatever aspects of the nuclear fuel cycle South Australia ultimately pursues, this organisation can offer and foster the necessary expertise in radiation protection to ensure the benefits are enjoyed while still protecting the community, workers and the environment.

ARPS SA offers the following comments on a number of the issues and questions raised by the Royal Commission.

## Issues Paper 1: Exploration, extraction and milling

**Issue 1.6 Does more need to be done now and in the future with factor inputs (including skills and training, research, education and infrastructure), which are relevant to decisions made to invest in new projects or to expand those that already exist? What capabilities and capacities would be required for the development of new projects? What is the evidence that and specific deficiency influences new investment? What needs to be done to address any deficiency and how would it be done?**

- **New mine development, or the expansion of existing mines, will need to be supported by expansion of the number of skilled radiation protection professionals.**

Expansion in mining of uranium, or mining of thorium, will require a matching increase in the number people with the necessary radiation protection training and experience to both work on the projects, and to work in the regulatory area. The absence of radiation protection resources is not likely to influence the decision to invest in projects, however it may result in delays once a decision to develop a project has been taken.

The traditional path to entry into radiation protection in mining has been via a university degree in physics or medical physics with some graduates then moving into a graduate radiation protection role to develop specific skills in the workplace. In the past, some radiation protection professionals have been sourced from overseas.

Steps are now being taken to develop a more formal pathway into radiation protection. For example the University of Adelaide has introduced a Graduate Certificate in Radiation Management. The Australian Radiation Protection Accreditation Board is working to expand their certification programs. Industry or government support of these efforts could minimise any lag in skills availability that may result from an expansion of uranium or thorium mining.

**Issue 1.8 Would an expansion in extraction activities give rise to new or different risks for the health and safety of workers and the community? If so, what are those risks and what needs to be done to ensure they do not exceed safe levels?**

- **No new radiation related risks are expected to arise from an expansion in extraction activities. An expanded number of extraction operations would however require a larger radiation protection workforce involved across the operations, as well as within regulatory agencies.**

South Australia through the Environment Protection Authority (EPA) has a well-developed regulatory approach to radiation protection in mining and mineral exploration. The radiation protection regime for workers and members of the public is arguably the best of any Australian jurisdiction and is based on the Standards, Codes of Practice, Guidelines and recommendations of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). As such, it adopts a rigorous and graded approach that is matched to the level of risk, in line with international recommendations.

The radiation exposure pathways and risks associated with extraction and milling of radioactive minerals are well known and understood. This knowledge and understanding has been gained over many decades through the development of existing uranium and mineral sand mining activities in the South Australian environment and elsewhere.

For example, the knowledge and experience gained by regulatory agencies in SA from approximately 30 years of operations at Olympic Dam, and 15 years experience with in-situ leach uranium mines, is readily transferable to similar operations. EPA licence conditions ensure comprehensive and site specific risk based Radiation Management Plans are adopted by every operation for the protection of workers, the public and the environment.

**Issue 1.10 Would a future expansion of exploration, extraction and milling activities create new environmental risks or increase existing risks? If so, are current strategies for managing those new risks sufficient? If not, in what specific respects? How would any current approach need to be changed or adapted?**

- **The environmental risks associated with exploration, extraction and milling of radioactive materials in South Australia are well understood, and are appropriately managed under existing regulatory processes.**

As noted above, the South Australian government and mining industry has had extensive experience gained over several decades in managing both the broad environmental, and the specific radiological risks, associated with uranium mining operations and other naturally occurring radioactive materials.

The currently approved mine waste management methods have been developed over many years and provide a high level of protection to the environment. New operations are expected to utilise similar methods, with refinements depending on site-specific factors.

With regard to radiological impacts on people and the environment, there is a well established 'Program for Environmental Protection and Rehabilitation' (PEPR) which is administered by the Department for State Development. Where radioactive materials are mined or processed, the PEPR is applied in conjunction with a Radioactive Waste Management Plan (RWMP) administered by the Environment Protection Authority. The RWMP, based on ARPANSA guidance, ensures internationally accepted radiation protection standards apply to all relevant mining operations approved in South Australia and that environmental impacts are well managed and minimised.

## Issues Paper 4: Management, storage and disposal of nuclear and radioactive waste

**Issue 4.1** Are the physical conditions in South Australia, including its geology, suitable for the establishment and operation of facilities to store or dispose of intermediate or high level waste either temporarily or permanently? What are the relevant conditions? What requires further investigation now and in the future?

- **The broad geographical areas previously identified by the Commonwealth during its search for a near surface repository should be re-examined as possible locations for a State radioactive waste store, and as a possible disposal site for intermediate and high level waste.**

The Australian Government, with the support of State and Territory governments, initiated a project in 1992 to construct a near-surface repository for disposal of Australia's low level and short-lived intermediate level radioactive waste. In 1994 the Commonwealth identified eight broad regions of Australia that could be considered for such a National Repository. Four regions were identified in central and northern South Australia.

Following additional work by the Commonwealth, three suitable sites were identified in 2001 in one of those regions near Woomera. However, following the objections of the State Government and a decision by the High Court, the project was abandoned in 2004.

It is therefore clear from the Commonwealth's initial investigations that there are several areas in South Australia that have the appropriate physical conditions suitable for the establishment of a radioactive waste store and repository. Further work by both SA and the Commonwealth governments would be required to determine the extent to which any of those might be suitable locations for a store or repository for intermediate or high level waste. There are also regulatory issues to be considered such as the repeal of the *Nuclear Waste Storage Facility (Prohibition) Act 2000*, specifically designed to prevent the establishment of facilities such as those contemplated by this Royal Commission.

- **There is a clear need on radiation safety and security grounds for construction of facilities for the management and disposal of the full range of radioactive wastes generated in South Australia.**

**The provision of a radioactive waste store and repository for South Australian wastes would meet a long-standing local need. In addition, the demonstrated ability to construct and operate such a store/repository would be an essential step towards the establishment of a facility accepting wastes from outside South Australia, should that need arise in the future.**

The need for a repository for South Australian radioactive waste was first identified several decades ago, but limited progress towards construction of such a repository has occurred. In 2000, the South Australian government carried out a desktop survey of registered sealed sources that were considered by their owners to be waste. The purpose of the survey was to determine the level of demand for a central store for this type of radioactive waste.

The events of September 2001 created a greater awareness of the security of radioactive material both nationally and internationally, and the potential for such materials to be used for malevolent purposes such as terrorism.

In 2002, the EPA commenced an audit of radioactive material (regulated in SA under the *Radiation Protection and Control Act 1982*) with particular emphasis on material designated as waste, and to determine the nature and volume of the material and whether it was safely and securely stored.

The report entitled, *Audit of radioactive materials in South Australia (2003)*, clearly identified the quantity and types of waste present in SA at that time. The Audit contained a number of recommendations including, in relation to the future management of radioactive waste:

#### **Key recommendation 8**

That the government undertake a rigorous feasibility study of options for future management of South Australia's radioactive waste and that this study be commenced as soon as practicable.

## Key recommendation 9

That the government investigate the feasibility of establishing a facility for the safe handling, packaging and interim storage of waste pending the establishment of appropriate facilities for long-term management.

Further work was subsequently conducted by the EPA and its consultants to examine possible options for an interim store. This resulted in a 3-Stage process to 2005, to assess options for a store.

([http://www.epa.sa.gov.au/environmental\\_info/radiation/waste](http://www.epa.sa.gov.au/environmental_info/radiation/waste)). Two candidate locations (Olympic Dam region and Radium Hill) were identified at that time, however no further progress was made on the development of an interim store.

Since these investigations by the EPA a number of employers in South Australia have gone to considerable effort to arrange disposal or recycling of waste materials overseas. Despite experiencing some success from such efforts a range of wastes remain where options have been exhausted and the materials can only be managed through long-term storage. As identified in the EPA report, these wastes remain within a number of locally supervised stores. While these radioactive wastes are safeguarded in accordance with regulatory requirements for safety and security, oversight would be more efficient and effective if wastes could be consolidated in one government-supervised secure store and/or repository.

While any store or repository will be supervised by government regulatory agencies, it could be operated on a commercial basis. It is arguable that the construction and operation of the facility would provide modest economic benefits to South Australia and reduce the financial burden on the many institutions and businesses currently storing waste on tens of sites across the State.

The construction and operation of such a store/repository would demonstrate that South Australia has the regulatory and technical experience necessary to identify and establish a facility capable accepting wastes from outside South Australia, should that need arise in the future. There would also be increased economic benefits involved in constructing and operating a facility capable of accepting materials from around Australia.

**Issue 4.8 Bearing in mind the measures that would need to be taken in design and siting, what risks for health and safety would be created by establishing facilities to manage, store and dispose of nuclear or radioactive waste? What needs to be done to ensure that risks do not exceed safe levels? Can anything be done to better understand those risks?**

- **There are a large number of facilities that already safely manage and store radioactive waste in South Australia. Many of these are located within the city of Adelaide and surrounding suburbs. Development of a single secure facility in a suitable location to manage, store and dispose of South Australian waste will provide improved efficiencies and further reduce any possible risks to the wider South Australian community. The radiation exposure pathways and risks associated with handling radioactive waste are well known. Radiation risks can be safely controlled by applying the Standards, Codes of Practice, Guidelines and recommendations of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), which are based on international recommendations.**

The EPA audit of 2003 identified 35 sites where unsealed waste radioactive material was held. In addition, there were approximately 200 sealed sources considered to be waste and held by owners across SA. There was also a quantity of miscellaneous radioactive materials held in various locations. In summary, there were around 80 sites across the State in 2003 where low and intermediate level waste was stored. The numbers are expected to be similar today.

The EPA Audit of 2003 found that radioactive waste was generally stored safely and securely. The multiple storage facilities currently in SA represent no more risk than other waste facilities that are commonly accepted by the community. However, storage in a single location is to be preferred.

The Commonwealth presented an initial business case for the long-term management of Australia's radioactive waste.

(<http://www.radioactivewaste.gov.au/resources/related-information> ).

It noted that Australia's radioactive waste management policy requires that all waste generated nationally be stored or disposed of within Australia at suitably sited facilities after being categorised in accordance with the national classification, consistent with international best practice. In addition, it notes that 'while there

exists a range of regulatory and governance frameworks for radioactive waste management in Australia, they remain essentially unfulfilled while there is no route for actual disposal or long term storage’.

There is a clear case for SA to establish a long-term solution for the storage and/or disposal of low and intermediate level wastes to ensure there is no undue burden on future generations as a result of the use of the materials now. The construction of a single well engineered facility for long term storage and disposal of radioactive waste will reduce the ongoing operational risks for SA where uniform design, operating and safety standards must be achieved across a large number of existing storage sites. A single facility established at a location with suitable physical conditions is not expected to create additional risks to health and safety. Development of such a facility is consistent with internationally accepted requirements for governance of radioactive waste. (*Fundamental Safety Principles, IAEA Safety Fundamentals No. SF-1*)