Progress on the National Low Level Radioactive Waste Repository and National Intermediate Level Waste Store

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SUMMARY Over the last few years, significant progress has been made towards siting national, purpose-built facilities for Australian radioactive waste. In 2001, after an eight year search, a preferred site and two alternatives were identified in central-north South Australia for a near-surface repository for Australian low level (low level and short-lived intermediate level) radioactive waste. Site 52a at Evetts Field West on the Woomera Prohibited Area was selected as the preferred site as it performs best against the selection criteria, particularly with respect to geology, ground water, transport and security. Two alternative sites, Site 45a and Site 40a, east of the Woomera-Roxby Downs Road, were also found to be highly suitable for the siting of the national repository.

A project has commenced to site a national store for intermediate (long-lived intermediate level) radioactive waste on Commonwealth land for waste produced by Commonwealth agencies. Public input has been sought on relevant selection criteria.

1. INTRODUCTION

Most Australians benefit either directly or indirectly from the medical, industrial and scientific use of radioactive materials, and a small amount of radioactive waste is generated as a result. Much of this material is currently stored in cities and in regional Australia in places such as hospital or university basements and industry and government stores which were not designed for the long-term management of such material, and where storage space is limited.

In order to improve overall community safety and confidence, the Commonwealth, through the Department of Industry, Science and Resources, is progressing two projects to establish national facilities for the safe and responsible management of Australian radioactive waste. In January 2001, a preferred site and two alternatives in central-north South Australia for the national radioactive waste repository for Australian low level (low level and short-lived intermediate level) waste were announced. The sites are currently undergoing environmental assessment.

A separate process has commenced to identify a site for a national store for Australian intermediate (long-lived intermediate level) radioactive waste generated by Commonwealth agencies.

This paper briefly summarises the background and status of the two projects.

2. NATIONAL RADIOACTIVE WASTE REPOSITORY

2.1 Background

In 1992, the Commonwealth Government commenced an Australia-wide search for a suitable site for the disposal of Australian low level radioactive waste.

Australia currently has about 3,500 cubic metres (about the volume of eight average houses) of waste which would be suitable for disposal in the national repository. The material is generated at a rate of less than 50 cubic metres per year (less than the volume of one shipping container), and consists of items such as lightly contaminated soils, plastics, paper, laboratory equipment and clothing, smoke detectors, gauges and exit signs.

Phase 1 of the national radioactive waste repository project, commenced in 1992, involved the development of the methodology for siting a national repository. The method used computer-based geographic information systems to apply internationally accepted site selection criteria adapted for Australia on an nation-wide basis. Thirteen

relevant selection criteria were published in the National Health and Medical Research Council's *Code of Practice for Near-surface Disposal of Radioactive Waste in Australia* (1992), based on siting the repository in an arid or semi-arid environment.

Phase 2 of the investigation, commenced in 1994, involved the application of the site selection methodology developed in Phase 1, taking into consideration public comment on Phase 1, to identify eight broad regions of Australia likely to contain suitable sites.

Phase 3 of the study commenced in 1998, with the announcement of the selection of the central-north region of South Australia as the preferred area for further detailed investigation. The region, which covers approximately 67,000 square kilometres, was chosen as it offered the largest area of potentially suitable sites for the repository when compared to the other regions identified in Phase 2 of the study.

An expert advisory committee, the National Repository Advisory Committee, advised on the siting process.

2.2 Site Selection Process

1.5 x 1.5 square kilometre sites in central-north South Australia were identified for investigation based on scientific assessment and community consultation.

There has been extensive public consultation throughout the site selection process from the national release of public discussion papers, to consultation with regional stakeholders through information days, the establishment of an information office, the distribution of a newsletter in the region, and the formation of a Regional Consultative Committee, with members from soil conservation boards, Aboriginal groups, local industry, and local and State Government.

The views of stakeholders have been taken into consideration in selecting sites - as a result, new sites have been selected for investigation, and work has not proceeded on other sites. Extensive consultation with pastoralists, and with Aboriginal groups on the heritage value of potential sites was undertaken. The preferred site and alternatives have been cleared of heritage values by Aboriginal groups.

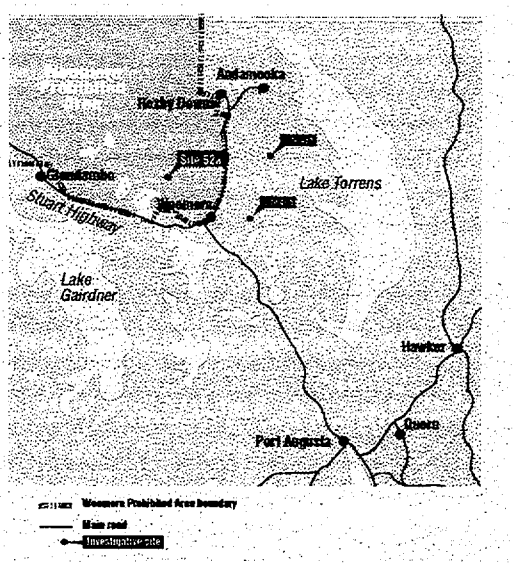
Stage 1 involved the drilling of 11 sites, and was undertaken in 1999. Stage 2 involved more extensive drilling of 5 sites, and three sites were further investigated in Stage 3.. Stages 2 and 3 were undertaken in 2000.

Sites located on raised, stony desert plateaus were studied.

Scientific investigations involved description and assessment of the rock types encountered and their structures, determination of the level of the ground water, its salinity, supply rate, age, and recharge and discharge characteristics.

In January 2001, a preferred site and two alternatives (Figure 1) for the repository were announced by the Minister for Industry, Science and Resources, Senator Nick Minchin.

Figure 1: Location of preferred site and alternatives for the national radioactive waste repository.



Site 52a at Evetts Field West was selected as the preferred site as it performs best against the selection criteria, particularly with respect to geology, ground water, transport and security. Two alternative sites, Site 45a and Site 40a, were also found to be highly suitable for the siting of the national repository.

Site 52a is preferred because

- The surrounding landforms near the site indicate that there is little run-on of water onto the site. This provides a highly favourable environment for the construction and maintenance of the disposal trenches
- The rock type (the Bulldog Formation, which is a shale) and ground water features mean that the water drainage characteristics can be modelled more easily for this site than for others
- The host rock for the trenches is preferred as it consists of materials which are resistant to ground water flow, and which will therefore

provide a highly effective natural barrier to the waste
- There is superior transport access, with a well-formed road to the site
- There are excellent prospects for long-term control or security, as the site is located on the Woomera Prohibited Area where there is restricted public access.

In addition, Site 52a and the two alternatives have low volumes of highly saline underground water, unsuitable for human, agricultural or industrial use. There are no valuable minerals on the sites.

Isotopic studies of ground water at the three sites indicate that it takes thousands of years for surface water to move downwards to the water table, and then thousands of years for the water at the water table to move to an area of discharge, such as a salt lake.

2.3 The Facility

The total area of the site is 1.5 x 1.5 kilometres, most of which will be an extensive buffer zone.

The area required for the near-surface disposal trenches would only be about the size of a football field (100 x 100 metres), and would be located in the centre of the site.

A number of trenches of a maximum depth of 15-20 metres would be constructed for disposal of the waste, which would be disposed of in steel or concrete drums. Support buildings, including a site office and a building for the receipt and handing of waste would be located near the centre of the site adjacent to the trenches. The site would be under appropriate security surveillance, and monitored, and surrounded by a boundary fence.

The repository will be owned by the Commonwealth, and the facility will be regulated by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).

Radioactive waste will be transported infrequently to the facility, in accordance with the guidelines in the *Code of Practice for the Safe Transport of Radioactive Substances (1990)*, or the *Code of Practice for the Safe Transport of Radioactive Materials*, which is expected to be adopted in the near future, and relevant state and territory regulations.

The repository will operate for 50 years, after which there will be a review to determine whether the facility should continue to operate. Following closure of the repository, the radioactivity of the waste will decay to safe levels during a period of restricted access and monitoring which would be about 200 years. At the end of this period no further control of the site will be necessary.

2.4 Review and Assessment Process

In order for the national repository to be established, it must satisfactorily comply with environmental assessment and radiological licensing processes.

The preferred site and two alternatives are currently undergoing environmental assessment under the Commonwealth's environmental legislation, the *Environment Protection and Biodiversity Conservation Act (1999)*. The Minister for the Environment and Heritage, Senator Hill, has directed that an Environmental Impact Statement (EIS) must be prepared on the project.

After public consultation, the final guidelines for the EIS were issued by Environment Australia in June 2001. The EIS must consider issues including the need for the proposal, a description of the repository facility, transport of waste to the repository, a description of the existing environment, impacts and risks to the natural and human environments from the proposal, environmental safeguards to minimise impacts and risks to the natural and human environment, and the regulatory regime and operator responsibility.

A draft EIS is currently being prepared, and is expected to be completed and released for public comment early in 2002. A supplementary EIS will then be written, responding to issues raised during the public consultation process.

Three licences must also be obtained from ARPANSA for the siting, construction and operation of the facility. The licensing process is expected to commence in 2002.

3. NATIONAL STORE FOR INTERMEDIATE LEVEL WASTE

In 1996, the Commonwealth Government made an in-principle decision to establish a national store, and the need for a national store was supported by the Commonwealth State Consultative Committee on the Management of Radioactive Waste.

In August 2000, the Minister for Industry, Science and Resources, Senator Minchin, announced a national search for a site for a national store for Australian intermediate level (long-lived intermediate level) waste, and sought cooperation of states and territories.

In February 2001, the Minister announced that the Commonwealth would site a national store on Commonwealth land for the storage of intermediate level waste produced by Commonwealth agencies. This decision resulted from a lack of support from some states and territories for a national store for all of Australia's intermediate level waste.

The Commonwealth is proceeding with the search for a site for a national store for Commonwealth waste, as it has a responsibility to manage this material safely. The waste consists of about 400 cubic metres of operational waste from Lucas Heights, residues from mineral sands processing, and waste from the Department of Defence and Department of Health, including radium needles, electronic valves, luminescent watch and compass faces, night markers, and disused sources, currently held on the Woomera Prohibited Area. The national store will also eventually accommodate the small volume of intermediate level waste to be returned to Australia from the overseas processing of Australian research reactor spent fuel.

In addition, states and territories hold about 100 cubic metres of intermediate level waste.

Senator Minchin has ruled out co-location of the store for intermediate level waste with the repository for low level waste in South Australia, in order to avoid any suggestion that the two processes are not completely separate.

An expert advisory committee, the National Store Advisory Committee, has been appointed to advise on the search for a site for the national store.

In July 2001, a public discussion paper which looks at the criteria which could be used to decide a site was released.

Relevant to the siting of the store are: the long-term safety of radioactive waste in the facility, the operational requirements for transport, safe handling, storage and retrieval of the waste packages, the local environment, the security of the facility and other land uses.

The selection criteria for the national store, an above-ground structure, will differ somewhat to the criteria used for the national repository, which will consist of below-ground trenches.

The following will be taken into account when siting the store

- Geological hazards, such as earthquakes, volcanic activity and landslides
- Local environmental hazards such as flooding and fires
- Natural environmental features such as surface drainage
- Access to transport, support facilities and infrastructure
- Social impacts
- Sites or areas of special environmental, cultural or historical significance
- Security
- Land ownership and compatibility with adjacent land use.

The national store will be designed to operate for a period of up to at least 50 years. Given the amount of the Commonwealth's holdings of this type of waste, the likely rate of generation in the foreseeable future, and the fact that storage of waste is safe and practical, a geological repository for disposal of this waste cannot be justified at present.

4. NO INTERNATIONAL RADIOACTIVE WASTE FOR AUSTRALIA

Unlike low level and intermediate level waste, Australia does not generate high level radioactive waste, and has no responsibility to store or dispose of this waste in Australia.

The Commonwealth Government has indicated that it has no intention of accepting the nuclear wastes of other countries for storage or disposal in Australia.

5. CONCLUSIONS

Over the last few years, significant progress has been made towards siting national, purpose-built facilities for Australian radioactive waste. A preferred site and two alternatives for a national low level radioactive waste repository have been identified in central-north South Australia, and are currently undergoing environmental assessment.

A project has commenced to find a site for a national store for intermediate level waste on Commonwealth land for waste produced by Commonwealth agencies. Public input has been sought on relevant selection criteria.

Further information on the projects can be obtained on the internet site http://www.isr.gov.au/radwaste, by emailing Repository@isr.gov.au or Store@isr.gov.au, or by calling the toll-free information line 1800 682 704.