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Australian Nuclear Science and Technology Organisation Waste Management Facilities' Extension and Upgrade

5.1 The Australian Nuclear Science and Technology Organisation (ANSTO) seeks approval from the Committee to upgrade and extend radioactive waste management facilities at its Lucas Heights site.[1]

5.2 ANSTO is Australia's national nuclear research and development organisation. At the heart of ANSTO's capabilities is the Open Pool Australian Light-water (OPAL) reactor, which generates radioactive waste through nuclear medicines, irradiated silicon and neutron production.[2]

5.3 In November 2015, the Federal Government announced a short list of potential sites for the National Radioactive Waste Management Facility (NRWMF), which is expected to be completed by 2020. Once operational, this facility will provide for the centralised and permanent storage of radioactive waste currently stored at more than 100 sites across Australia. These sites include hospitals and medical facilities, scientific organisations such as ANSTO, universities and industrial facilities associated with mining.[3]

5.4 ANSTO's available waste storage at Lucas Heights will be at capacity in early 2017, well before the NRWMF will become operational. Consequently, the 2015-16 federal budget provided funding to allow ANSTO to extend two of its existing waste storage facilities to provide the necessary additional storage.[4]

5.5 The estimated cost of the project is $22.3 million, excluding GST.

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1 ANSTO, submission 1, p. 4.

2 ANSTO, submission 1, p. 3.

3 ANSTO, submission 1, p. 3.

4 Dr Adrian Paterson, ANSTO, transcript of evidence, 5 April 2016, p. 1.

5.6 The project was referred to the Committee on 3 February 2016.

Conduct of the inquiry

5.7 Following referral, the inquiry was publicised on the Committee's website and via media release.

5.8 The Committee received one submission and two confidential submissions regarding the project costs and risk register from ANSTO, one submission from the Australian Conservation Foundation and one submission from the Medical Association for Prevention of War and the Public Health Association of Australia. A list of submissions can be found at Appendix A.

5.9 The Committee received a briefing from ANSTO and conducted public and in-camera hearings in Melbourne on 5 April 2016. A transcript of the public hearing and the public submissions to the inquiry are available on the Committee's website.[5]

Need for the works

5.10 While the NRWMF is being sited, constructed and licensed, radioactive waste generated from ANSTO's operations will continue to be temporarily stored at its Lucas Heights campus. However, increasing domestic and international demand for the nuclear medicines produced at ANSTO, as well as the need to decommission end-of-life nuclear facilities, mean that ANSTO's available waste storage will be at capacity in early 2017, before the NRWMF is planned to be operational.[6]

5.11 The proposed works will provide additional storage for both low level solid waste (LLSW) and intermediate level solid waste (ILSW).[7] Dr Paterson, Chief Executive Officer, ANSTO commented on the national importance of the works:

> Without additional interim waste storage capacity, our ability to operate within our regulatory framework will be compromised, and we would have to cease critical business operations, including the production of life-saving nuclear medicines. Accordingly, these works are of national importance.[8]

5 <www.aph.gov.au/pwc>.

6 ANSTO, submission 1, p. 3.

7 ANSTO, submission 1, p. 4.

8 Dr Adrian Paterson, ANSTO, transcript of evidence, 5 April 2016, p. 1.

5.12 Additionally, the works will further enhance both safety and security features, keeping ANSTO in line with current world best practice and maintaining Australia's record in nuclear safety and security.[9]

5.13 At the public hearing ANSTO discussed the importance of nuclear medicine in diagnosis and therapeutics:

> The quality of nuclear medicine imaging has improved with every generation and the amount of isotope that we have used goes down per patient in every generation that we apply it. Today, technetium-99m is by far and away the cheapest and most efficacious diagnostic isotope used anywhere in the world. Eighty-five per cent of nuclear medicine procedures, 40 million to 45 million procedures a year are based on the production of this isotope. …
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> The other type of nuclear medicines that are produced in the OPAL reactor are therapeutic isotopes. … Iodine-131 is used therapeutically to treat thyroid cancer and has been a very, very successful application for many decades now in the treatment of thyroid cancer. More recently, based on work that has been undertaken in Europe, mainly in Germany, we have introduced to Australia a new therapeutic isotope, lutetium-177. Based on the work in Germany, this is particularly effective against neuroendocrine tumours. [10]

5.14 Submissions from the Australian Conservation Foundation (ACF) and from the Medical Association for Prevention of War and the Public Health Association of Australia supported the allocation of funds for extended interim storage capacity at Lucas Heights pending outcomes of the NRWMF.

5.15 Notwithstanding the support for interim storage, these organisations queried ANSTO's longer term forecasts of nuclear waste production and storage requirements. Specifically they questioned whether Australia would increase its reactor production of isotopes, suggesting that cyclotron production would improve Australia's security of supply of isotopes, reduce taxpayers expenditure and reduce radioactive waste production. The ACF also queried ANSTO's assertions that one in two Australians will require a nuclear medicine in their lifetime.[11]

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9 ANSTO, submission 1, p. 5.

10 Dr Adrian Paterson, ANSTO, transcript of evidence, 5 April 2016, pp. 1-2.

11 Australian Conservation Foundation, submission 2, pp. 5-7; Medical Association for Prevention of War and the Public Health Association of Australia, submission 3, p. 3.

5.16 Dr Paterson responded to these queries at the public hearing and affirmed his confidence that there is no viable alternative in the short to medium term for the production of the medical isotypes in Australia other than by fission or neutron capture in a reactor. On the question regarding the number of Australians to benefit from nuclear medicine, Dr Paterson stated:

> There has also, I believe, been a question raised as to whether one in two Australians will benefit from nuclear medicine in their lifetime. This is based on the amount of material that we ship—the number of doses that are taken up every year in the Australian setting. It has been calibrated against the data from the US and I think it is clear that, as we have an ageing population and the indications are required mainly in the context of ageing populations, we can already see that one in two Australians during the course of their lifetime will have a procedure based on nuclear medicines. It is likely, if you take some scenarios, that that might even expand. [12]

5.17 At the public hearing the Committee queried the sense of urgency for an extension of the existing facility, particularly in view of existing planning for the NRWMF. Dr Paterson advised that although planning for waste storage was ongoing, and the limits of the existing storage facilities at Lucas Heights known, the need to store waste returned to Australia from France in 2015 and the understanding that the NRWMF would not be available until 2020, had resulted in the need to expand the current storage facilities and contributed to the sense of urgency.[13]

5.18 The Committee is satisfied that the need for the work exists.

Options considered

5.19 The proposed waste storage extensions and upgrades will have a life of approximately five years before they are at capacity. Dr Paterson stated that planning for the additional five years seemed to be prudent, given the advanced state of discussion about the NRWMF.[14]

5.20 At the public hearing representatives from ANSTO commented on the waste storage options considered, including a business-as-usual case, the short term reduction of the volume of waste, and building more extensive waste facilities:

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12 Dr Adrian Paterson, ANSTO, transcript of evidence, 5 April 2016, pp. 1, 6-7.

13 Dr Adrian Paterson, ANSTO, transcript of evidence, 5 April 2016, p. 7.

14 Dr Adrian Paterson, ANSTO, transcript of evidence, 5 April 2016, p. 5.

> We have sought to get a balance of a conservative, low-cost approach for the short-term—the five-year period—while at the same time getting the improvements which will allow our practice to continue to evolve…. On balance, I think that is the most effective and lowest cost approach to the use of public resources.[15]

5.21 The Committee found that ANSTO has considered the available options to deliver the project and has selected the most suitable option.

Scope of the works

5.22 ANSTO have separated the scope of work into two major components:

5.23 **Building 27 (ILSW) Extension Project**

- duplication and upgrade of the current retrievable storage pits, and extending the building towards the east. The new retrievable storage pits within the new extension will utilise current design practices and will have greater storage capacity than the existing pits;
- provision of all equipment required to operate the new extension as per current operating procedures of ANSTO Waste Management Services;
- the façade of the entire facility will be upgraded, enhancing physical security; and
- upgrade of electronic and physical security of the facility as required.[16]

5.24 **Building 20B/57 (LLSW) Extension Project**

- extension to the current Building 20B facility, connecting it to the existing B57 facility;
- the extension will increase the storage capacity for standard LLSW being stored in various forms such as standard drums, compressed into overpacks and also storage of decommissioning/demolition waste from across site (excluding the decommissioning of the High Flux Australian Reactor (HIFAR) Reactor);
- the process flow of the new and existing facility will be revised, and if possible enhanced in order to centralise site storage of LLSW; and
- provision of a new overhead building crane for material handling.[17]

5.25 The project also includes:

- implementation of works as required for minimising or eliminating any disruptions to the current operation of both facilities;

15 Dr Adrian Paterson, ANSTO, transcript of evidence, 5 April 2016, p. 4.

16 ANSTO, submission 1, p. 6.

17 ANSTO, submission 1, pp. 6-7.

- upgrade to active ventilation systems;
- upgrade to electrical infrastructure as required;
- minor refurbishments or equipment relocation of the existing facilities to enhance the waste management process flow; and
- road works as required by the Building Code of Australia and for the passage of heavy vehicles for the eventual loading of stored waste for dispatch to the NRWMF. Those road works will comply with requirements of NSW Roads and Maritime Services.[18]

5.26 At the public hearing representatives of ANSTO stated that it has invested approximately $50 million in constructing facilities for waste storage and conditioning over the past 20 years. A number of the facilities at ANSTO can be repurposed, for example, as waste processing facilities or an expansion to graduate facilities.[19]

5.27 The two projects are being delivered under different schedules due to ANSTO's operational priorities. As the ILSW storage capacity will be exhausted in early 2017, this extension project is being expedited to deliver the new extension by that time, subject to Parliamentary approval. The LLSW extension project is expected to be operational by April 2018.[20]

5.28 The Committee finds that the proposed scope of works is suitable for the works to meet its purpose.

Design and regulatory considerations

5.29 ANSTO has performed in-house conceptual design for both facilities, in particular specialised nuclear design aspects such as radiological shielding requirements. The concept stage option study for the B20B/57 (LLSW) extension will be performed by an external architectural consultant in order to better understand the waste process flow, technical and construction challenges and price for the currently proposed options.[21]

5.30 The B27 (ILSW) Extension does not require an external option study as the location and proposed size of the extension is known based on ANSTO's operational experience.[22]

5.31 The ILSW will be stored in well-engineered, deep storage pits within the facility with appropriate concrete shielding walls, minimising external radiation to well below safe levels. The pits will be water proof and

18 ANSTO, submission 1, p. 7.

19 Mr Lubi Dimitrovski and Dr Paterson, ANSTO, transcript of evidence, 5 April 2016, pp. 3, 7-8.

20 ANSTO, submission 1, pp. 9-10.

21 ANSTO, submission 1, p. 14.

22 ANSTO, submission 1, p. 14.

isolated from the water table, with the added assurance of routine water table sampling from a nearby well by the ANSTO environmental monitoring unit. The ILSW will be retrievable for eventual storage at the NRWMF.[23]

5.32 The LLSW will be stored as per international best practise in dedicated containers and stacked for routine monitoring and if required, maintenance. The facility shall provide appropriate shielding walls to reduce external radiation dose to well below safe levels.[24]

5.33 ANSTO will provide a full submission to the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) for approval in order to include the new extensions under the current facility licences prior to operation. The extensions will not require a new licence.[25]

5.34 ANSTO may be required to make appropriate submissions or notifications to the Australian Safeguards and Non-proliferation Office (ASNO) through the Security and Safeguards division of ANSTO.[26]

5.35 Proposals for any future modifications and/or new construction associated with either facility will require the approval of ANSTO's Safety Assurance Committee and, if significant, of ARPANSA.

5.36 At the public hearing the Committee queried ANSTO about receiving regulatory approvals for the proposed works within the timeframes required to construct the facilities. Dr Paterson responded:

> The timescales are challenging but not impossible. In the case of the complexity of the solutions we are proposing, they are already well enveloped by practices we have on the site, so we are not inventing new types of waste management, in this particular case. We have already opened up discussions with all of the regulators, in terms of both the extension of these facilities and the likely timescales of the project, subject to the approval of this committee. My view is that the regulatory management process needs to have its own integrity and time line, and we do not determine that and do not seek to put inappropriate pressure on the regulators, in any way. We have seen the regulators act effectively on the time lines that we have for these projects, in the past, and since we are not

23 ANSTO, submission 1, p. 15.
24 ANSTO, submission 1, p. 15.
25 ANSTO, submission 1, p. 14.
26 ANSTO, submission 1, p. 15.

> introducing any new regulatory principles and it is enveloped by the current operations the risk is low to negligible.[27]

5.37 Nevertheless, the Committee requires ANSTO to keep it updated on any ARPRANSA or ASNO requirements which affect the scope or cost of the proposed works.

Environmental considerations and community impacts

5.38 The proposed extensions will be built on brownfield sites as they are currently within the existing facilities' boundaries.[28]

5.39 In general, construction of the facility extensions will result in short term, localised, small–scale impact to soils, air quality, flora and fauna, noise, visual amenity and landscape. Management protocols by the principal contractor will restrict any impact on surface runoff and erosion, and mitigate any other environmental effects.[29]

5.40 ANSTO anticipate only minimal disruption to the local community in surrounding suburbs (Menai-Heathcote) both during and post construction. There is not likely to be a large number of truck movements during the construction phase. Additionally, there will be no increase to radiation levels at ANSTO or the surrounding suburb.[30]

Cost of the works

5.41 The estimated cost of the project is $22.3 million, excluding GST.

5.42 ANSTO provided further detail on the project costs in the confidential submission and during the in-camera hearing.

5.43 The Committee considers that the cost estimates for the project have been adequately assessed by ANSTO and the Committee is satisfied that the proposed expenditure is cost effective. As the project will not be revenue generating, the Committee makes no comment in relation to this matter.

Committee comments

5.44 The Committee did not identify any issues of concern with ANSTO's proposal and is satisfied that the project has merit in terms of need, scope and cost.

5.45 Having regard to its role and responsibilities contained in the *Public Works Committee Act 1969*, the Committee is of the view that this project signifies

27 Dr Adrian Paterson, ANSTO, transcript of evidence, 5 April 2016, p. 7.

28 ANSTO, submission 1, p. 11.

29 ANSTO, submission 1, p. 11.

30 ANSTO, submission 1, p. 11.

value for money for the Commonwealth and constitutes a project which is fit for purpose, having regard to the established need.

Recommendation 6

5.46 **The Committee recommends that the House of Representatives resolve, pursuant to Section 18(7) of the *Public Works Committee Act 1969*, that it is expedient to carry out the following proposed work: Australian Nuclear Science and Technology Organisation Waste Management Facilities' Extension and Upgrade.**

Recommendation 7

5.47 **The Committee requires that the Australian Nuclear Science and Technology Organisation (ANSTO) provide it with an update on any regulatory requirements, as sought by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) and the Australian Safeguards and Non-proliferation Office (ASNO), which affect the scope or cost of the ANSTO Management Facilities' Extension and Upgrade project. This update should be provided as soon as the information is available.**

5.48 Proponent agencies must notify the Committee of any changes to the project scope, time, cost, function or design. The Committee also requires that a post-implementation report be provided within three months of project completion. A report template can be found on the Committee's website.

Senator Dean Smith

Chair

2 May 2016