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The Australian Nuclear Science and Technology Organisation (ANSTO) Nuclear Medicine Project

3.1 The Australian Nuclear Science and Technology Organisation (ANSTO) produces and sells nuclear medicine, including Molybdenum-99 (Mo-99).

3.2 The project has two parts:

- a facility to process Mo-99 into a form suitable for use by over 200 hospitals in Australia and New Zealand
- a facility to produce a synthetic rock material (Synroc) from the waste by-product of nuclear medicine production.

3.3 The purpose of the project is to provide a secure supply of Mo-99 and to treat waste for safe disposal.

3.4 The cost of the project is $168.8 million.

3.5 The project was referred to the Committee on 29 November 2012.

Conduct of the inquiry

3.6 Following referral to the Committee, the inquiry was advertised on the Committee's website, by media release and in the *St George and Sutherland Shire Leader* newspaper.

3.7 The Committee received one submission and two supplementary submissions from ANSTO. The Committee also received submissions from two other organisations. The list of submissions can be found at Appendix A.

3.8 The Committee received a private briefing and conducted a site inspection, a public hearing and an in-camera hearing on 1 February 2013 in Sydney.

3.9 A transcript of the public hearing and the submissions to the inquiry are available on the Committee's website.[1]

Need for the works

3.10 ANSTO is currently dependent on its existing Mo-99 plant and imports of nuclear medicine to ensure a reliable supply to Australia. This plant is ageing and will reach the end of its useful life in 2017.

3.11 The existing Mo-99 facility was retro-fitted with the existing suite of radiation shielding enclosures or 'hot cells' in 2006. This plant was designed and commissioned as a demonstration plant with a life of 10 years. It was always anticipated that this plant would be superseded within its design life.

3.12 The purpose of the Synroc waste treatment facility will be to treat the waste which is a necessary by-product of nuclear medicine production. Synroc technology is an Australian innovation which immobilises nuclear waste into a synthetic rock which is safe for long-term storage. The Synroc plant will also be used to treat legacy waste from over 50 years of Australian nuclear medicine production into a form suitable for ultimate disposal.

3.13 The plant could also create excellent spin-off opportunities for Australia. Australia will not store other countries' waste. However, the Synroc plant will become an operating demonstration facility to showcase how Synroc technology could be exported with significant commercialisation potential.[2]

3.14 ANSTO determined that the existing Mo-99 facility could not be refurbished and considered other options for processing Mo-99. In its submission, ANSTO explained why it proposes to construct a new facility. ANSTO also assessed various options for disposing of nuclear waste and provided reasons for proposing the Synroc facility.[3]

3.15 The Committee is satisfied that there is a need for the works.

Scope of the works

3.16 The Mo-99 facility will contain:

- a production area with radiation shielding enclosures for the handling, process and maintenance of the facility
- tanks for the interim storage of production liquid wastes

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

2 ANSTO, Submission 1, p. 4.

3 ANSTO, Submission 1, pp. 5-9.

- a treatment system for production off-gases
- laboratories for analysing starting materials and finished product
- a product dispatch area
- staff amenities
- reticulated building services, including water, waste water, ventilation, electrical, lighting, security, fire detection, alarms and public address.[4]

3.17 The Synroc plant will contain three areas:

- the white area which contains offices, meeting rooms, and hot cell operations rooms
- the blue area which contains space for the support of the hot cell equipment
- the red area which contains the hot cells for the purpose of processing the waste into a synthetic rock material.[5]

3.18 The Synroc project contains an approved test and evaluation plant, which will be essential to demonstrate the technology to the regulator whilst seeking regulatory approvals. The test and evaluation plant will also serve as a useful training tool and marketing device.[6]

3.19 The Committee finds that the proposed scope of works is suitable to meet the need.

Cost of the works

3.20 The project cost is $168.8 million. The Committee received a confidential supplementary submission detailing the project costs and held an in-camera hearing with ANSTO on these costs.

3.21 The Committee is satisfied that the costings for the project provided to it have been adequately assessed by the proponent agency.

Project issues

Community consultation and waste management

3.22 The Sutherland Shire Council, where the Lucas Heights site is located, made a submission to the inquiry. This submission raised issues including

4 ANSTO, Submission 1, p. 14.
5 ANSTO, Submission 1, p. 14.
6 ANSTO, Submission 1, p. 15.

the lack of a national nuclear waste repository, a lack of information on the project, and the scale and safety of the facilities.[7]

3.23 ANSTO is a large employer within the Sutherland Shire and many of its employees live in the Shire. ANSTO stated that it has ongoing consultation with the Council and the local community.[8]

3.24 The Council expressed concern that the Synroc plant would process nuclear waste from other countries and that waste would be stored on the grounds of ANSTO's Lucas Heights site.[9]

3.25 ANSTO agreed that the key public concern was waste management. The Chief Executive Officer of ANSTO affirmed that:

> We have no intention of processing other countries' waste locally.[10]

3.26 Regarding waste storage on site, ANSTO stated that it was also concerned that waste would not be removed from Lucas Heights:

> … our [A]ct does not permit us to become the long-term waste repository and store. So the [P]arliament has already anticipated that and it is a very strong position we can take. I am certain the regulator—because they are also required to reflect international best practice, which I think is the term in the [A]ct—would never allow this to become a permanent repository and store, because it would fly in the face of what everybody else has agreed at the International Atomic Energy Agency.[11]

3.27 Furthermore, ANSTO stated that it advocates against the long-term storage of nuclear waste at its Lucas Heights site.[12]

> We have regularly engaged in Senate estimates and other settings, explaining the importance of Australia as a country that meets international best practice, which is to have a national waste repository and store. Typically, these are located in remote sites that are geologically and otherwise stable for these storage purposes. We have assisted the department responsible for that with our expertise in interim waste management, as we do on the site, to assist them in developing the process by which it is happening.[13]

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7 Sutherland Shire Council, Submission 2.

8 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 5.

9 Sutherland Shire Council, Submission 2, p. [4].

10 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 2.

11 Dr A Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 6.

12 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 5.

13 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 5.

3.28 ANSTO affirmed that it is encouraged by and supportive of the development of a national waste repository and store. ANSTO indicated that it is responsible for maintaining the interim storage facilities and building public confidence in nuclear waste management.[14]

3.29 The lack of information regarding the facilities is due to the fact that the detailed design stages have not yet commenced. This is explained further in the Costs section below. However, ANSTO stated that it is happy to share detailed design information with the Council when it is developed.[15] This will provide the Council with further detail on the size and scale of the facilities.

3.30 Further, ANSTO indicated that the size and scale of nuclear facilities does not affect safety:

> … scale and safety are not correlated in my view. It is always safe, and scale is simply the scale you require to deliver the result.[16]

3.31 ANSTO also reaffirmed that it is not able to operate any nuclear facilities without the approval of the independent regulator, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).

> [ARPANSA's] statute and mandate goes to the issue of public accountability for safety and health for the public and the broader environment itself. So the public can be reassured that there are sufficient independent processes to look to public safety, to look to the safety of operations and the work and safety environment in which we operate. We would not be permitted to proceed if there was any risk to the public in this regard.[17]

3.32 ANSTO noted that two reactors in Canada were constructed but were prohibited from being operated by the Canadian regulator, demonstrating the power of regulators over organisations such as ANSTO.[18]

3.33 ANSTO reaffirmed that communication and consultation is essential:

> I believe we have a duty and a burden to continue to communicate with stakeholders in the shire and in the broader region. But I do not think there are any fundamental issues that would in any way compromise the quality of the thinking and the planning that has underpinned this application.[19]

14 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 5.
15 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, pp. 5-6.
16 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 6.
17 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 6.
18 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, pp. 8-9.
19 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 6.

3.34 At the public hearing, ANSTO undertook to provide a further submission addressing the concerns of the Sutherland Shire Council. This submission acknowledges and responds to the Council's concerns.[20]

Committee comment

3.35 The Committee appreciates ANSTO's willingness to acknowledge the concerns of the local community and to publicly respond to issues raised in the submission from the Sutherland Shire Council.

3.36 In future, ANSTO should endeavour to provide more comprehensive detail in its initial submissions wherever possible.

3.37 The Committee notes ANSTO's ongoing engagement with the Council and expects ANSTO to continue to engage with the Council and the local community, provide timely public information wherever possible and address issues of concern as they arise.

3.38 The Committee expects ANSTO to consult with the Council and other interested stakeholders once the detailed designs are available.

3.39 The Committee accepts ANSTO's undertakings that waste will not be stored over the long-term at ANSTO's Lucas Heights site. The Committee also accepts ANSTO's statement that the Synroc plant will not process nuclear waste from other countries.

Costs

3.40 ANSTO acknowledged that it does not have a detailed design for either the Mo-99 facility or the Synroc facility at this point in time. However, ANSTO indicated that this is a standard ANSTO process and costs are estimated with this in mind:

> We have had this discussion with the committee in previous meetings. The challenge is to have a sufficiently advanced design whereby you can have a predictable set of costs but not so advanced that you consume public resources to a great degree. So we are currently at the point where we have not yet entered into a detailed design, because that is when you spend all of the money on detailing all of the engineering issues. We have essentially completed the preliminary design for the Synroc plant and we are ready to roll on the detailed design. For the nuclear medicine plant, we are completing the preliminary design during the course

20 ANSTO, Submission 1.2.

> of this next part of the calendar year [the detailed design will commence in around August-September].[21]

3.41 ANSTO provided significant detail in the public hearing regarding its processes for developing cost estimates, including how it develops contingency estimates:

> … at the early stages of project development we will have an envelope in which we are operating in which you will have as many defined costs as you can define and a large contingency. As you move through the stage-gates and you get more predictability and more certainty, the contingency tends to shrink and the scope of the project gets better and better defined as you move through it. The reason I am confident that ANSTO can operate within the budget that we have secured for this project is that within our strategic assets projects that we are currently delivering, which is a portfolio of about $300 million in value, we are not experiencing cost blow-outs. For example, our own internal construction team works up the work that we then provide to people like quantity surveyors and others to assist us, and we are finding that we are very close to the types of estimates that they will then confirm with their work. Ultimately, these are found to be pretty respectable estimates when we tender out for the work to be done in detail.[22]

3.42 ANSTO noted that the competitive nature of the construction sector also assists in keeping costs down.[23]

3.43 Further, ANSTO stated that it has been particularly cautious with cost estimates for the Synroc plant, given it is a first-of-its-kind development:

> … we have drawn on the knowledge of international nuclear engineering reviewers to come and review, in detail, the engineering status of that project so that we can be assured, with their independent view, that we have developed the capacity and the facilities to the level where they are manufacturable, constructible and operable. That is a discipline that is seldom used in first-of-a-kind projects, but we feel it is absolutely essential to utilise that type of discipline.[24]

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21 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 3.

22 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, pp. 3-4.

23 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 4.

24 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 4.

3.44 ANSTO indicated that it will repay all funds for both facilities once they are operational. ANSTO also stated that it will also pay a dividend on the production of nuclear medicine.[25]

Committee comment

3.45 The Committee acknowledges that ANSTO has a record of meeting project budgets and avoiding cost blowouts.

3.46 The Committee is satisfied that ANSTO has adequate costing processes and has incorporated adequate allowances for the proposed project.

Protection of intellectual property

3.47 The Committee raised some concerns about the protection of the intellectual property surrounding Synroc. ANSTO stated emphatically:

> I will make a very clear statement in the public setting: we are very serious about protecting this. We think that this is a major future engineering opportunity for Australia. We want to capture it for this country and be able to go to other countries to do the work.[26]

3.48 ANSTO emphasised that there have been high-level bilateral discussions with the United States regarding the sharing and protection of ANSTO's intellectual property in other instances.[27]

Committee comment

3.49 Following assurances during the in-camera hearing, the Committee is satisfied that ANSTO is taking all appropriate measures to protect intellectual property.

3.50 Further, the Committee encourages ANSTO to promote its various technologies and capabilities, such as Synroc, to a wider audience.

Final Committee comment

3.51 The Committee's briefing clearly highlighted the global need for an increased supply of Mo-99, recent global shortages and the imminent closure of the Canadian producer, which contributes a significant proportion of the global supply of Mo-99.

3.52 The Committee's inspection at Lucas Heights included the current Mo-99 facility and the OPAL reactor. The Committee met various ANSTO personnel during the briefing and inspection and thanks them for their

25 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 7.

26 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 5.

27 Dr A. Paterson, ANSTO, *transcript of evidence*, 1 February 2013, p. 4.

contributions to the inquiry. The Committee also enjoyed lunch with some of ANSTO's graduates, which provided valuable insight into the work of the organisation.

3.53 The Committee appreciates the submission from the Sutherland Shire Council. The Committee acknowledges ANSTO's commitment to ongoing consultation with the Council.

3.54 The Committee encourages ANSTO to promote and fully protect Australian innovation and technology.

3.55 The Committee was satisfied with the evidence provided by ANSTO regarding the proposed Nuclear Medicine Project. The Committee is satisfied that the project has merit in terms of need, scope and cost.

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

Recommendation 1

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: The Australian Nuclear Science and Technology Organisation (ANSTO) Nuclear Medicine Project.