



Australian Government



Nuclear-based science benefiting all Australians

Senate Standing Committee on Legal and Constitutional Affairs

Inquiry into the National Radioactive Waste Management Bill 2010

Submission by the Australian Nuclear Science and Technology Organisation (ANSTO)

Introduction

The Australian Nuclear Science and Technology Organisation (ANSTO) is Australia's national nuclear science and technology organisation and the centre of Australian nuclear expertise. ANSTO staff have extensive skills and expertise in nuclear technology and its applications, and in particular in the handling of radioactive materials.

ANSTO's nuclear infrastructure includes the research reactor OPAL, particle accelerators, radiopharmaceutical production facilities, and a range of other unique research facilities. OPAL is used to produce radioactive products, particularly those used in nuclear medicine¹. The OPAL reactor is also a source of neutron beams for scientific research, and it is used to irradiate various substances, including silicon for semiconductor applications. These activities deliver considerable benefits to all Australians. ANSTO has an active waste minimisation program, but the operation of ANSTO's facilities necessarily produces small amounts of radioactive waste, which are managed in accordance with national and international standards.

That waste has been safely managed at Lucas Heights for many decades, and ANSTO has the capacity to safely manage it for years to come. However, the National Radioactive Waste Management Facility is not intended to be used only for ANSTO's waste. We understand that waste destined for the Facility is currently held at around 100 locations within Australia. Any decision on the safe long-term management of radioactive waste needs to recognise that indefinite storage of radioactive waste by small holders is not consistent with international best practice. International best practice involves the provision of central disposal facilities or stores by government, and the imposition of regulatory requirements for the use of those facilities, so that the risks arising from unwanted radioactive materials are minimised. Such facilities currently exist in Western Australia and Queensland. Criteria developed for similar facilities overseas should be applied in the design and construction of any facility developed under the Bill if it becomes law, in order to ensure that it is consistent with international best practice.

The global context

In 2007, Australia's total current holdings of Low Level Waste (LLW) and short-lived intermediate level waste (SLILW) were approximately 4,020 m³. ANSTO's share of that is approximately 1,600 m³ (around 40%) – a volume which will be reduced further by supercompaction of existing drums before transport to any national facility. By comparison, by the end of 2007 the French government had disposed of a total of 735,000 m³ of similar wastes in near-surface repositories - 527,000 m³ in the Manche repository in Brittany and the balance in the operating repository at Aube, Champagne. Australia's total holdings of LLW and SLILW are a small fraction of the annual production of LLW and SLILW in countries such as Britain or France (about 25,000 cubic metres per year). The United States has transported and disposed of almost four million m³ of low-level waste. Many other countries operate low-level waste repositories – for example, such a repository was inaugurated in Hungary in October 2008 with strong community support. The operation of those facilities has had no impact upon surrounding areas, and the transport of waste to them has not caused any significant exposures to people or the environment. This overseas experience would indicate that, properly managed, a similar facility in Australia would not pose significant threats to human health or the environment.

¹ The current crisis in global supply of these radioisotopes has made Australia's self-reliance in this regard the envy of much of the world.

As for longer-lived intermediate level waste, in 2007 Australia's total holdings of this category of waste amounted to approximately 535 m³, of which ANSTO holds the majority. In addition, the wastes arising from the reprocessing of HIFAR spent fuel will be approximately 132 m³. By comparison, France produces 930 m³ of this class of waste every year, together with another 155 m³ of high-level waste (which Australia does not produce at all). Again, the storage and transport of that material has not caused any significant exposures to people or the environment.

In contrast to the strong safety record of national waste management facilities, there have been a number of serious accidents involving disused radioactive sources in circumstances where such facilities were unavailable or not used. Those accidents have caused a number of deaths and serious injuries, and significant economic loss². In recent years, concerns about the security of radioactive materials have also increased, and ANSTO and other organisations have worked nationally and internationally to secure disused high activity sources and remove them from vulnerable facilities.

Internationally, concern about the management of disused radioactive sources has increased. An International Atomic Energy Agency (IAEA) meeting in Vienna from 29 June to 1 July 2009 discussed the challenges facing the management of disused radioactive sources³. The discussion confirmed that, given the risks of disused sources becoming orphaned and thereby potentially becoming safety and/or security risks, most countries require licensees to either send disused sources back to the supplier or to send them to a licensed recycling or waste management facility. In these countries, licensees are prohibited from retaining disused sources beyond the period required to arrange shipment to the supplier, recycler or waste management facility. Most countries also ensure that central storage or disposal facilities for disused or orphaned sources, which cannot be returned to the supplier, are available. The clear view of the meeting was that this is international best practice.

The findings of that meeting were reflected by the IAEA General Conference last year. In a consensus resolution, the Conference called upon all States to identify secure storage and disposition pathways for disused radioactive sealed sources⁴. Suggestions that holders of radioactive waste in Australia should be required to retain that material indefinitely are therefore not consistent with international best practice.

Transport of waste to the facility

Radioactive materials are transported around Australia every day for a variety of purposes. These include:

- radiopharmaceuticals used in nuclear medicine procedures;
- sterilisation of medical equipment, blood and products such as cosmetics;
- industrial radiography of welds;

² See, for example, the report on an accident in Brazil in 1987 at http://www-pub.iaea.org/MTCD/publications/PDF/Pub815_web.pdf.

³ Technical Meeting on Implementation of the Code of Conduct on the Safety and Security of Radioactive Sources with Regard to Long Term Strategies for the Management of Sealed Sources; <http://www-ns.iaea.org/downloads/rw/code-conduct/info-exchange/chair-report-tm-june-july2009.pdf>

⁴ GC(53)/RES/11, http://www.iaea.org/About/Policy/GC/GC53/GC53Resolutions/English/gc53res-11_en.pdf.

- quality control processes for materials and slurries;
- element analysis in borehole logging;
- road repairs and resurfacing; and
- research applications that involve the use of radioactive tracers to allow biological processes to be followed in the test tube, a living organism or the environment.

ANSTO is the main supplier of radioisotopes for use in nuclear medicine in Australia. In the past year, about 31,000 packages containing radioisotopes were dispatched from ANSTO by road and air to destinations around Australia and overseas. ANSTO understands that a larger number of movements of radioactive materials would have taken place under licence from state and territory regulatory authorities. Most of the 31,000 packages despatched by ANSTO contained radioisotopes for use in nuclear medicine, where they benefited around half a million Australians. Indeed, on average, at present levels of usage, every Australian will need a radioisotope for medical purposes during their lifetime.

All shipments of radioactive materials in Australia, including any shipments of radioactive waste, are required to be transported in accordance with the Australian Code of Practice for the Safe Transport of Radioactive Material (2008)⁵. This Code is based on guidelines developed by the IAEA, and is administered by competent authorities in Australia, such as the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) and the various state and territory regulators. The Code ensures that the standard of packaging is appropriate for the level of radioactivity in the material being transported – whether or not that material is waste.

The transportation of radioactive materials has a remarkable safety record. Over several decades, tens of millions of packages of radioactive material, including packages of radioactive waste, have been transported around the world each year. In all those transports, there has never been an in-transit accident with serious human health, economic or environmental consequences attributable to the radioactive nature of the goods.

All radioactive waste to be transported to the facility will have to meet stringent waste acceptance criteria. In particular, such waste will be in solid form, and in the extremely unlikely event of an accident would not release radioactive material into the environment.

After the initial campaign for the disposal of 50 years' production of radioactive waste, the transport of radioactive waste to the facility will be an infrequent event. ANSTO generates about one truckload (about one standard size shipping container) of such waste a year. This means that, if the facility is opened once every five years for a disposal campaign, only five trucks will travel from ANSTO during that year.

The road transport of hazardous materials such as petrol, other flammable liquids, flammable gases and toxic chemicals is a common event throughout Australia. When vehicles carrying such (non-radioactive) goods are involved in accidents, a wide area can be affected. Occasionally, lives are lost as a direct result of the hazardous nature of the load. Experience demonstrates that the risks associated with the transport of radioactive waste are much lower than the risks associated with the transport of many other hazardous materials classified as dangerous goods.

⁵ <http://www.arpansa.gov.au/Publications/codes/rps2.cfm>.

Possible storage of waste at Lucas Heights

Since the introduction of the Bill, there have been a number of suggestions made through the media that ANSTO's Lucas Heights facility should become the site of a national radioactive waste management facility. Whilst such a decision is of course one for government, we would note:

- The *Australian Nuclear Science and Technology Organisation Act 1987* would have to be amended to allow that to occur. The current provisions of the Act reflect community views in the early 1990s;
- As noted above, the majority of Australia's low level waste and short-lived intermediate level waste is held at sites other than Lucas Heights. Given that, a decision to move that waste to Lucas Heights would require a transport operation of similar magnitude to that needed for a remote site. Whilst, as noted above, such transport would be conducted safely, it would presumably raise the same concerns among some interested groups as transport to a remote site has;
- The disposal of low level waste and short-lived intermediate level waste in purpose-built, facilities reflects international best practice;
- Lucas Heights does not meet the geographical and geological criteria for a disposal facility outlined in the *Code of Practice for the Near-Surface Disposal of Radioactive Waste in Australia*, issued by the National Health and Medical Research Council in 1992 and referenced in the report of the Senate Standing Committee on Environment, Communications and the Arts' inquiry into the *Commonwealth Radioactive Waste Management (Repeal and Consequential Amendment) Bill 2008*⁶; and
- Current waste storage capacity at Lucas Heights is insufficient to store all of Australia's radioactive waste.

Conclusion

The current situation in Australia, whereby there are limited facilities for the disposal or long-term storage of radioactive waste, forces some holders of that material, mainly those who hold industrial and medical sources, to store it in facilities which may be unsafe or insecure. That is not conducive to the safety and security of that material. The construction of a central radioactive waste management facility, which would obviously be designed and constructed specifically for the disposal or long term storage of that material, would be consistent with international best practice. Many such facilities exist overseas, and their operation – and the transport of waste to them – has an exemplary safety record. Drawing on those well-established practices under the guidance of bodies such as the IAEA makes good sense for Australia.

⁶ http://www.aph.gov.au/senate/committee/eca_ctte/radioactive_waste/report/report.pdf, paragraph 2.16.