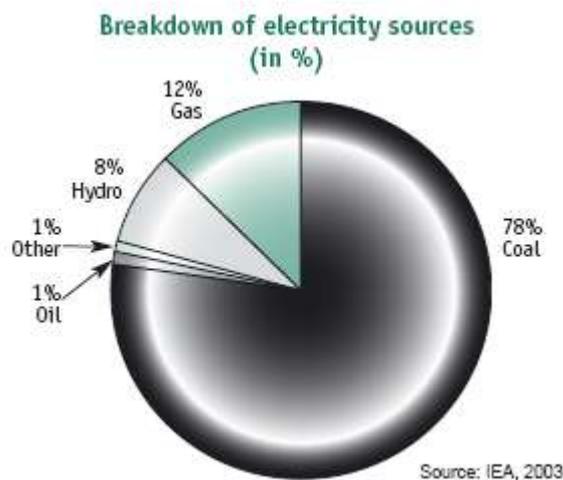


RADIOACTIVE WASTE MANAGEMENT PROGRAMMES IN OECD/NEA MEMBER COUNTRIES

AUSTRALIA

NATIONAL NUCLEAR ENERGY CONTEXT

- Australia is one of the only developed countries that does not use electricity, either indigenous or imported, produced from nuclear energy.
- A proposal to build a 500 MWe nuclear power plant at Jervis Bay, NSW was abandoned in 1972. Since then, Australia has pursued a policy of non-reliance on nuclear power. Australia's energy consumption is heavily reliant upon coal, as illustrated below:



- Australia uses radioactive materials in medical, research and industrial processes. These beneficial uses of radioactivity generate small amounts of radioactive waste.
- Australia's first research reactor, the High Flux Australian Reactor (HIFAR), was permanently shut down in January 2007, following almost 50 years of successful operation.

- HIFAR has been replaced by the 20 MW Open Pool Australian Light water (OPAL) reactor, which was designed as a multi-purpose research reactor: for neutron beam research, production of radioisotopes for medicine and industry and irradiation of materials, such as silicon for the high-performance computer industry.
- The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), Australia's national nuclear regulator, issued the Australian Nuclear Science and Technology Organisation (ANSTO) with a licence to operate OPAL in July 2006.
- OPAL is the only operational nuclear reactor in Australia. It is at the heart of almost all the research activities of ANSTO and supports those of several other organisations on the Lucas Heights site near Sydney.

SOURCES, TYPES AND QUANTITIES OF WASTE

In Australia, radioactive waste is subdivided into four different categories, i.e. A, B, C and S. This classification scheme was developed by the National Health and Medical Research Council (NHMRC) in the Code of Practice for the Near-Surface Disposal of Radioactive Waste in Australia (1992), which is based on international recommendations for radioactive waste management but specifically describes and caters for the types of radioactive waste generated in Australia.

Categories A, B and C: Low-level and short-lived intermediate-level radioactive waste

Wastes in categories A, B and C are low-level and short-lived intermediate-level radioactive wastes under the scheme described in the International Atomic Energy Agency (IAEA) Safety Guide on the Classification of Radioactive Waste. The NHMRC Code defines category A, B and C wastes as suitable for near-surface disposal. Near-surface repositories may include sub-surface trenches and caverns at depths of up to some tens of metres, with or without engineered barriers, and may include above and below-ground vaults. Repository design is determined by the geography and geology of the site and the types of waste to be disposed of in the facility.

Australia's inventory of category A, B and C wastes arises primarily from medical, research and industrial applications of radioactive substances but also includes domestic smoke detectors.

Category S: Long-lived intermediate-level waste

Category S wastes are long-lived intermediate level wastes under the IAEA classification. The amount of long-lived intermediate-level radioactive waste generated in Australia is small, some 500 m³, with an annual generation rate of less than 5 m³/year. It includes spent or disused radiation sources from medical, research and industrial applications and wastes from production of radiopharmaceuticals and processing of mineral sands. In due course, it will also include long-lived intermediate level radioactive

waste returned to Australia after treatment of spent fuel from ANSTO’s HIFAR and OPAL research reactors. These wastes are not suitable for disposal in a near-surface repository, but they can be safely stored in a purpose-built facility above ground.

Australia’s radioactive waste

Categories	Cumulative quantity	Annual arisings
Low-level and short-lived intermediate-level radioactive waste	Approximately 3 700 m ³	Approximately 40 m ³ *
Long-lived intermediate-level radioactive waste	Approximately 500 m ³ (The volume of an average house.)	< 5 m ³

* An additional 500 m³ of low-level waste is expected to arise in 2035 from the decommissioning of the HIFAR research reactor at Lucas Heights in Sydney.

High-level waste

Australia does not generate any high-level waste and it is Australian Government policy that Australia will not accept high-level waste from other countries.

RADIOACTIVE WASTE MANAGEMENT POLICIES AND PROGRAMMES

Proposed national radioactive waste management facility

Australia’s radioactive waste comes from two main sources: mining activities and the use of radionuclides in research, medicine and industry.

In Australia, producers of radioactive waste are responsible for looking after the waste that they generate, and each of the Federal, State and Territory governments is responsible for regulating the radioactive waste generated within its jurisdiction. Given the small amounts of radioactive waste generated in Australia, it is technically and economically inefficient, as well as impractical, for storage and disposal facilities to be established within each jurisdiction. As a result, almost half of Australia’s radioactive waste is stored at hospitals and universities in more than 50 different locations around Australia.

Although the waste is stored under supervision, and in accordance with Acts and Regulations applied by each level of government, these arrangements are not ideal as storage of waste is not centralised and long-term safety is not assured.

The Australian Government started discussing siting and selection criteria for a national repository in 1985. Whilst numerous proposals to establish a national, purpose-built facility for the storage and disposal of radioactive waste have been put forward since that time, to date, these proposals have not been successful in establishing a national repository.

In December 2005, the Australian Government passed the *Commonwealth Radioactive Waste Management Act 2005*, (whose full title is “an Act to make provision in relation to the selection of a site for, and the establishment and operation of, a radioactive waste management facility, and for related purposes”). This Act provides the Commonwealth with the express authority to do anything necessary for, or incidental to, establishing or operating a Commonwealth Radioactive Waste Management Facility (CRWMF) in the Northern Territory and transporting radioactive waste to it. This facility would manage radioactive waste of Commonwealth origin only.

Following the introduction of this Act, four sites were selected as being possible sites for the CRWMF, and a detailed suitability study of each site is currently being undertaken. Once the final site has been chosen, licences to site, construct and operate the CRWMF must be obtained from ARPANSA. The Australian Government, represented by the Department of Resources, Energy and Tourism (DRET) will own the CRWMF, but it is expected that a contractor will manage the facility on a day-to-day basis.

Depending on the suitability of the host site, low level and short-lived intermediate level waste will be disposed of in a near-surface repository. Long-lived intermediate level waste will be stored in a separate building (see below). Under the NHMRC classification scheme, low-level radioactive waste includes such things as lightly contaminated clothing, laboratory equipment and soil as well as smoke detectors. It contains only very small amounts of radioactive material. (A smoke detector, for example, contains only about 40 kBq of activity.) It does not require shielding during handling and transport, it presents a very low radiation hazard, and it is suitable for shallow land burial.

Intermediate-level radioactive waste may include spent or disused radiation sources from industry or hospitals, resins, chemical sludges and metal nuclear fuel cladding. Such waste may require radiation shielding to allow safe handling. An industrial radiation source containing about 20 GBq of activity would be classified as intermediate-level radioactive waste. Under the NHMRC classification scheme, if it has a short half-life, about 30 years or less, it is classified as short-lived intermediate-level radioactive waste and may be accepted by the proposed national repository if other considerations are met.

Store for long-lived intermediate-level waste

It is proposed that an above-ground, purpose built store for intermediate level waste will be co-located at the CRWMF site. Any such store will also be subject to the relevant licence approvals from ARPANSA for site preparation and for construction and operation of the facility.

RESEARCH AND DEVELOPMENT

The development of ceramic waste forms for the immobilisation of high level and long-lived radioactive waste is continuing in Australia. ANSTO is currently installing a process to immobilise its own radioactive wastes arising from radiopharmaceutical production.

ANSTO has also developed processes and technologies for managing its radioactive wastes, which include the so-called legacy wastes that have accumulated over the 40 years of ANSTO operations. The processes involve a number of integrated tasks that have provided ANSTO with modern waste management facilities and capabilities. The construction of a multi-purpose Waste Treatment & Packaging Facility will enable ANSTO to prepare waste in forms that comply with the repository waste acceptance criteria for storage in the proposed CRWMF.

DECOMMISSIONING AND DISMANTLING POLICIES AND PROJECTS

Australia has one operating research reactor (OPAL) and two permanently shutdown research reactors (HIFAR & MOATA). Each of these reactors is under the control of ANSTO. HIFAR, a 10MW thermal reactor, was operated between 1958 and 2007, and MOATA, an ARGONAUT 100 kW type reactor, was operated between 1961 and 1995. ANSTO currently holds a licence from ARPANSA to decommission the MOATA reactor and intends to apply for a licence to decommission HIFAR in the near future.

The MOATA decommissioning studies were finalised in 1999 and a decision was taken to adopt a long-term storage option. However, this timeframe has since been revised and planning for the decommissioning of MOATA has commenced. Preparatory steps of removing fuel and coolant from the reactor, had already been carried out in 1996. The main reactor structure is currently in the care and maintenance stage until decommissioning plans are finalised.

Both reactor structures are enclosed, and measures have been put in place to prevent unauthorised access. The facilities are subject to periodic inspection and radiation measurement, and are incorporated into ANSTO's plans and arrangements for accidents and incidents on site. Financial provision has already been made for the cost of the current stages of decommissioning.

TRANSPORT

How often will transport take place?

Because Commonwealth agencies produce only a very small amount of radioactive waste each year, transport of radioactive material to the CRWMF will be infrequent. Initially, a number of shipments will be required for disposal of Australia's existing inventory of low-level radioactive waste. Once the existing national inventory is removed to the CRWMF, disposal campaigns are expected to take place every one to three years.

It is estimated that 20 million packages of radioactive material are routinely and safely transported throughout the world each year. More than 30 000 of these movements take place within Australia. In fact, there are fewer risks associated with transporting radioactive waste than there are with flammable and corrosive substances such as fuel and acid, which are routinely transported in and around major cities on a daily basis. Like any other vehicles carrying hazardous materials, those vehicles transporting radioactive waste are appropriately marked.

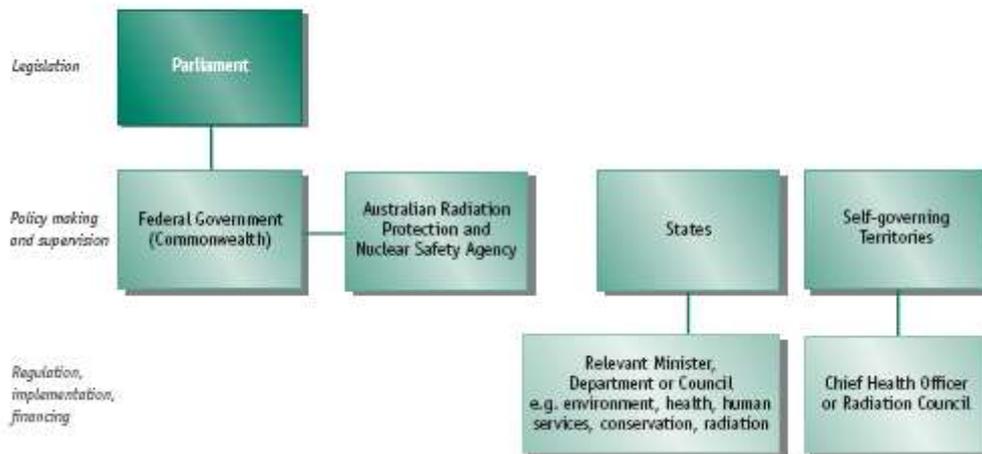
COMPETENT AUTHORITIES

Is transporting radioactive waste safe?

Australia is a federation of six States (i.e. New South Wales, Queensland, Victoria, South Australia, Western Australia and Tasmania), with three self-governing Territories (i.e. the Northern Territory, the Australian Capital Territory and Norfolk Island), each with its own constitution, government and laws. The Australian Constitution originated as an agreement under which the former British colonies came together as States in a federation. It established the form of the federal government (i.e. the Australian Government or Commonwealth) and set out the legal basis for relations between the Commonwealth and the States and Territories.

The list below shows the regulatory bodies established by the States and Territories for regulation of the safe use of radioactive material and equipment and, in the case of the Commonwealth, it shows the body responsible for regulation of nuclear installations such as the OPAL and HIFAR reactors, the proposed CRWMF and other prescribed radiation facilities such as the National Medical Cyclotron.

Main bodies involved in radioactive waste management in Australia



FINANCING

The Commonwealth, State and Territory Governments each finance their own radioactive waste management schemes and associated research and development programmes. These schemes and programmes are generally financed through direct government funding, except in Western Australia and Queensland where the established radioactive waste management facilities are partly financed by fees charged for accepting waste.

PUBLIC INFORMATION

For more information, the websites of the relevant authorities and organisations are listed below.

Government

Department of Resources, Energy and Tourism (DRET)

The Information Officer Radioactive Waste Management Department of Resources, Energy and Tourism (DRET), Canberra E-mail: radioactivewaste@dest.gov.au –or see: <http://www.radioactivewaste.gov.au/>

Research

Australian Nuclear Science and Technology Organisation (ANSTO)
PMB 1 Menai NSW 2234 Australia E-mail: enquiries@ansto.gov.au Website:
<http://www.ansto.gov.au>

Regulatory bodies

Commonwealth

Chief Executive Officer, Australian Radiation Protection and Nuclear Safety Agency
(ARPANSA), Miranda NSW 1490. E-mail: arpansa@arpansa.gov.au Website:
<http://www.arpansa.gov.au>

Australian Capital Territory

Director Radiation Safety Section ACT Health
E-mail: radiation.safety@act.gov.au Website: <http://www.health.act.gov.au/c/health?a=da&did=10054021&pid=1074210066>

New South Wales

Director Radiation Control Section New South Wales Department of Environment and
Conservation E-mail: radiation@epa.nsw.gov.au Website:
<http://www.epa.nsw.gov.au/radiation/index.htm>

Northern Territory

Manager - Radiation Health Radiation Health Section Northern Territory Department of
Health and Community Services (DHCS) E-mail: envirohealth@nt.gov.au Website:
<http://www.health.nt.gov.au>

Queensland

Director Radiation Health Queensland Department of Health E-mail:
radiation_health@health.qld.gov.au Website: <http://www.health.qld.gov.au/phs/ehu/>

South Australia

Director Radiation Protection Division Environment Protection Authority E-mail:
radiationprotection.branch@state.sa.gov.au Website:
<http://www.environment.sa.gov.au/epa/radiation.html>

Tasmania

Senior Health Physicist Health Physics Branch Department of Health and Human Services
E-mail: health.physics@dhhs.tas.gov.au Website:
<http://www.dhhs.tas.gov.au/publichealth/radiationcontrol/index.html>

Victoria

Manager Radiation Safety Program Department of Human Services MELBOURNE VIC
AUSTRALIA E-mail: radiation.safety@dhs.vic.gov.au Website:
<http://www.dhs.vic.gov.au/phd/radiationsafety/index.htm>

Western Australia

Secretary, Radiological Council NEDLANDS WA AUSTRALIA E-mail:
radiation.health@health.wa.gov.au