



Australian Government



Nuclear-based science benefiting all Australians

Incident response and safety at ANSTO

ANSTO (Australian Nuclear Science and Technology Organisation) operates the OPAL reactor at Lucas Heights. OPAL is Australia's largest ever single scientific investment and plays an important role in Australian science and the production of radiopharmaceuticals for nuclear medicine.

It is normal practice to have emergency response plans in place for these types of activities, and such plans have been in place at Lucas Heights since the early 1960s.

The current Response Plan for Accidents and Incidents at ANSTO's Lucas Heights site is on the ANSTO website, www.ansto.gov.au/ansto/safety/Response_Plan_Final.pdf

It provides arrangements for coordinating the response by ANSTO and NSW Emergency Services organisations, such as the police, fire, and ambulance. It sits within the framework provided by the NSW State Emergency and Rescue Management Act. The plan is complemented by training and detailed response procedures that are regularly exercised and reviewed.

ANSTO Background

Why is there a reactor at ANSTO?

Radioisotopes are the radioactive component of radiopharmaceuticals which are used to diagnose and treat disease. On average, every Australian will have a nuclear medicine procedure using an ANSTO radiopharmaceutical during their lifetime.

OPAL has the capacity to produce four times more radioisotopes for nuclear medicine than Australia's first reactor HIFAR. The isotopes produced in the world-class reactor will be used in more than 80% of diagnostic nuclear medicine procedures (about 470 000 procedures) in Australia every year, and enhance ANSTO's capability for new nuclear medicine research.

The reactor is also used by scientists and post-graduate students from around Australia and from other countries for research in the areas of neutron scattering, materials, radiopharmaceutical and environmental science. Specialised radioisotopes are made for industrial applications and environment assessment such as tracing the movement of sand in Port Hacking and of sewage along the Sydney coastline. One industrial application of the reactor is silicon irradiation (the irradiated silicon is used to make high quality computer chips).

OPAL is not used for electrical power generation or any military purpose.

More information about OPAL can be found at www.ansto.gov.au/info/brochures/OPALr.pdf

How big is OPAL

OPAL is a fraction of the size of a power reactor. Its core is about the size of bar fridge and contains about 7 kilograms of uranium-235. The heart of OPAL is a compact-sized core of 16 low-enriched uranium fuel assemblies interspersed with control rods. OPAL uses low enriched uranium fuel, produces 20 megawatts of thermal energy and operates 340 days per year. OPAL operates at atmospheric air pressure.

By comparison, a typical electricity-generating reactor holds more than 150 tonnes of fuel, operates at several times atmospheric pressure and produces 3 000 megawatts of thermal energy.

Who regulates ANSTO?

ANSTO's operations are regulated from a safety point of view by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA - www.arpansa.gov.au) and Comcare for other safety issues (www.comcare.gov.au).



OPAL



Reactor Safety at ANSTO

What sorts of safety systems are used at ANSTO's reactor?

OPAL was designed and constructed in line with the most modern safety standards according to international best practice. OPAL's automated and highly reliable safety features include two independent safety systems to quickly shut down the reactor core in the case of an emergency. In addition, the core of the reactor can be cooled by natural circulation of the coolant, without the need for pumped flow. The reactor is staffed by trained operators 24 hours a day, every day of the year.

As a further safety measure, a buffer zone prevents any residential development within 1.6 km OPAL. This zone is extremely large by international standards.

In the unlikely event of an accident which damages even a small part of the core, OPAL has a containment system in place to ensure minimal amounts of radioactivity escape to the environment. The containment includes systems to trap radioactive material in high efficiency particulate filters (these filters physically remove contaminants), as well as activated charcoal for trapping radioactive iodine. With these containment systems in place, conservative modelling demonstrates that radiation doses to members of the public would be well below acceptable limits.

How safe is the reactor in a major earthquake?

OPAL is able to withstand much greater earthquake loads than other industrial buildings, high rise units and dams. A very severe earthquake, much greater than has ever been recorded in the Sydney Basin, would be required to cause any damage to OPAL in which radioactivity could be released. Expert geologists have confirmed that the site is geologically stable.

Have members of the general public ever been affected by an accident at a research reactor like ANSTO's?

In the hundreds of research reactors operating around the world, which have more than 16 000 combined years of reactor operation, there has never been an event with off-site health consequences. Many operate on university campuses, and many have housing close by.

Emergency Plans

Are there plans for dealing with accidents and incidents at ANSTO?

The ANSTO Response Plan provides the framework for responding to all incidents and accidents at Lucas Heights. It is supported by internal standing operating procedures and specific plans and arrangements for the research reactor.

The Response Plan sets out arrangements for incidents where support from the NSW emergency service organisations is needed. The plan has been developed by ANSTO operations and safety specialists. It has been reviewed and endorsed by the ANSTO Local Liaison Working Party (LLWP), which comprises representatives from NSW Police, NSW Fire Brigades, NSW Rural Fire Service, Ambulance Service of NSW, and other bodies including the Australian Federal Police and Sutherland Shire Council. ARPANSA is an observer at LLWP meetings.

What happens if there is an incident at ANSTO which requires external assistance?

The NSW emergency service organisations respond to requests for assistance from ANSTO in the same way they do for all organisations. These organisations operate within a framework of state, district and local level emergency plans, and each organisation has its own plans and supporting standing operating procedures. Normal requests for assistance from ANSTO to the NSW Fire Brigades and the Ambulance Service of NSW occur under these general arrangements.

In the unlikely event of a major radiological incident at ANSTO's Lucas Heights site, emergency support for the organisation would be managed at the state level. The State Emergency Management Committee has issued the State Lucas Heights Emergency Sub Plan, which is supported by the Lucas Heights Emergency Evacuation Sub Plan.

Can I see these plans?

The ANSTO Response Plan can be viewed at www.ansto.gov.au/ansto/safety/Response_Plan_Final.pdf

Further information on emergency management arrangements in NSW and the State Lucas Heights Emergency Sub Plan and supporting Lucas Heights Emergency Evacuation Sub Plan can be found at www.emergency.nsw.gov.au/content.php/363.html

To learn more...

Can I get more information about ANSTO and its activities?

ANSTO provides considerable information through its website.

Briefings can also be arranged for individuals or community groups.

Phone (02) 9717 3111 or visit the website at www.ansto.gov.au

Can I visit ANSTO?

Public tours are available free of charge. Bookings are necessary, and can be made by phoning (02) 9717 3111 or emailing enquiries@ansto.gov.au

Special interest tours can also be arranged.

Information for residents within a 3 km radius of ANSTO

It is highly unlikely that there will be a radiological risk requiring evacuation of anyone outside the ANSTO site. If evacuation is required it will be coordinated by the NSW Police. Remember that, unlike a bushfire, the threat is not an immediate threat. If alerted to a radiological emergency at ANSTO you are advised to follow the CALM procedure:

- **Close** all doors and windows, turn off air conditioning and stay indoors.
- **Await** further information from emergency services by listening to radio or television stations.
- **Locate** a change of clothes, identification and any vital medication in case you are advised to evacuate.
- **Move** to allocated evacuation centres if you are advised to do so. Once inside your car, turn off the air conditioning and ensure vents and windows are closed. Remain calm and courteous.

Will I need to evacuate?

This is very unlikely. If there ever is a need to evacuate, NSW Police or other identifiable emergency service personnel will specifically request you to do so.

What if my children are at school or child care?

If an evacuation is required, DO NOT collect your children from school or child care centres unless advised by emergency services. There are specific arrangements in place to both notify and evacuate schools and child care centres, if this were necessary.

3km