Australian Government

Ansto

Nuclear-based science benefiting all Australians

Annual Report
2014-15

AUSTRALIAN NUCLEAR SCIENCE AND TECHNOLOGY ORGANISATION

CHAIRMAN'S LETTER

Australian Government | ansto
Nuclear-based science benefiting all Australians

2 October 2015

The Hon Christopher Pyne MP
Minister for Industry, Innovation and Science
Parliament House
CANBERRA ACT 2601

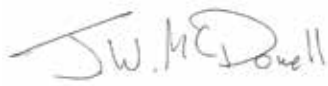
Dear Minister

I am pleased to present the Annual Report of the Australian Nuclear Science and Technology Organisation (ANSTO) for the period 1 July 2014 to 30 June 2015.

This report has been prepared in accordance with the requirements of the *Australian Nuclear Science and Technology Organisation Act 1987 (ANSTO Act),* section 46 of the *Public Governance, Performance and Accountability Act 2013 (PGPA Act)* and with the requirements of section 7AB of the Public Governance, Performance and Accountability (Consequential and Transitional Provisions) Rule 2014 (the CTP Rule). The CTP Rule extends the annual report requirements contained in the Commonwealth Authorities (Annual Reporting) Orders 2011 to apply to the 2014-15 annual reports of Corporate Commonwealth entities in the same way as they applied for the financial year ending on 30 June 2014.

The report has been approved for presentation to you by a resolution of the ANSTO Board members on 1 October 2015.

Yours sincerely



Jim McDowell
Chairman

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ABOUT ANSTO

The Australian Nuclear Science and Technology Organisation (ANSTO) is one of Australia's largest public research organisations and custodian of much of our country's landmark and national research infrastructure, including the Open Pool Australian Light-water (OPAL) multi-purpose research reactor, the Australian Synchrotron, the Centre for Accelerator Science (CAS) and the Bragg Institute and neutron beam instruments.

More than 500 scientists, engineers and technicians work at ANSTO to answer the significant environmental, medical and industrial questions using nuclear techniques. On average, ANSTO accommodates over 1800 visiting researchers from other Australian research organisations and international research centres each year.

ANSTO's strategic international collaborations ensure Australian scientists are connected to a global network of experts and important global research projects. ANSTO's partnerships include agreements with the European Organization for Nuclear Research (CERN); the French Atomic Energy Agency (CEA); Shanghai Institute for Applied Physics (SINAP); Japanese SPring-8 Synchrotron Centre and the Asia Oceania Forum for Synchrotron Radiation Research (AOFSRR). These important partnerships give Australian scientists access to some of the world's most sophisticated research techniques, enabling discoveries that benefit Australia and the world.

As part of enabling a strong national collaborative network, ANSTO is connected with all Australian and New Zealand universities through the Australian Institute of Nuclear Science and Engineering (AINSE), providing researchers access to Australia's nuclear science, technology and engineering expertise and landmark infrastructure which, in turn, facilitates greater national science collaboration.

ANSTO operates research facilities across three locations - Lucas Heights and Camperdown in Sydney and Clayton in Melbourne. At the heart of ANSTO's research capabilities is the OPAL nuclear research reactor which is one of the world's most effective multi-purpose research reactors. OPAL is used for scientific research, the production of medical radioisotopes, and the irradiation of silicon used in microelectronics and other specialised irradiations for research and industry.

OPAL facilitates specialised research using a suite of 13 neutron beam instruments where scientists apply neutron scattering techniques to solve complex research and industrial problems. Neutron scattering enables scientists to see what X-rays cannot. Neutrons are used to see the internal structure of materials, helping researchers understand why materials have the properties that they do, providing new insights that can be applied to problems such as the development of renewable, clean energy technologies or new battery materials, and studying the structural integrity of materials such as railway tracks.

ANSTO's neutron beam instruments are used to solve complex problems for thousands of local and international industry and researcher partners

ANSTO's CAS offers a suite of four accelerators - the 2MV Small Tandem for Applied Research (Star), the 10MV Australian National Tandem Research Accelerator (Antares), a 1MV low energy multi-isotope accelerator (Vega) and a 6MV tandem accelerator (Sirius) – that provide cutting-edge research techniques for fields as diverse as archaeology to zoology.

ANSTO researcher Quan Hua with the new Vega 1MV low energy multi-isotope accelerator

ANSTO's broad capabilities affords researchers access to a suite of tools in one location that can be used across isotopic dating, air pollution, climate science, modification of materials for future nuclear reactors, radiation damage studies, forensic science, nuclear detector characterisation, and microbiological studies.

The ANSTO-run Australian Synchrotron is a world-class research facility that uses accelerator technology to produce a powerful source of light (X-rays and infrared radiation) many times brighter than the sun. It has approximately 3000 registered users each year from Australian and international universities and research institutes.

The facility has nine different experimental stations, or beamlines, which harness light to see the invisible structure and composition of materials from the macroscopic to the atomic - with a level of detail, speed and accuracy not possible in conventional laboratories.

The Australian Synchrotron supports a broad range of high-quality research, with applications ranging from medicine and nanotechnology to manufacturing and mineral exploration.

ANSTO is central to Australia's nuclear medicine manufacturing capabilities. Each week ANSTO delivers over 10,000 patient doses of potentially lifesaving nuclear medicines to over 250 partner hospitals and medical practices across Australia and the region. It is estimated one in two Australians will benefit from the nuclear medicines that originate from ANSTO.

Construction is well underway for the $168 million ANSTO Nuclear Medicine (ANM) Project which will position Australia as a global leader in the high-end manufacturing of nuclear medicine used in over 45 million medical procedures globally each year to diagnose cancers, heart disease and skeletal conditions. ANM will secure Australia's supply of nuclear medicines for the domestic market, and deliver the ability to contribute significantly to meeting international demand. Subject to required approvals the plant will be operational in late 2016.

The minerals industry relies on ANSTO to provide advice and technology to handle naturally occurring radioactive materials in minerals processing. ANSTO also provides expert advice to the minerals sector on the safe treatment and disposal of nuclear waste and specialised irradiation services.

ANSTO uses its specialised expertise to provide quality advice to the Australian Government on all matters relating to nuclear science, technology and engineering. This expertise is recognised internationally and, on behalf of Australia, ANSTO holds a seat on the prestigious Board of Governors at the International Atomic Energy Agency (IAEA) headquarters in Vienna.

ANSTO is leading the way in nuclear security in the areas of nuclear forensics, border protection detector technology and nuclear non-proliferation to ensure the peaceful uses of nuclear science and technology.

ABOUT ANSTO

Low-enriched uranium, used to power Australia's OPAL research reactor is the safest available nuclear fuel because of its proliferation resistance. The mass production of molybdenum-99 (Mo-99), used in 80 per cent of nuclear medicine procedures, using a low enriched uranium reactor and low enriched uranium target, has positioned Australia at the forefront of a global movement to reduce the use of highly-enriched uranium.

More than 500 scientists, engineers and technicians work at ANSTO to answer the significant environmental, medical and industrial questions using nuclear techniques

Strategic priorities

ANSTO's strategic priorities for 2010-15 are to:

- Deliver world-class research and innovation in nuclear science and technology
- Expand ANSTO's reach and contribution, exploiting landmark technologies
- Serve the nuclear needs of government, industry, community and the people of Australia
- Drive organisational renewal.

Our vision

To deliver excellence in innovation, insight and discovery through our people, partnerships, nuclear expertise and landmark infrastructure.

Our Corporate Plan 2010-15

ANSTO Corporate Plan 2010-15 is the enabling document for the organisation to implement strategic priorities and vision. Approved by the ANSTO Board and accepted by the responsible Minister, the plan is a public document, available via the ANSTO website.

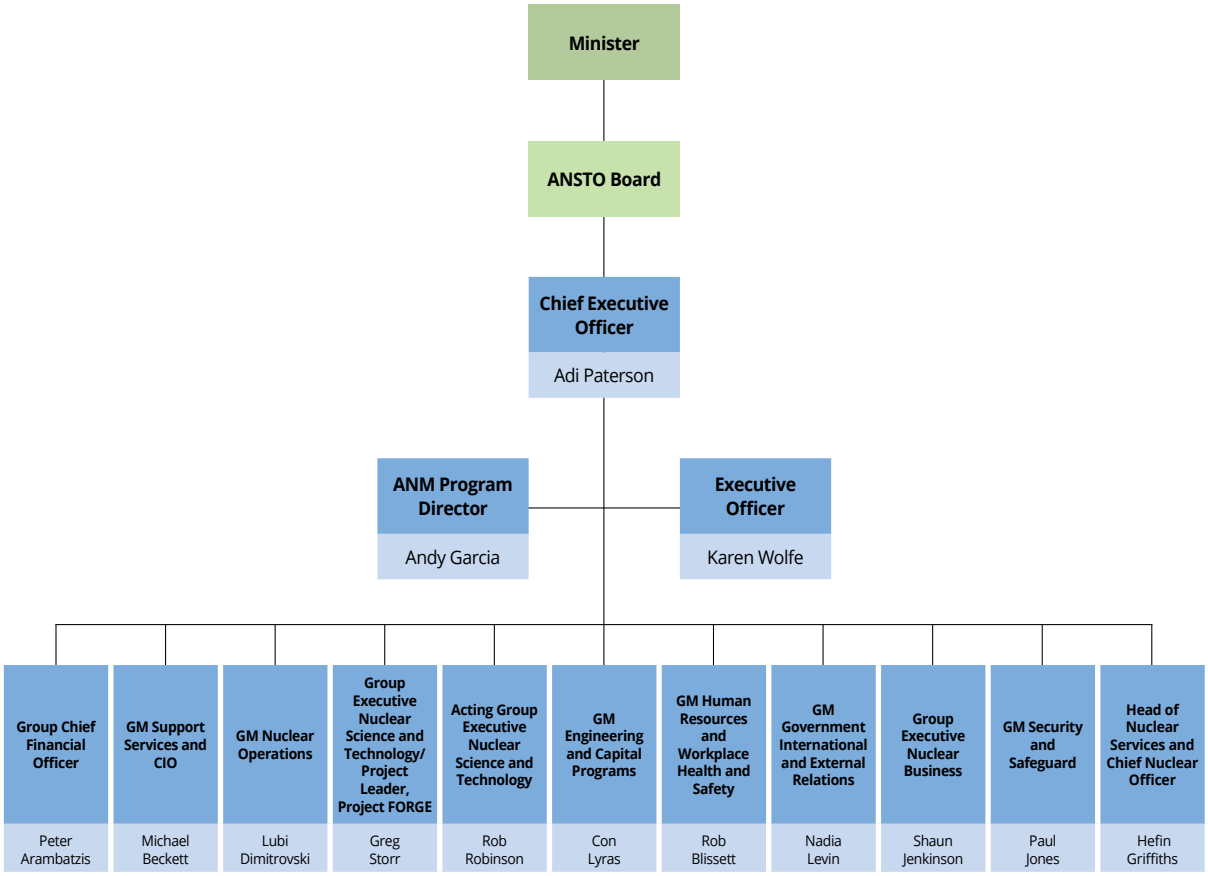
Statement of Compliance

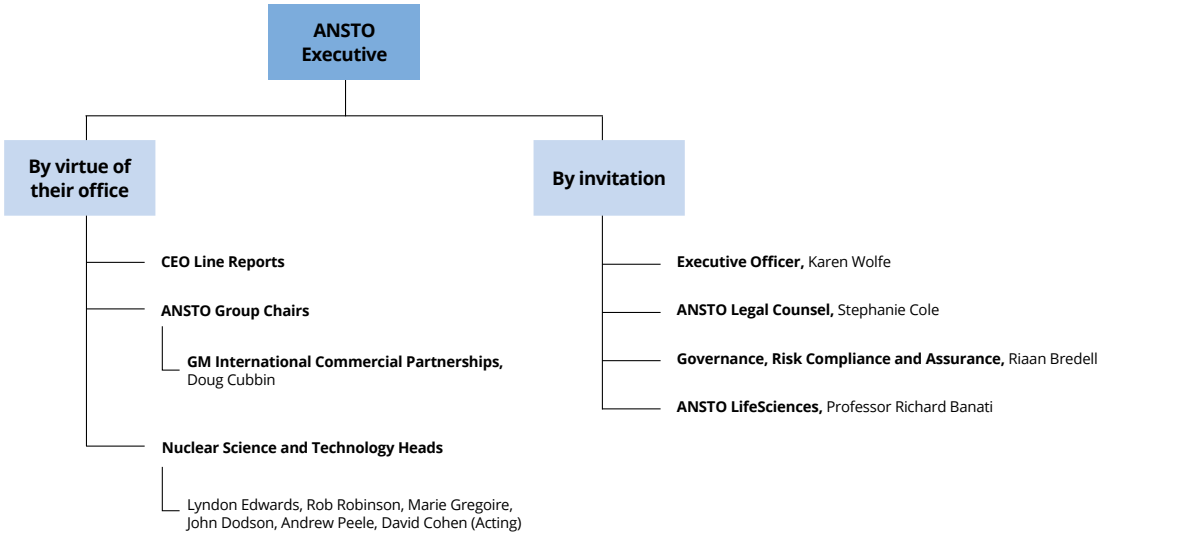
This report is written with reference to the *Public Governance, Performance and Accountability Act 2013 (PGPA Act)*.

Responsible Minister

The Hon Ian Macfarlane MP, Minister for Industry and Science

ORGANISATIONAL CHART





MEMBERS OF THE BOARD

Dr Paul Greenfield AO (Chairman)

BE (Hons), B.Econ, PhD, FTSE, FIEAust, FIChE, FAICD, CPEng, CEng, CSci Engineer.

Chairman
24 February 2011 – 24 July 2014

Appointed
25 July 2007

Term concluded
24 July 2014

Mr Jim McDowell (Chairman)

LL.B (Hons)

Independent business person with 35 years' experience in aerospace and defence, CEO BAE Systems Saudi Arabia.

Appointed
12 December 2013

Appointed Chairman
21 August 2014

Deputy Chairman
Until 20 August 2014

Term concludes
11 December 2018

Ms Erica Smyth (Deputy Chair)

MSc, FAICD, FTSE

Scientist and business person.
Chair of ANSTO's Risk and Audit Committee

Appointed
12 December 2008

Reappointed
14 March 2013

Appointed Deputy Chair
21 August 2014

Term concludes
13 March 2018

Professor David Copolov OAM

MBBS, PhD, FRACP, FRANZCP, MPM, DPM

Pro Vice-Chancellor, Office of the Vice-Chancellor and Professor of Psychiatry, Monash University; Academic and psychiatrist.

Appointed
1 May 2008

Reappointed
28 June 2012

Term concludes
27 June 2016

Professor Judy A Raper

PhD, BE (Hons)

Deputy Vice-Chancellor (Research) University of Wollongong; Academic and engineer.

Appointed
28 June 2012

Term concludes
27 June 2016

Ms Penelope J Dobson

Dip Pharm, MPS, MBA, GAICD

Global pharmaceutical executive and business person.

Appointed
24 April 2014

Term concludes
23 April 2019

Professor Andrew Scott

MBBS (Hons), MD, FRACP, DDU, FAICD, FAANMS

Nuclear Medicine Physician, Scientist, and Academic.

Appointed
26 September 2007

Reappointed
29 September 2011

Term concludes
28 September 2016

Dr Adrian (Adi) Paterson

BSc, PhD

Chief Executive Officer; Chemical engineer.

Appointed
1 March 2009

Reappointed
1 March 2014

Term concludes
28 February 2017

ANSTO EXECUTIVE LEADERSHIP TEAM

Dr Adrian (Adi) Paterson
Chief Executive Officer

Mr Peter Arambatzis
Group Chief Financial Officer

Mr Michael Beckett
General Manager, Support Services and Chief Information Officer

Mr Robert (Rob) Blissett
General Manager, Human Resources and Workplace Health and Safety

Mr Douglas (Doug) Cubbin
General Manager, International Commercial Partnerships

Mr Lubi Dimitrovski
General Manager, Nuclear Operations

Professor John Dodson
Head, Institute for Environmental Research (until May 2015)

Dr David Cohen
Acting Head, Institute for Environmental Research (from May 2015)

Professor Lyndon Edwards
Head, Institute of Materials Engineering

Dr Marie-Claude Gregoire
Head, ANSTO LifeSciences

Mr Shaun Jenkinson
Group Executive, Nuclear Business

Mr Paul Jones
General Manager, Security and Safeguards

Mr Hefin Griffiths
Head of Nuclear Services and Chief Nuclear Officer, Nuclear Operations

Ms Nadia Levin
General Manager, Government, International and External Relations

Mr Con Lyras
General Manager, Engineering and Capital Programs

Professor Andrew Peele
Director Australian Synchrotron

Dr Robert (Rob) Robinson
Head, Bragg Institute/Acting Group Executive NST

Dr Greg Storr
Group Executive, Nuclear Science and Technology/ Project Leader, Project FORGE

By invitation:

Professor Richard Banati
Distinguished Research Fellow and ANSTO LifeSciences

Dr Riaan Bredell
Senior Manager Governance, Risk, Compliance and Assurance

Ms Stephanie Cole
Legal Counsel

Ms Karen Wolfe
Executive Officer to CEO

CHAIRMAN'S REPORT

It has been a year of notable achievements for ANSTO. The organisation has continued to translate the outcomes of its research into benefits for industry, and to establish the national research infrastructure needed to deliver competitive advantages for Australia.

ANSTO completed the Centre for Accelerator Science (CAS) and the commissioning of three neutron beam instruments at the Bragg Institute. These world-class facilities are now enabling ANSTO and other Australian researchers to address national research priorities.

The Australian Government committed funding of $20.5 million for the ANSTO-operated Australian Synchrotron to continue operations from June 2016. This funding supports the operation of this important landmark facility over the 2017 reporting period whilst the long term ownership and operations are finalised with all stakeholders. The Australian Synchrotron remains one of the most important research infrastructure elements to be resolved in the current deliberations initiated in the Research Infrastructure Review.

The OPAL multi-purpose reactor set a new performance benchmark this year in both reliability and operating days. Through OPAL, ANSTO continues to maintain and gradually expand effective supply of critical lifesaving radioisotopes and nuclear medicines. Similarly, OPAL ensures the neutron scattering community benefits from ANSTO's neutron beam instruments and the diversity of experimental

conditions under which research can be conducted using interchangeable sample environments. Research productivity measurements and industrial linkages are important benchmarks. This year improvements have been achieved in this area and, in a number of cases, ANSTO is now seen by its peers as the benchmark for research output by users.

During the year the South Australian Royal Commission into the Nuclear Fuel Cycle was established. As the centre of Australia's nuclear expertise, ANSTO is working closely with the Commission to provide fact-based information and analysis and ANSTO made a submission to the Commission.

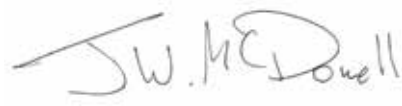
A new policy proposal announced during the year will extend and refit two waste storage facilities. With the construction of ANSTO's Interim Waste Facility completed this year, ANSTO will continue to have a role in safely managing the returning waste while the Government is establishing a National Radioactive Waste Management Facility.

Internationally, ANSTO continues to have an active role within the International Atomic Energy Agency (IAEA) promoting the peaceful use of nuclear and sharing our expertise in the Asia Pacific region. As the custodian of the Becquerel, the scientific standard measure of radioactivity, ANSTO benchmarked the accuracy of measurements by a group of nuclear medicine facilities to assist in underpinning safe and accurate diagnosis and treatment.

In closing, I wish to thank Erica Smyth who is Deputy Chair and Chair of the ANSTO Risk and Audit Committee for her substantial contribution.

The Board also wishes to commend CEO Adi Paterson for his exceptional leadership of a complex organisation and thank the Executive Leadership Team for their competency and accomplishments.

We look to the future with confidence, optimism and readiness.



Jim McDowell
Chairman

Engineers inspect the complex technology of an ANSTO accelerator

CHIEF EXECUTIVE OFFICER'S REPORT

Through its landmark infrastructure and leveraging national and international collaborations and partnerships, ANSTO has delivered a strong performance this year. The organisation's work is continuing to support Australian industry and improve the lives of Australians through the application of nuclear science and technology.

Throughout the year ANSTO successfully commissioned two new accelerators as part of Australia's Centre for Accelerator Science (CAS) and three neutron scattering instruments within the Bragg Institute. This expansion of landmark and national research infrastructure will ensure Australia can benefit from developments in nuclear science and technology for generations to come.

The OPAL multipurpose research reactor set a new performance benchmark operating continuously for 307 days— an achievement which establishes it as one of the world's highest performing research reactors. This exceptional level of reliability ensures ANSTO maintains a competitive edge in the supply of critical lifesaving radiopharmaceuticals and the availability of beam lines for research and collaboration

During the reporting period, ANSTO Health produced its four millionth dose of lifesaving nuclear medicine used in diagnostics and treatment, and increased revenue by 15 per cent. ANSTO Health will continue to produce and supply Molybdenum-99 (Mo-99) until the new ANSTO Nuclear Medicine (ANM) facility is completed in 2016. The Mo-99 production facility will assure the supply for diagnostic and case management services that depend on Mo-99 for domestic use, and create a new supply source to address the closure of aging reactors around the world.

ANSTO's business operations are an important component of our organisation. The evolution of ANSTO's Silicon Neutron Transmutation Doping (NTD) capability makes ANSTO one of the world's most competitive, profitable and reliable providers of this service. A great example of a clear strategy implemented well, converting Nuclear Science and Technology into products that are used around the world.

ANSTO provides policy advice to the Australian Government on developments in the global nuclear industry, ensuring Australia is abreast of any new developments in key areas including nuclear power solutions.

ANSTO is clearly focused on Australia's national research priorities and, importantly, therefore responds to the needs of a wide range of Australian industries.

ANSTO's nuclear science and technology research efforts this year included the development of a new chemical production process set to benefit chemical

companies; a study to understand the complex behaviour of granular materials such as grain and coal that could assist the agricultural and transport industries; work on structural components to improve the safety and airworthiness of civil and military aircraft; and a study that provides a better understanding of the chemistry of hydrogen, considered essential for technology powered by hydrogen fuel.

ANSTO partners with a wide range of research organisations around the world and this year formalised a number of relationships with our Japanese counterparts. The signing of memoranda of understandings (MOU) with the Japan Atomic Energy Agency (JAEA), the Institute of Solid State Physics (ISSP) at the University of Tokyo, the National Institute of Materials Science (NIMS) and Tsukuba University, will strengthen and promote research collaborations through institutional exchange of personnel, exchange of scientific and technical information, and joint conferences and workshops.

Our people are central to all of ANSTO's achievements and a number of ANSTO researchers received awards throughout the year including Rob Robinson, who was selected for the Australian Nuclear Association 2014 Award; Margaret Elcombe who earned a prestigious international 'Women in Nuclear' award; Helen Maynard-Casely who was awarded the Japan Society for the Promotion of Science Fellowship; and the Kowari Strain Scanner neutron beam instrument team who took home a highly commended distinction at the Sydney Engineering Excellence Awards.

The growing expertise of our researchers is supported by an ever expanding user community. These talented scientists are connecting with ANSTO via the Australian Institute of Nuclear Science and Engineering (AINSE). This new generation of users are fostering fresh thinking and dynamic partnerships that will deliver exciting scientific achievements for Australia into the future.

ANSTO has continued to make important progress in providing a workplace which offers equal employment opportunities regardless of gender. Over 50 ANSTO employees from across the organisation are advancing ANSTO's Gender Equity Program to ensure ANSTO is an equitable employer.

I would like to thank ANSTO's Executive Leadership Team and staff whose contribution and vision is powering the progress we have made.

The expertise and capacity of the ANSTO Board has kept our strategic direction well-focused, performance fine-tuned and governance sound.

We are well positioned to continue to deliver excellence in innovation, insight and discovery.

Dr Adrian (Adi) Paterson
Chief Executive Officer

2014-15 HIGHLIGHTS

ANSTO researcher Zeljko Pastuovic with the new Sirius 6MV tandem accelerator

Australia's new Centre for Accelerator Science

Centre for Accelerator Science (CAS) has been established with a $25 million grant funded by the Australian Government through the national Education Investment Fund (EIF), and a further $13 million contribution by ANSTO.

CAS provides research techniques to support a wide range of fields with its four accelerators - the 2MV Small Tandem for Applied Research (Star), the 10MV Australian National Tandem Research Accelerator (Antares), a new 1MV low energy multi-isotope accelerator (Vega) and the new 6MV tandem accelerator (Sirius). During the reporting period all four accelerators became operational.

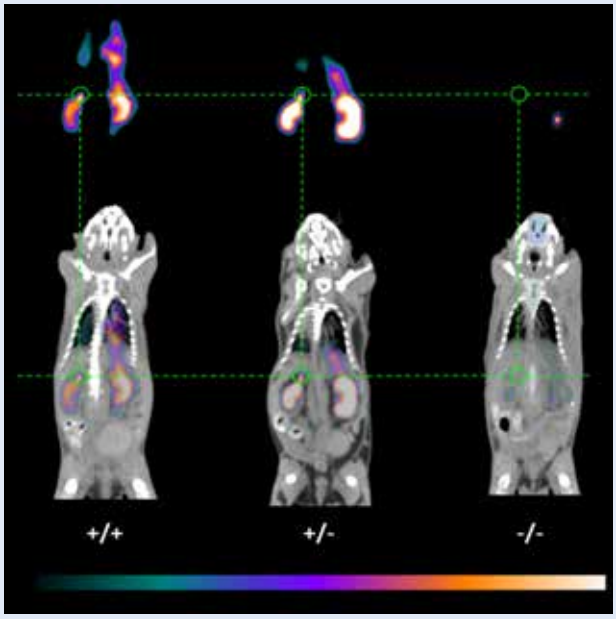
The unique combination of capabilities affords national and international users access to a suite of tools in one location that can be used across isotopic dating, air pollution, climate science, modification of materials for future nuclear reactors, radiation damage studies, forensic science, nuclear detector characterisation, and microbiological studies.

The new Vega accelerator has already been used by Australian university researchers to date sediments in mangrove swamps to evaluate the impact of changing sea levels; and analyses of environmental samples for the International Atomic Energy Agency (IAEA) in its role in monitoring the Non-proliferation Treaty.

New TSPO-free model discovery will assist drug development for diseases including dementia, cancer and obesity

In November, researchers from ANSTO, the University of Sydney and the University of Wollongong confirmed the existence of generations of mice living without the mitochondrial translocator protein (TSPO).

The TSPO is a protein that has great clinical relevance. The TSPO appears to regulate vital inflammatory and immune processes and is found to be involved in a wide range of diseases. Already established as a diagnostic indicator in the living human brain by positron emission tomography (PET) and single-photon computer tomography (SPECT), the TSPO is now also under investigation as a therapeutic target. This is a good example of a measurement target that has both diagnostic and therapeutic use, known as theranostics.



MicroPET image comparing wild type (left), heterozygous (middle) and full TSPO knock-out animals. While wild type, heterozygous animals show the expected distributions of the TSPO, the TSPO knock-out animals are devoid of any signal

In plants, proteins of the TSPO family play a role in photosynthesis, while in humans they regulate the production of sex and stress hormones. It has long been thought that a protein that has changed little for billions of years must be essential for life. Researchers at ANSTO disproved this long-held view about the TSPO and are re-writing our understanding on how hormones are produced and regulated.

The research, published in *Nature Communications*, is a scientific breakthrough that could be key to developing better diagnostics and new treatments for conditions as diverse as multiple sclerosis, dementia, cancer and obesity.

The new TSPO knockout model enables researchers to determine how existing drugs work and develop new, more selectively targeted drugs which reduce the risk of unwanted side-effects.

2014-15 HIGHLIGHTS

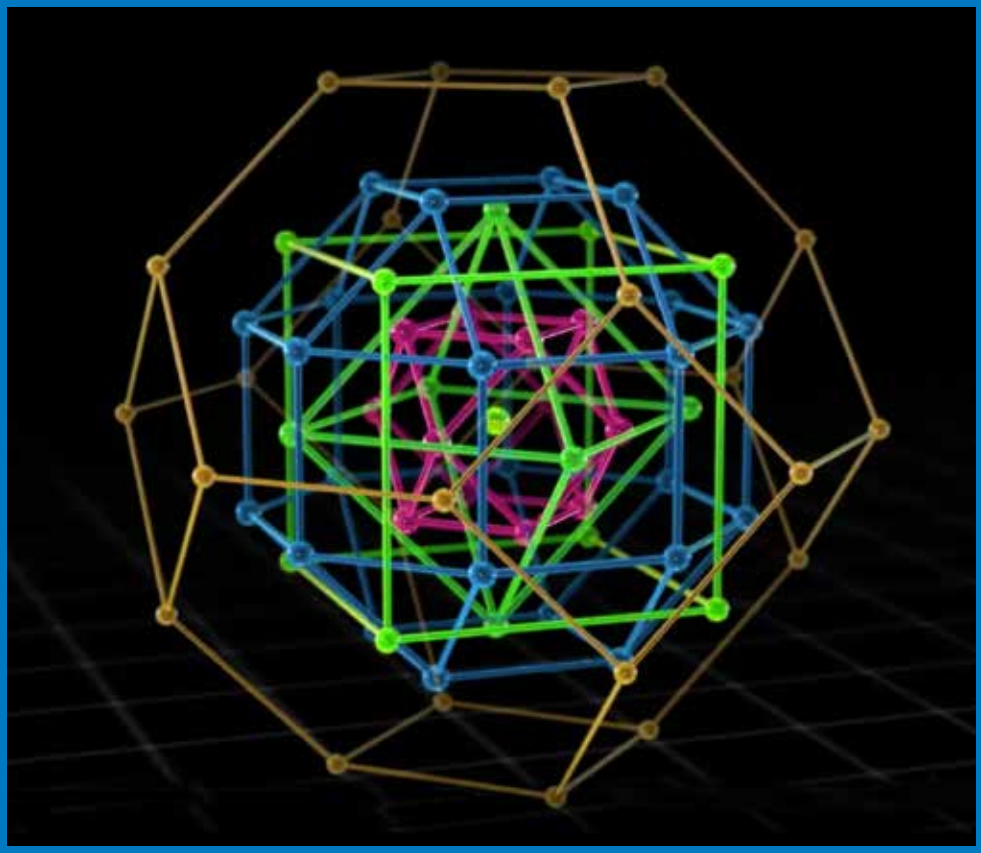
One step closer in the pursuit of hydrogen fuel - new molecule provides insights into hydride chemistry and binding

Crystallography was the tool used to decipher the remarkable secrets of the 'Chinese Puzzle Molecule'. The molecule was made at National Dong-Hwa University in Taiwan in 2011 and initial X-ray crystallographic studies provided a partial model. Significant questions remained unanswered regarding the molecular formula until single-crystal neutron diffraction studies were undertaken at ANSTO.

The study revealed the intriguing inner four copper atom shell , a total of 15 hydrides double the anticipated number and a new binding mode of hydride which added to the growing body of knowledge about hydride – the smallest anion and a key species in progress towards viable hydrogen storage systems. The knowledge revealed by this research strengthens our understanding of the chemistry of hydrogen which is essential if transport applications such as hydrogen cars are to become a reality.

The discovery was featured on the cover of the prestigious chemistry journal *Angewandte Chemie*.

The Chinese Puzzle Molecule - a twenty eight copper fifteen hydride core wrapped in dithiocarbamate



It is estimated one in two Australians will benefit from the nuclear medicines that originate from ANSTO

New tools to improve patient dose accuracy

ANSTO's Activity Standards Laboratory is equipped with specialised tools that enable accurate measurements of radioactivity in equipment used by the mining industry, environmental scientists and, importantly, in around 250 nuclear medicine centres located around Australia.

As the home of Australia's nuclear expertise and under the *National Measurement Act 1960*, ANSTO is authorised to maintain primary and secondary standards for the radioactivity of radionuclides.

ANSTO's Australian Nuclear Medicine Traceability Program has provided hospitals and medical centres with new ways to ensure closer correlation between intended and actual doses of radiopharmaceuticals commonly given to patients in order to diagnose cancer and heart disease.

During the year, ANSTO completed the first 12-month phase of a $400,000 upgrade of radioactivity measurement equipment at its Lucas Heights campus, which provides internationally-recognised radioactivity measurement services to Australian organisations.

92 per cent of ANSTO's waste is low level

Safely managing Australia's radioactive waste

ANSTO continued to plan for the return of reprocessed waste from France which, under an international agreement established in the 1990s, must be returned to Australia by the end of 2015.

The reprocessed waste is made up of spent fuel rods from the now decommissioned HIFAR research reactor, which from 1958 until 2007 produced millions of doses of nuclear medicine. The reprocessing operation has made the returning waste suitable for storage in a national radioactive waste management facility.

In 2012, the *National Radioactive Waste Management Act 2012* came into effect. The Act is paving the way for Australia to have a purpose built, National Radioactive Waste Facility. Until the national facility is completed, the Australian Government has asked ANSTO to temporarily store the returned waste. ANSTO has the expertise to safely manage the returning waste from France on an interim basis until the National Radioactive Waste Management Facility is built.

An interim waste store has been constructed (see more details on page 47) at Lucas Heights and will be ready to receive the returned waste from France.

The waste that is returning is approximately one third the size of a regular shipping container. It will be immobilised in glass, shielded in lead and placed into a custom designed container with walls more than 20cm thick. People can safely stand next to the container without the need for any protective clothing or equipment.

International year sheds light on the Australian Synchrotron and diabetes research

Diabetes costs Australia around $10 billion annually, and while as yet there is no cure, some discoveries made at the Australian Synchrotron are expected to contribute towards improved treatments or even potential vaccinations.

ANSTO hosted an event at Parliament House on 5 March to discuss the groundbreaking research into diabetes, causes, cures and treatments made possible through the Australian Synchrotron.

One of Australia's leading scientific minds, Nobel Prize winner Professor Brian Schmidt, joined with Diabetes Australia CEO Professor Greg Johnson to explain how the Australian Synchrotron is helping to shine a light on important discoveries about diabetes.

Collaborative research teams have used the technique to produce the first 3D images of insulin 'docking' within an insulin receptor on the cell surface; a blood protein that dissolves blood clots and cleans up damaged tissues; and an assassin protein that is key to the body's defence mechanisms.

The insulin research was led by an Australian team. The result clarified the insulin binding process, which had been under investigation for more than 20 years. The finding, published in pre-eminent scientific journal *Nature* in January 2013, is expected to lead to the development of improved forms of insulin for Type 1 and Type 2 diabetes.

The Minister for Industry and Science The Hon Ian Macfarlane represented the Prime Minister of Australia at the breakfast and provided the event's closing remarks.

As part of the 2015 United Nations International Year of Light and Light-based Technologies, Synchrotron facilities around the globe are engaging in discussions like those at this event which highlight the importance of light and optical technologies.

The Year of Light represents a unique opportunity for scientists to engage, inspire, and educate on a global scale.

(L-R) Australian Synchrotron Director, Professor Andrew Peele; Diabetes Australia CEO, Professor Greg Johnson; ANSTO Chairman, Jim McDowell; Minister for Industry and Science, The Hon Ian Macfarlane; ANSTO CEO, Dr Adi Paterson; and Nobel Prize winner, Professor Brian Schmidt

2014-15 HIGHLIGHTS

OPAL achieves new performance benchmark

ANSTO's OPAL research reactor is one of the world's most reliable research reactors and during the reporting period delivered a new performance benchmark, achieving 307 days of consistent power since going critical in 2006.

This high level of reliability ensures ANSTO maintains a competitive advantage in the supply of potentially life-saving nuclear medicines to the Australian public and to the world. It also ensures a reliable supply of neutrons to ANSTO's neutron beam instruments for specialised studies to solve complex research and industrial problems.

OPAL is one of the world's most effective multi-purpose research reactors

ANSTO's nuclear medicines are used to diagnose a wide range of illnesses including cardiac conditions, cancers and skeletal injuries

Nuclear medicine production milestone

In June, ANSTO delivered its four millionth dose of nuclear medicine produced from the OPAL research reactor.

Business improvements following the adoption of Oliver Wight's integrated business planning and supply chain program, resulted in ANSTO Health achieving an Oliver Wight Class A Accreditation for Planning and Control as of December 2014.

The milestone is thanks to the coordinated effort of ANSTO's Reactor Operations team; and the ANSTO Health processing, production operators, customer service, and quality and dispatch teams who work around the clock to ensure this vital medicine arrives at hospitals and nuclear medical centres around Australia and the region each week.

Solutions for Australian industry

Optoelectronics industry set to benefit from new chemical production process

Researchers at ANSTO's National Deuteration Facility have developed an inexpensive method of producing bulk quantities of modified molecules for optoelectronic technologies (electronic devices that source, detect and control light) including organic light emitting diodes (OLEDs) used in telecommunications, medical devices and automatic control systems.

Thin film OLEDs have opened a whole new dimension in display technologies because they produce brilliant colour and sharp picture quality, allow screens to be curved, as well as being energy-efficient and long-lasting. However their use has been limited due, in part, to the cost of producing large quantities of organic molecules used in the synthesis of compounds and polymers for the multiple layer structure of the OLED.

ANSTO researchers discovered a new method to simply and cheaply produce bulk quantities of deuterated organic molecules (in which hydrogen atoms have been replaced with deuterium) using standard, inexpensive laboratory equipment instead of a highly specialised vessel capable of high temperatures and pressures.

This finding is of great benefit to chemical companies producing organic compounds for the optoelectronics industry.

Improving aircraft safety

Fatigue and corrosion damage to structural components can be a major threat to the safety and airworthiness of civil and military aircraft.

ANSTO researchers have used nuclear techniques to evaluate the integrity of structural components of aircraft in collaboration with aeronautical engineers from Defence Science Technology Organisation's (DSTO) Aeronautical Research Laboratory.

Dr Anwen Krause-Heuer, part of the ANSTO team who developed a new, inexpensive chemical production process for optoelectronic technologies including OLEDs

An ANSTO and DSTO research team evaluated structural novel repair technologies used to extend the fatigue life of an aircraft. Non destructive neutron diffraction measurements on the Kowari Strain Scanner allowed the investigation of residual stress through various stages of the technological process, to pinpoint the most effective enhancement procedure. The team also tested fatigue performance and examined samples for fatigue cracks using scanning electron microscopy.

The research, which was published in *Applied Surface Science* in September 2014, confirmed the technology improved fatigue performance.

ANSTO research has confirmed the effectiveness of a new repair technology for aircraft

Improving transport and storage of granular materials

Unravelling the complex behaviour of granular matter is of significant importance to the pharmaceutical sector, agriculture, and energy production as the flow, transport and storage of granular products such as medicine capsules, grain and coal is crucial for these industries.

Using the residual-stress diffractometer Kowari and the neutron imaging instrument Dingo, researchers from ANSTO, the University of Newcastle, and the European Spallation Source have provided a window into how these unique forms of matter behave under stress.

Measurements from the nuclear instruments provided the first direct three-dimensional observations of force chains in granular systems. Force chains typically form a network that extends throughout an entire assembly, rapidly adapting and changing in response to deformation and are considered an inherent feature of granular matter.

The research made it possible to characterise the full discrete triaxial stress state of the entire assembly. The resulting information has provided one of the most detailed views of the inner workings of a granular material.

Crafting new drug delivery systems

Developing highly versatile and efficient methods of drug delivery is of critical importance to the future of cancer therapy in order to develop more effective treatments.

The new vehicles are designed to deliver a drug directly to the inside of a cancer cell while significantly reducing toxicity and risks associated with taking the drug.

Because of recent advancements in radiolabeling techniques ANSTO produced enough Iodine-124 (I-124) to be incorporated into the drug delivery system for in vivo imaging by PET.

ANSTO's expertise in PET imaging techniques has provided industry partners with the ability to assess the behaviour of new therapeutics in animal models of cancer.

An improved understanding of the pharmacological properties has provided important information for improving the safety and effectiveness of this drug delivery technology in cancer patients and contributed to its progression through to the first phase of clinical trials.

This ongoing work has already helped the company to improve its product design to ultimately improve the success of cancer therapies.

Improving the health of Australia

Nuclear techniques confirm unique biology of human eye lens

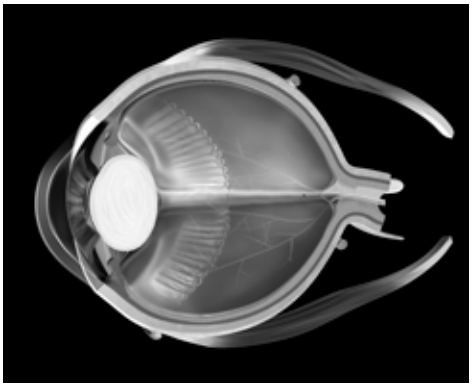
Age-related cataract and a reduction in the ability to focus are very common vision problems in older Australians. New research has provided evidence to confirm the long life of an important biomolecule in the human eye lens which may be relevant for the study of age-related diseases.

A group of researchers from the University of Wollongong, the Illawarra Health and Medical Research Institute, Queensland University of Technology and ANSTO found that, the human eye lens, whose function is to focus light onto the retina, does not lose and replace cells during an entire lifespan.

It is the first time that it has been shown that the molecule, a lipid, without access to metabolic machinery, lives longer than other lipids in the body.

The team conducted accelerator mass spectroscopy (AMS) using the Antares and Star accelerators at ANSTO's Centre for Accelerator Science to measure the amount of a specific isotope, carbon-14, in a process more commonly known as radiocarbon dating, present in the lenses of fourteen donors.

The investigators found that the level of carbon-14 in the nucleus of the lenses reflected the amount of carbon-14 in the atmosphere of the year of birth. Because the level of carbon-14 was found to be an accurate predictor of birth, it indicated the absence of lipid turnover during the human lifespan.



ANSTO research on an important human eye lens biomolecule is set to assist studies into age-related diseases

These results represented the first evidence that some lipids are long lived and may support other research in life science studies.

Understanding the role of chronic stress in adolescents with schizophrenia

Schizophrenia arises due to an interaction between genetic and environmental factors during the growth of the brain from birth through childhood, culminating with disease onset in late adolescence. Current antipsychotic drugs fail to treat all schizophrenia symptoms, particularly cognitive dysfunction which is an important predictor of permanent disability.

Characterising the neurochemical changes underlying these early, abnormal neurodevelopmental changes within key brain regions has the potential to improve drug therapy however developing good animal models of this complex psychiatric disorder is extremely difficult and hinders research opportunities.

ANSTO assisted collaborators in using in vitro imaging techniques on post mortem brain tissue to look for density changes in glutamate brain receptors within multiple brain regions. This work demonstrates that adolescent exposure to stress (environment) and a change linked to a gene associated with schizophrenia in the brain (genetic) did interact to reduce the binding of a receptor in the medial prefrontal cortex, a region strongly implicated in the neurobiology of schizophrenia and stress.

This work helped clarify how the dynamics of glutamate neurotransmission is altered within these unique animal models, and increases our understanding of how cannabis use and chronic stress in adolescence can predispose certain populations of people to developing schizophrenia.

New model to assist drug development for life-threatening diseases: TSPO

The creation of the first healthy mouse without the evolutionary conserved mitochondrial translocator protein (TSPO), long thought to be essential for life, was an important scientific breakthrough. Developed at ANSTO, it paved the way to new diagnostics and treatments for inflammation, dementia, obesity and cancer.

To aid the systematic study of the TSPO in membranes, scientists at ANSTO and colleagues at the Brain and Mind Centre within the University of Sydney used Australia's landmark and national nuclear science infrastructure to develop diagnostic tools, such as radioligands for positron emission tomography (PET) and single-photon emission computed tomography (SPECT) imaging and ANSTO's neutron reflectometer instrument (Platypus). This was part of a strategic interdisciplinary research project aimed at understanding the function of this abundant and highly regulated, ancient mitochondrial protein.

The broad diagnostic and therapeutic importance of the TSPO stems from the observation that its cellular expression increases dramatically during inflammation, dementia, obesity and cancer, and also appears to play a role in behavioural conditions, such as anxiety. The TSPO has thus become a diagnostic biomarker of disease progression, but it is also attracting attention as an important therapeutic target.

As of 2014, there have been well over 30 clinical trials involving diagnostic and therapeutic aspects of the TSPO in disease conditions ranging from inflammation to neurodegeneration and behavioural illnesses.

In their study which appeared in *Nature Communications*, the team, which was led by Richard Banati, reported the existence of healthy global TSPO gene knock-out mice. The team's findings came as a surprise since previous observations had suggested that the loss of the TSPO, in line with its pivotal role in steroid synthesis, was embryonal lethal. Consequently, the new findings have generated a lively debate about some of the most basic aspects of physiology, such as the synthesis pathways of steroids, for which the TSPO has long been thought to be one of the rate-limiting steps.

Understanding the true role of the TSPO is of fundamental scientific interest and a global gene knock-out model is important for systematic loss-of-function and mechanisms of compensation studies. ANSTO is trying to develop such a model, but has already demonstrated the immense practical utility of this animal model for TSPO drug development, particularly for assessing drug selectivity in life and off-target effects that may cause toxic or other effects.

The researchers were especially excited about the possibility of creating tailored cancer models. For example, the TSPO knock-outs could be used to study syngeneic brain tumours that have retained their wild-type TSPO, and observe the tumour response to treatment in virtual isolation from the surrounding tissue under realistic in vivo conditions.

Nuclear techniques to understand epilepsy

Temporal lobe epilepsy (TLE) is the most common form of partial epilepsy in adults, and is often resistant to pharmacological therapies. An imbalance of an inhibitory neurotransmission, GABAergic has been proposed to play a role in the development of temporal lobe epilepsy (TLE).

A group of researchers from the Royal Melbourne Hospital, the Peter MacCallum Cancer Centre and ANSTO have demonstrated that variations of the GABAergic system can be quantified with PET in an animal model mimicking the clinical situation.

The ANSTO team established the radio-labelling protocol of the PET compound with Fluorine-18 and PET, a powerful data processing method that allows for the accurate measurement of GABAergic receptors changes during the process in which epilepsy develops.

The investigators found that the changes are truly functional and independent of the structural changes in the same structures observed with MRI in the same animal. These results were fully consistent with the clinical situation.

This study brought the tools needed to provide new insights into the role of these changes in the pathophysiology of the disease, facilitating the translation to clinical application and the development of new therapies during the very early phase of the disease.

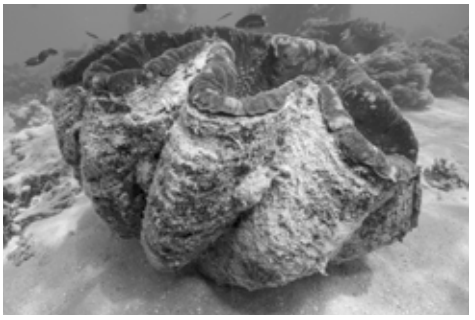
Understanding our environment

Giant clams open up climate secrets

Environmental scientists from ANSTO and the Chinese Academy of Sciences are collaborating to determine the temperature range in the Coral Sea over the past 150 years by analysing the shells of giant clams.

Learning more about our region's past climate can help scientists to make better predictions about future weather patterns. Researchers are particularly interested in understanding how sea surface temperatures vary in the Coral Sea, because these changes drive winds and currents that affect rainfall in the north and east of Australia.

The clams are found in the shallow waters of the Coral Sea, northeast of Australia, where they live for up to 150 years. Each year, they grow a new layer of shell, and measuring the ratio of the elements calcium and strontium in these layers enables ANSTO scientists to calculate the temperature of the sea in that year.



ANSTO and the Chinese Academy of Sciences researchers are uncovering centuries of climate history locked inside the shells of giant clams

Several of ANSTO's facilities play a vital part in this environmental research: a high-precision optical and X-ray scanner, X-ray fluorescence, and an imaging technology known as inductively coupled plasma – atomic emission spectroscopy and accelerator mass spectrometry.

Going underground to understand Australia's past rainfall variability

Given the importance of water in Australia, there is surprisingly little information about the past variability of rainfall on this continent. As past climate can help predict the availability of water resources in the future, this is an essential area of research.

Research by ANSTO, the University of New South Wales and the National Parks and Wildlife Service is contributing to improving the rainfall record in Australia.

The study is taking place in the Snowy Mountains, which provide a source of water for the Murrumbidgee and Murray River systems and two major waterways in southeast Australia.

Researchers have found new information that will help reconstruct past climates and groundwater recharge from cave deposits. Cave deposits, or speleothems, are mineral accumulations formed by calcium-rich water in underground caverns. They are important because they can be used to establish a record of past environmental changes, such as rainfall variability.

The researchers have been monitoring dripping water, which forms stalagmites, for fifteen months in the cave system, located in the Kosciuszko National Park. Monitoring the water movement from the surface to the cave is important because it carries the majority of the climate and environmental information from the surface, where the rain falls.

Stalagmites are important because they can be analysed using mass spectroscopy to determine records of past climate.

Understanding the feeding habits of Humpback Whales

Researchers from ANSTO and Griffith University are studying the feeding ecology and migratory behaviour of the Southern Hemisphere Humpback Whale due to reported changes to their physical condition and migratory feeding habits that are of concern.

Southern Hemisphere Humpback Whales are known to fast for up to seven months during their travel from Antarctic feeding grounds to equatorial regions where they feed on krill to replenish their blubber stores in Antarctic waters.

ANSTO researchers are collaborators in a study to determine the feeding ecology and migratory behaviour of Humpback Whales due to reported changes in their physical condition and migratory feeding habits

ANSTO is contributing to the study with radiocarbon analysis on the baleen plates that hang from the top jaw and act as filters for the krill. These keratin plates that grow throughout the whale's life reflect the nutrients absorbed through feeding and the water in which the whale is travelling.

Since the whales travel through two different bodies of water, the Southern Ocean and the Pacific Ocean, analysis using ANSTO's Star accelerator can show variations in the amount of carbon-14 in the baleen plates that can indicate feeding locations.

The research will provide a comparison between a whale feeding according to the traditional model and a whale showing signs of supplementary feeding.

Air pollution in Antarctica

While Antarctica remains one of the cleanest places in the world, increasingly large amounts of natural and man-made atmospheric pollutants are finding their way to the frozen continent.

Since 2013, researchers from ANSTO and the Korea Polar Research Institute have been collaborating to identify the source regions of pollution making its way to King George Island on the fringe of the Antarctic territory and determining the fate and impact of this pollution.

The main investigative tool to track the pollution to its source is the naturally-occurring radioactive gas radon which is emitted continuously from all soils and rock (i.e. land surfaces), with almost none coming out of the ocean.

Due to its short radioactive half-life of 3.8 days, radon levels decay away almost completely within 20 days after emission. By simply measuring the radon concentration of air arriving at Antarctica, researchers are able to deduce the degree of land contact it has had over the past 2-3 weeks, and therefore the source of the pollution.

In the summer of 2016, researchers from the Australia Korea Foundation, will install a second radon detector at the newly-established Korean Antarctic base at Jang Bogo Station.

Together with a comprehensive suite of aerosol and trace gas monitoring equipment already operating at Jang Bogo, these new radon measurements will be used to gain a better understanding of pollution pathways to the Antarctic heartland, more than 3000 km from the nearest continent.

Understanding our world

Neutron scattering helping conserve the world's great historic monuments

Physical weathering, deterioration and damage to marble and other architectural stones present a serious problem for the preservation of historic sculptures, monuments and buildings. A recent international study led by ANSTO is helping conservationists preserve significant marble architecture and artefacts.

Carrara marble, from the Carrara area of Italy and the stone used by Michelangelo in sculpting David, was one of the most popular types of marble in the world because of its beauty and high lustre.

Despite its beauty, the suitability of Carrara marble for buildings and artworks has been questioned because of 'spectacular bowing behaviour' of marble slabs on numerous modern buildings including the Amoco building in Chicago and the Grand Arche de la Defense in Paris.

A study of Carrara marble led by ANSTO in collaboration with the Joint Institute for Nuclear Research in Moscow and the University of Göttingen in Germany, has used non-destructive neutron diffraction techniques made possible through the Echidna and Kowari instruments to confirm that microstresses are caused by temperature variation. The physical properties of the marble itself help explain the deterioration.

A collaborative study on Carrara marble led by ANSTO is using the Echidna (pictured) and Kowari neutron beam instruments

Neutron scattering enabled the researchers to measure the stiffness of a material to accurately measure the accumulated damage after a thermal exposure that could be clearly attributed to tiny cracks.

Nuclear techniques produce first data on Greek coins

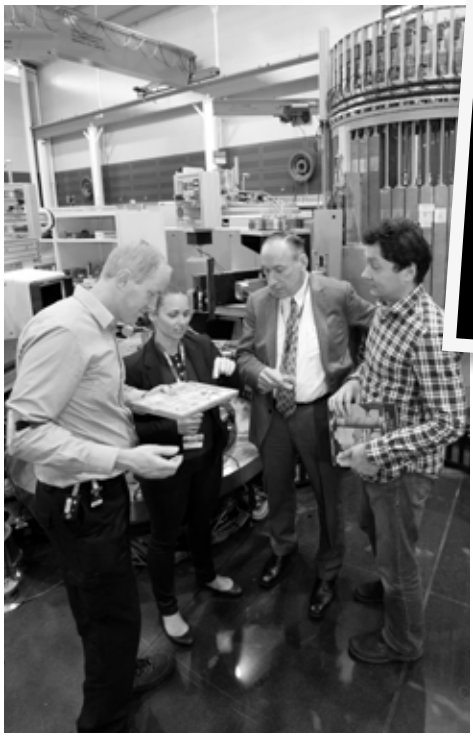
ANSTO researchers and currency experts from Macquarie University have used nuclear techniques to study one of the world's first coinages, incuse Greek coins from the 6th century BC. Neutron scattering doesn't damage materials when testing, making it ideal to help unlock the history trapped inside precious artefacts.

Using highly sensitive neutron diffraction and imaging techniques, the research is helping reveal how they were made, why they were made and why production stopped suddenly after only a century and a half.

As there are no surviving contemporary accounts of Ancient Greek coin manufacture, or other sources of information, the experts at Macquarie needed a way to acquire quantifiable data while keeping the highly valuable coins intact.

The results of ANSTO's work using the Kowari neutron beam instrument and Dingo imaging instrument provided Macquarie with information about the composition of the coins and the ancient technologies used to produce the coins.

Analytical techniques based on neutron beams that have been developed in the last decade have proved very useful in



Macquarie University currency experts and ANSTO researchers are undertaking research on one of the world's first coinages, incuse Greek coins (pictured above) from the 6th century BC

studies of ancient metal objects. They are often combined with other methods of analysis to provide information ranging from conservation status to the forensic reconstruction of smelting and metalworking processes.

These techniques are important in the study of cultural heritage objects because they are non-destructive, insensitive to surface conditions and extremely useful for bulk objects.

As the neutrons can penetrate deeply into matter, they can provide information about the interior of bulky and metallic objects.

This use of neutron diffraction to study ancient coin manufacturing was among the first in the world and attracted world-wide interest from archaeologists and nuclear physicists.

Ned Kelly mysteries finally unravelled

The legend of Ned Kelly and his gang, with its blending of facts and hearsay, has been put to the test and published in a book by the CSIRO called 'Ned Kelly: Under the microscope'. The book reveals how scientific techniques have answered questions that have remained unsolved for more than a century.

More than 30 experts contributed to the book including a team from ANSTO who set out to study one of the big questions: did the Kelly Gang have help making their armour?

The answer would finally reveal the truth about how they were perceived in society and whether they had the support of the community.

Over three days the armour was studied at ANSTO using neutron diffraction, parallel beam X-ray diffraction, optical metallography, and X-ray fluorescence.

Using these techniques, the team set out to determine the temperature that the material had been heated to at the time it was made. This would reveal whether the armour was created in a bush forge, or in a blacksmith forge, where temperatures would have been much higher.

The results showed that there is evidence the steel used in the armour would have been readily available during the time of the Kelly Gang. Although results suggest the armour was indeed made in a homemade bush forge.

Operation of key infrastructure

OPAL

OPAL continues to consolidate its reputation as one of the world's most reliable and available multipurpose research reactors. In the 2014-15 financial year, the OPAL research reactor achieved a new performance benchmark by achieving 307 days of high power operation. The reactor achieved planned availability of over 98 per cent.

A number of capacity and capability improvements to OPAL were completed throughout the year including the upgrade and commissioning of the Heavy Water Purification System. Approvals have been gained to undertake a major update to the hardware and software components of the Reactor's Control and Monitoring Systems. These improvements further enhance the ongoing safe and reliable operation of the OPAL reactor.

Optimised Cold Neutron Source operations throughout the year have continued to boost capabilities for Australian scientists and industry. The Cold Neutron Source has operated with over 99 per cent reliability, providing low-energy neutrons for research and facilitating the study of superconductivity, magnetic, and other quantum effects that occur in materials at very low temperatures.

Successful production of reactor based radiopharmaceuticals, neutron activation analysis for scientific research, and transmutation doping of silicon by irradiation was achieved during the year. The effective delivery of these products and services was progressed through embedding of the integrated planning framework as part of ANSTO's Organisational Excellence program.

OPAL continues to strive for world class, safe and reliable operations through the implementation of an Asset Management program supported by the Strategic Asset management plan which incorporates strategies to optimise facility maintenance and actively monitor plant conditions.

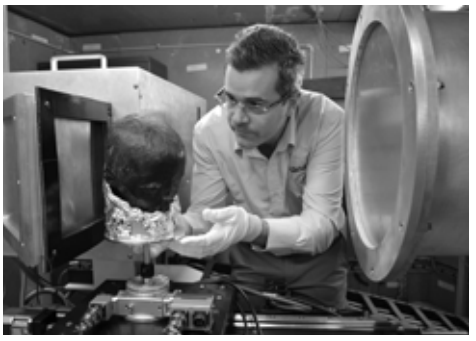
ANSTO has set a 295+ day target in 2015-16 for the safe operation of the OPAL research reactor to meet radioisotope supply requirements and sustain high availability for neutron based research. The Reactor Operations team will continue to implement essential projects including replacement of the Reactor Control and Monitoring System and increase the reactor's capacity in Mo-99 production in readiness for commissioning of the ANSTO Nuclear Medicine facility.

Neutron beam instruments

ANSTO is home to Australia's national neutron beam facility. The neutron beam instruments use the neutrons produced by the OPAL reactor to perform research into a wide variety of materials used in: computing, batteries, solar cells, plastics, food and medicine to name a few. Neutrons' unique properties enable researchers to investigate matter in a way that other techniques cannot, and help us to tailor new materials.

A major milestone of 500 research papers from the OPAL reactor was achieved last year, evidencing the success of the neutron beam user program. In addition, 623 research experiments were undertaken at the Bragg Institute in 2014-15.

Three neutron beam instruments (Pelican, Sika and Dingo) have been successfully



ANSTO's Dr Joseph Bevitt using the Dingo neutron imaging instrument to study preventative dental surgery in a 2000 year old mummified Egyptian child

transitioned to user operations, bringing the total number of instruments available to the community via the user program to eleven. The new additions to the instrument suite extend the capabilities in studying the dynamics of materials and neutron imaging. In addition, the two remaining instruments under commissioning which were funded under the Australian Government's National EIF collected their first neutron data.

The neutron beam instrument industry engagement program has continued to grow, with over ten commercial projects completed, generating revenue for ANSTO. The industrial engagement team has hosted over 200 industry participants at ANSTO through focus group meetings.

Australian Synchrotron

Over the 2014-15 financial year, the Australian Synchrotron continued to strengthen its connectivity with ANSTO.

The Federal Government's commitment to provide $20.5 million, as part of Budget 2015, to this landmark research facility for the 2016-17 financial year was received positively by the research community and signalled a clear commitment toward a permanent solution for this important national scientific infrastructure.

Use of the Australian Synchrotron to solve problems and to make important and innovative advances across industry and academic research continued to grow in 2014-15. In 12 months, the Australian Synchrotron supported more than 5,100 researcher visits and 888 experiments in areas as diverse as developing understanding of the structure of new drugs and drug targets to revealing the secrets of precious artworks, from the study of the molecular structure of carbon fibres to understanding how to maximise the processing of iron ore.

The work undertaken at the Australian Synchrotron underpins the positioning of Australia and New Zealand as innovation-rich economies; it directly increases the competitiveness of Australian and New Zealand industry and, importantly, helps to drive collaborations between research groups and between researchers and industry. Demonstrating the high-calibre of this research were the 568 papers featured in international peer-reviewed scientific journals, including in high-impact *Nature* publications, throughout the 2014-15 year.

The Australian Synchrotron continued its efforts to reach out and engage with its communities. The organisation contributed to the United Nations' 2015 International Year of Light celebrations with a public lecture series, which attracted audience members of all ages keen to learn more about synchrotron light and its applications, and a breakfast at Parliament House in Canberra attended by 20 members of parliament and senators, as well as a number of luminaries from the national science community. Celebrations relating to the International Year of Light will continue into the second half of the year.

The Australian Synchrotron in action

The Australian Synchrotron is now one of Australia's most important pieces of research infrastructure. Following are just two examples of the real impacts of the 888 research experiments undertaken at the Synchrotron in 2014-15:

X-rays reveal the key to the effectiveness of new Alzheimer's drugs

Researchers from St Vincent's Institute of Medical Research in Melbourne have used the Australian Synchrotron to reveal important new detail of the structure of a drug currently in advanced clinical trials to combat Alzheimer's disease.

The research team revealed how the drug, Solanezumab, interacts with brain proteins associated with the development of Alzheimer's; the findings highlight what makes current therapies for the disease effective, and show how these therapies can be improved.

The team used the high-intensity X-ray beams from the Macromolecular Crystallography (MX) beamlines at the Australian Synchrotron to visualise the structure at a resolution powerful enough to see how Solanezumab, an antibody, interacts with a toxic peptide thought by many to cause the disease.

The research showed the drug behaves in a fashion similar to a second Alzheimer's drug, Crenezumab, also in clinical trials, and lays the foundation for ways to improve these therapies.

Revealing the mysteries of a gem

Opals are an iconic Australian commodity and in 2003 accounted for more than $35 million in exports from NSW. The Australian Gemmological Association, in partnership with Sherman Opals and the University of Technology Sydney (UTS), have used the Small Angle X-ray Scattering (SAXS) beam line at the Australian Synchrotron to investigate the differences in the internal structure of grains of ordered arrays of silica spheres.

Using the SAXS derived information on nanostructure combined with previous work carried out at UTS, this study focused on precious opal from the Tintenbar NSW volcanic opal deposit, which shows a range of brightness and vibrant play-of-colour but is more susceptible to crazing than precious opal from other NSW environments when processed by normal lapidary cutting and polishing techniques. The outcomes will result in an improved model of Tintenbar opal structure – with the aim to improve yields of the precious stone.

Radiopharmaceutical production facilities

ANSTO manufactures radiopharmaceuticals through its business arm, ANSTO Health. The core mission is to manufacture and advance the use of radiopharmaceuticals to improve the health of Australians. The products are manufactured at ANSTO Health in its Therapeutic Goods Administration

ANSTO hot cell used to produce lifesaving nuclear medicines

The National Deuteration Facility provides a unique service to researchers, producing made-to-order molecules or proteins

(TGA) licensed facilities.

Our products are used in nuclear medicine scans to help diagnose a wide range of diseases and illnesses including cancers, cardiac conditions, skeletal injuries and hyperthyroidism. ANSTO Health also produces and distributes therapeutic products and continues to provide a consistently reliable supply of isotopes which ensures the accuracy and speed of diagnosis providing the optimum opportunity for follow up and treatment of these life threatening conditions for Australians.

National Deuteration Facility

The National Deuteration Facility (NDF) is Australia's national facility for labelling molecules with the non-radioactive isotope of hydrogen called deuterium. This is achieved using chemical or biological processes and enhances contrast between components when conducting structural studies using neutron scattering instruments at the OPAL research reactor or using spectroscopic techniques such as Nuclear Magnetic Resonance (NMR), Infra-Red (IR) or Mass Spectrometry (MS).

A key part of the NDF's role is to expand the OPAL research reactor's range of applications to help solve problems in industries such as medicine and health, communications, energy, and mining sectors. The facility allows the study of the relationship between molecular structure and function in medically and environmentally relevant proteins and biomolecules, synthetic polymers, or other nanotechnology/biotechnology-based materials.

The NDF is one of the few open

access facilities in the world offering chemical deuteration for Australian and international researchers and is the only such facility to offer both chemical and biodeuteration. It is recognised as one of Australia's nationally significant infrastructure facilities funded through the National Collaborative Research Infrastructure Strategy which is an initiative of the Australian Government.

This year, the NDF produced more than 100 deuterated molecules and supported more than 110 scientific users from 32 institutions in Australia and overseas. Demand for the NDF's expertise and facilities increased by 24 per cent over the year. Leading international organisations accessing the NDF for the first time included the Medical Research Council Laboratory for Molecular Biology in Cambridge, England, the European Spallation Source, and the National Institute for Standards and Technology.

Some research highlights that utilised deuterated molecules included:

- Enabling study at the atomic scale of new types of lithium ion batteries under operating conditions to aid the development of batteries suitable for motor vehicles by an Australian and international consortium of researchers
- Investigating the effect of shear forces on human fat molecules to enable forensics scientists to determine whether samples taken from victims of fatal car accidents have been subject to high speed impact
- Determining molecular events in the absorption of carbon dioxide in nanoporous metal-organic frameworks whose properties can be tuned and have potential for CO^2 sequestration - a collaboration with the Lawrence Berkeley National Laboratory in the USA
- Measuring the surface coating behaviour of a protein used as a bioadhesive and subsequent attachment of cells, to inform design of medical implants
- Investigating the mechanism of the antifungal antibiotic Amphotericin B and the role of cell wall sterols such as cholesterol in effective action
- Determination of the structure of cholesterol oxidase in different functional states to understand the behaviour of this enzyme which is involved in cholesterol metabolism.

Centre for Accelerator Science

ANSTO's CAS at Lucas Heights operates a major technology platform based around ANSTO's four accelerators, associated beamlines, support capabilities, and in-house expertise.

2014-15 has been a significant year for CAS, with the completion of new major facilities including two new accelerator systems (the Vega and Sirius accelerators) and a suite of world-leading sample processing laboratories.

The Vega accelerator is a 1MV low-energy multi-isotope AMS system. Its capabilities include high throughput, high precision radiocarbon analysis, ultra-sensitive detection of uranium and plutonium isotopes, and analysis of a range of other long-lived radioisotopes. The system was commissioned during the past year and brought into routine operation. It has been used to provide analyses for a number of external and internal customers. Examples include work with Australian University researchers to date sediments in mangrove swamps to evaluate the impact of changing sea levels; and analyses of environmental samples for the International Atomic Energy Agency (IAEA) in their role in monitoring the Non-Proliferation Treaty.

The 6 MV medium-energy tandem accelerator, Sirius, was installed in

November and commissioned in June, with its acceptance tests being completed. Sirius provides excellent performance for a broad range of AMS, ion beam analysis, ion implantation and irradiation capabilities. Installed instrumentation includes ion sources covering virtually the whole periodic table, three AMS end stations, an online low-energy ion implanter, a high energy, heavy ion confocal microbeam facility capable of focussing beams to less than one micron and a nuclear reaction analysis beam line. The breadth of applications of Sirius extends across isotopic dating, air pollution, climate science, modification of materials for future nuclear reactors, radiation damage studies, forensic science, nuclear detector characterisation and micro-biological studies.

CAS provides for Australia's and the region's accelerator-based research needs well into the future. Access arrangements are in place to ensure that the facilities are available to those who need them, based on the scientific merit of proposed work, and accessible to businesses which can benefit from use of the high technology capabilities that CAS offers.

Irradiation facilities

ANSTO operates a range of cobalt-60 irradiators for small scale irradiation of a wide range of products, and to various doses. ANSTO is the only Australian provider of high precision irradiation services including:

- Underpinning the sterility of donated human bone and tendons for transplants and grafting in surgery, leading to improved outcomes for patients
- The domestic quarantine control of the Queensland fruit fly to help control infestations
- Food irradiation research as an alternative to pesticide use for postharvest treatments to improve export market access. ANSTO supports investigations into food quality, nutritional and other effects for various fruits and vegetables
- The development of a universal influenza vaccine using ionising radiation to inactivate the virus
- Irradiation treatment of items subject to Australian Quarantine
- Supporting Australian medical device manufacturers to validate the radiation sterilisation of their products
- Plant mutation studies
- Investigations into the radiation effects on plastics and electronics.

Highlights of the year included:

- A study to determine radiation doses required to sterilise the species of thrips and mites that occur in horticultural crops destined for the New Zealand fresh produce market
- A project in collaboration with the University of Sydney to design multi-functional surfaces for implantable biomedical devices that promote bone tissue regeneration. This work poses direct benefits to the Australian community by contributing to the options available for patients with spinal injuries
- The reduction degree of graphene oxide, which can be controlled through varying the gamma irradiation dose, leads to the synthesis of highly crystalline and near defect-free graphene based materials
- In collaboration with the Centre for Medical Radiation Physics at the University of Wollongong, a detailed characterisation of collimated radiation fields with 2D semiconductor array detectors is used to provide spatial information of the fields with less than 0.5 mm resolution.

Education

Tours of ANSTO's Lucas Heights facilities are one of the most powerful communication tools for educating the public on ANSTO's role and the benefits of nuclear science and technology.

Tour numbers continued to remain strong, with over 15,000 visitors this year. In particular, there has been a strong increase in Year 5 to 9 student visits in the last two years, with numbers rising from 1750 to 4525 per year. This increase demonstrates ANSTO's important role in encouraging students to participate in science, technology, engineering and mathematics (STEM) activities.

During the year, ANSTO began delivering video conferencing, providing schools from regional and remote areas with the opportunity to take a virtual tour of ANSTO's facilities and engage with ANSTO researchers. Close to 2,000 students participated throughout the year.

ANSTO's Teacher Professional Development training gained accreditation from the Board of Studies, Teaching and Educational Standards (BOSTES) for Standards 2 and 3 of the Australian Professional Standards for Teachers in 2014. Since then, over 200 teachers have participated in the programs.

ANSTO's Fact or Fiction events, which educate people on science by looking at what is fact or fiction in science fiction movies, remained popular with over 6,500 members of the general public and school students attending six events held across Australia.

Sutherland Shire Mayor Kent Johns supporting students participating in the annual ANSTO Science and Engineering Challenge aimed at encouraging students to continuing studying Science Technology Engineering and Mathematics (STEM) subjects in senior school

Since ANSTO's Teacher Professional Development training gained BOSTES accreditation, over 200 teachers have participated in the programs

ANSTO's education program was also recognised as best practice by the IAEA, leading to ANSTO's Discovery Centre team being invited to share learnings from our program with our counterparts in Indonesia and the United Arab Emirates.

Sponsorship and events

ANSTO's sponsorships and events program engages our many stakeholders from the local, national and international communities; universities and research organisations; community groups; schools; industry and government. ANSTO uses sponsorship and event opportunities to develop relationships with stakeholders and share information about the role ANSTO plays in contributing to health, the environment and industry.

This year, ANSTO continued its partnership with the Australian Museum through the ANSTO Eureka Prize for Innovative Use of Technology. Tri Phan from the Garvan Institute in Sydney and Steve Lee from the Australian National University in Canberra received the award in 2014 for creating optically superb lenses cheaply by curing a droplet of plastic as it hangs upside down.

ANSTO supported programs that highlight its role in health, including the Sutherland Shire Relay For Life event and Operation Art, a program by the Children's Hospital

Left: Sponsorship of the Sutherland Shire Relay For Life event highlights ANSTO's integral role in improving the health of Australia. Below: ANSTO's involvement in a plastic trawling expedition from Hobart to Sydney led to the development of the highly successful citizen science project, the ANSTO Plastics Project

at Westmead and the New South Wales Department of Education and Communities that invites NSW schools to submit artwork for display in the children's ward hospitals. The best works are displayed at the Art Gallery of New South Wales.

ANSTO's community event sponsorships create opportunities for face-to-face contact with local community members, leaders, businesses, council, government representatives and organisations. ANSTO continued its support of the Sutherland Shire Australia Day festival; the Sutherland to Surf fun run and the Cook Community Classic.

Through the ANSTO Plastics Project, ANSTO researchers were able to share information about environmental research and engaged with hundreds of families and community organisations, took part in community events, spoke to students at Taronga Zoo and various schools; and led beach walks and collections.

ANSTO supported a number of industry events such as Science at the Shine Dome run by the Academy of Science, Science meets Parliament and the Australian Academy of Technological Sciences and Engineering's (ATSE) Clunies Ross Awards. Education activities remained a focus including sponsoring the Synchrotron New User Symposium and Conference; the Australian Museum Science Festival; the National Youth Science Forum; the Australian Science Olympiads and the Wollongong Science Fair.

ANSTO engaged with the scientific audience of potential users and collaborators by supporting selected Australian and international conferences and workshops including the annual B/HERT (Business/ Higher Education Round Table) Awards; the 22nd Women in Nuclear Global Annual Conference (Sydney); CAMS 2014 – Combined Australian Material Society Conference (Sydney); Crystallography for the Next Generation: the legacy of IYCr (Morocco); the 4th IIW Welding Research and Collaboration Colloquium (Wollongong) and the Australian Institute of Physics Conference (Canberra).

Businesses

External earnings by ANSTO's business and commercial groups improved on the previous year with revenue amounting to $68 million in 2014-15.

ANSTO Health

ANSTO Health is the commercial division of ANSTO that produces radiopharmaceuticals in Australia and operates a production facility from ANSTO's southern Sydney campus. ANSTO Health plays an important role in the nuclear medicine and health industries in Australia, supplying over 10,000 patient doses of potentially lifesaving nuclear medicines each week.

The ANSTO Health business continues to grow with revenues increasing by 15.5 per cent compared to the previous year.

Hot cells are used to help produce the over 10,000 patients doses of potentially lifesaving nuclear medicines that are delivered to hospitals and medical practices across Australia every week

Export Low Enriched Uranium Mo-99

The Mo-99 produced by ANSTO uses Low-Enriched Uranium (LEU) as both the starter material and the fuel for OPAL, consistent with ANSTO's support of non-proliferation.

In 2014-15, after meeting Australia's Mo-99 requirements, ANSTO Health exported the product to the US, Japan, China and Korea. During April and May ANSTO played a critical role in providing Mo-99 to US customers, while the Canadian NRU reactor was unavailable due to the annual extended planned shutdown. Support from ANSTO was critical to ensure important diagnostic imaging was maintained for the US health system.

ANSTO Health has completed the installation and commissioning of manufacturing facilities for the production of lutetium-177 (Lu-177) which has shown significant promise in the treatment of neuroendocrine tumours, such as pancreatic cancer. The facility is expected to be producing Lu-177 for use in clinical trials throughout the coming year.

Export revenue was up 26 per cent compared with the previous year, and the health products increased by 10 per cent compared with prior periods.

PETNET

PETNET Australia Pty Ltd (trading as PETNET Solutions), a wholly owned subsidiary of ANSTO, operates two medical cyclotrons for radiopharmaceutical production at the Lucas Heights campus through an agreement with Siemens Medical Solutions.

PETNET has routinely supplied NSW hospitals as part of the state tender, as well as other states and continues to hold a strong market share based on its value proposition of reliable supply of quality product.

PETNET's revenue earnings for 2014-15 continue to increase in line with forecasts with a 20 per cent increase over the previous year and a continued increase in profitability.

Neutron transmutation doping silicon

ANSTO Silicon revenue for 2014-15 improved by 9.5 per cent over the prior year, despite some softening of the market and the introduction of competing technologies. This is a result of the continued focus on quality operations and customer needs.

ANSTO remains the leading provider of neutron transmutation doping (NTD) silicon irradiation services globally. ANSTO Silicon continued to grow its market share by delivering high quality consistent irradiation services for our customer's silicon ingots. The end use of this irradiated product, after further processing by the manufacturers, is in high end electronic switching devices. These devices are used in a range of applications such as power infrastructure, high-speed trains and to facilitate the development of energy from renewable sources such as wind.

New industrial irradiations increased revenue by 49 per cent compared with the previous year.

ANSTO Minerals

ANSTO Minerals provides consultancy and process development services for the minerals industry including undertaking applied research to develop processes for the treatment of ores containing, uranium, rare earths and other critical metals. ANSTO Minerals also provides consulting services to minerals processing operations managing naturally occurring radioactivity (NORM).

New and improved process concepts are first investigated and refined at the laboratory scale. The next stage of validation typically involves operation on a larger continuous scale for extended periods. ANSTO Minerals has established a strong reputation for high quality technical development for its clients, utilising its excellent facilities to allow the scale up of a range of unit operations including roasting, leaching, solid/liquid separation, multi-stage solvent extraction, ion exchange and precipitation.

The ANSTO Minerals facility precinct is well placed to cater for such development activities from laboratory to a mini-pilot plant and to undertake larger, fully integrated pilot/demonstration plant work.

ANSTO Minerals earnings for 2014-15 were lower than the previous year, reflecting the market challenges in this area resulting from a slowdown of development activity in the minerals sector.

ANSTO Minerals plays a critical role supplying expertise and process improvements to its clients in a market that continues to experience high levels of uncertainty.

With over 35 years' experience and over 60 professional scientists and technicians, ANSTO Minerals provides applied research, and commercial and consulting services to deliver practical and innovative solutions to industry

External radiation services

ANSTO is the leading provider of radiation protection services and advice in Australia. ANSTO has practical expertise in almost all facets of radiation safety and dealing with radioactive materials.

ANSTO radiation services increased revenue by 146 per cent over the previous year.

Services are tailored to client requirements. They include radiation safety training, radiation protection advice, measurement and management plan development and reviews, radiation instrument calibration, systems safety and reliability consultancy.

ANSTO also provides services and advice in high-dose irradiation and high-dose dosimetry for scientific research and the provision of irradiation services to health care, agriculture and industry clients.

International engagement

Non-proliferation

ANSTO continues to provide strong support to advancing Australia's efforts towards nuclear non-proliferation. In the lead-up to and during the non-proliferation treaty (NPT) Review Conference held at the United Nations in New York in April-May, ANSTO provided input to Australia's National Report and advice on Australia's position on various papers and issues discussed at the conference.

Security

ANSTO played a key role in the running of the IAEA International Conference on Nuclear Forensics in Vienna in July. ANSTO showcased our global reputation in the areas of nuclear forensics, emergency preparedness and response, and radiation detection, and our efforts to pass those skills onto other countries, particularly in our region.

On the back of the conference ANSTO also participated in a Nuclear Forensics International Technical Working Group meeting which is aimed at sharing knowledge.

ANSTO played a leading role in the organisation and conduct of the Global Initiative to Combat Nuclear Terrorism Response and Mitigation Workshop and exercise, held in Manila in April. The workshop, which attracted over 100 participants from 20 countries, the EU, United Nations and the IAEA, addressed the challenges associated with providing timely, accurate and consistent guidance to the public during a terrorist incident involving radioactive material.

IAEA

ANSTO continued to chair the International Expert Group on Nuclear Liability (INLEX) which provides advice to the IAEA. In April, INLEX recommended that licences for high-activity radioactive sources include a requirement that the licensee take out insurance coverage or other financial security to cover potential damage to third parties as a result of an incident.

An Australian delegation from ANSTO, ARPANSA and the Department of Industry and Science took part in the 5th Review Meeting of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management at the IAEA in Vienna during May. Under the Joint Convention, parties submit National Reports on their spent fuel and radioactive waste management policies and practices. ANSTO's planned Synroc facility was designated as one of only 18 Good Practices from 61 national reports presented at the meeting.

ANSTO's support to technical cooperation to developing countries has also been demonstrated through the hosting of nine Fellows and Scientific Visitors during the year. The Fellows and Scientific Visitors to ANSTO hailed from Jordan, Ghana, South Africa and Indonesia. The two Ghanaian

Fellows were scientists in isotope hydrology seeking training and skills as part of an IAEA-led project to improve water management in the Sahel region of Africa.

ANSTO participated in the Coordinated Research Project (CRP) program which encourages nuclear applications for peaceful purposes throughout the world and fosters the exchange of scientific and technical information and exchange of scientists. The CRP brings together scientists from developing and developed countries to exchange knowledge, experience and ideas.

RCA

During the year ANSTO continued to lead a significant Regional Cooperative Agreement (RCA) project investigating the use of nuclear and isotopic techniques to measure the impact of land-use practices on land degradation. The first meeting of the project was held in Kathmandu, Nepal, in September. Other projects benefiting from the participation of ANSTO scientists are investigating the source of air particulate pollution, the development and management of groundwater resources, the possible impact of the releases of radioactivity from the Fukushima Daiichi nuclear power plant into the marine environment, and the application of irradiation technologies to agricultural products.

At the RCA National Representatives Meeting in March 2014, it was agreed to consider amendments to the RCA to improve its effectiveness, efficiency and impact. ANSTO is chairing the working group set up to review and discuss the changes proposed.

FNCA

In November, Australia hosted the Forum for Nuclear Cooperation in Asia (FNCA) Ministerial Meeting for the first time since the inception of the FNCA in 2000. The FNCA is an informal cooperation arrangement between 12 regional countries, with its activities initiated and largely sponsored by Japan. Ministers and high level officials from the FNCA member countries participated in the meeting held in Sydney. The Federal Minister for Industry and Science, the Hon Ian Macfarlane, hosted the meeting - which sent an important signal to neighbouring nations about Australia's ongoing commitment to regional nuclear cooperation.

ANSTO supports the FNCA through participation of our experts in projects assisting developing member countries in a range of nuclear applications. One of the projects, on Safety Management Systems of Nuclear Facilities, is sponsored and led by ANSTO.

Ministers and high level officials from member countries participated in the Forum for Nuclear Cooperation in Asia (FNCA) meeting held in Sydney in November

Partnerships and associations

Asia Oceania Forum for Synchrotron Radiation Research

The Asia Oceania Forum for Synchrotron Radiation Research (AOFSRR) is an association of all synchrotron operating and user nations in the Asian region. Its mission is to strengthen regional cooperation in, and to promote the advancement of, synchrotron radiation research.

ANSTO has had a close association with the AOFSRR since its inception in 2006, when the ANSTO operated Australian Synchrotron Research Program joined as a foundation member representing Australia. Since 2012 ANSTO has served as financial manager of the AOFSRR, to facilitate the payment of membership fees by the eight full member nations.

Australian Collaboration for Accelerator Science

The Australian Collaboration for Accelerator Science (ACAS) was established in 2010, when a MOU was signed between the four major accelerator centres in Australia: ANSTO, the Australian National University, the Australian Synchrotron and the University of Melbourne.

Accelerator science underpins a wide range of modern research and technology, and is a key competency for ANSTO with its operation of the Centre for Accelerator Science, the Australian Synchrotron, and its maintenance of international relationships with overseas accelerator laboratories such as CERN and the Shanghai Institute of Applied Physics (SINAP).

The mission of ACAS is to grow accelerator science activities in Australia, and to link with major international accelerator centres. To date, the main activity has been collaborative research with CERN, and with the Japanese free-electron laser facility at SPring-8 (see page 41). ANSTO provides administrative support and some funding to ACAS.

Australian Institute of Nuclear Science and Engineering

The Australian Institute of Nuclear Science and Engineering (AINSE) provides a platform for training and cooperation in the nuclear science and engineering fields. Its membership comprises 46 Australian and New Zealand universities and science organisations, including ANSTO, making it one of few scientific institutions with such a wide membership. AINSE facilitates access to ANSTO and other associated nuclear capabilities through research grants, fellowships and support for conferences and workshops.

CERN

ANSTO has a formal agreement with CERN which allows scientists affiliated with each organisation to collaborate and receive reciprocal use of equipment. This means scientists from CERN benefit from access to ANSTO's facilities, including the OPAL reactor.

The agreement has laid a pathway for collaborative research by Australia's best and brightest scientists in areas such as accelerator science, health and life sciences, information technology and radiation detection. By engaging with CERN, ANSTO and Australia are benefiting from cutting-edge research and are able to develop expertise in areas such as particle-therapy platforms and large-scale accelerator facilities.

The collaboration also involves the joint supervision of research students, staff exchanges and negotiated arrangements for the exploitation of intellectual property.

Cooperative Research Centre for Polymers

ANSTO continued its involvement in the Cooperative Research Centre for Polymers (CRC-P), a national research cooperative made up of universities and research facilities that is assisting to boost Australia's $9 billion polymers industry.

The initiative features a novel degradable plastic film that Greening Australia and the Birchip Cropping Group have shown can dramatically improve the reestablishment of native woodlands.

The initiative will bring science and industry together to develop products that meet emerging global needs in three areas - health therapies and delivery, water and food security, and low-cost solar energy - using enabling advanced polymer technology.

Polymers include plastics, and more than $9 billion worth of polymers and polymer-based products are used annually in almost all sectors of the Australian economy. The CRC-P has a strong track record of developing technologies for the plastics industry, including ceramifying polymer technology, first used in 2003 by Australia's Olex Cables in a new range of fire performance cables.

In the current period of funding the CRC-P will help Australian manufacturers develop new products through clever chemistry and strong industry collaboration.

Defence Science and Technology Organisation

ANSTO and the DSTO signed a new partnership agreement in 2013 that covers a number of joint activities and projects including a whole of government Radiological and Nuclear Gamma Spectrum Database that will enable Australian emergency services and federal and state law enforcement agencies to more rapidly identify and deal with suspect objects. The database will hold measurements of gamma ray signatures emitted by nuclear and other radioactive materials, and the information will be made available to first responders and other national security agencies. This is a risk mitigating approach and provides better protection for emergency services and, overall, will provide a safer Australia.

Helmholtz-Zentrum Berlin

In March, ANSTO and Helmholtz-Zentrum Berlin (HZB), Germany's largest scientific organisation, signed a five-year MOU for cooperation in neutron scattering science. The MOU paves the way for the establishment of a collaborative research program to take full advantage of the instruments available at HZB and ANSTO and train staff at both facilities.

The agreement encompasses an exchange of personnel, materials, sample environments and instruments, sharing information and joint seminars, workshops and meetings.

ANSTO's previous MOU with HZB that concluded in 2013 focused on materials used for solar energy. There has also been previous joint work on the development of neutron instruments and sample environments.

Japan Atomic Energy Agency

In July 2014, ANSTO signed a MOU with JAEA to collaborate in the field of research and development regarding materials testing by utilising both organisations' research reactors. The ongoing shutdown of Japan's research reactors following the Fukushima accident in 2011 has caused JAEA to look for international partnerships to undertake research that can only be undertaken in an operating reactor.

Japanese National Institute for Materials Science

In March, ANSTO signed an MOU with the NIMS in Tsukuba.

The MOU aims to strengthen and promote research collaboration including through institutional exchange of personnel, exchange of scientific and technical information, and joint conferences and workshops.

Japanese SPring-8 Centre

ANSTO has a Memorandum of Understanding (MOU) with the Japanese SPring-8 Centre that gives Australian scientists access to its world leading photon science facility – the SPring-8 Angstrom Compact free-electron Laser.

The MOU was signed in 2011 by ANSTO on behalf of the ACAS, meaning the benefits are extending to ANSTO's ACAS partners which are Melbourne University, the Australian National University and the Australian Synchrotron.

The agreement has opened up opportunities for collaboration amongst Australian and overseas scientists to undertake reciprocal visits and facilitate greater cooperation. The MOU was renewed for a further five years in 2014.

Ludwig Institute for Cancer Research and Austin Health

ANSTO's partnership with the Ludwig Institute for Cancer Research and Austin Health established a state-of-the-art Positron Emission Tomography (PET) Solid Targetry Laboratory at the Austin Hospital.

The lab is enabling researchers from the three organisations to pursue vital research into new nuclear imaging techniques to benefit patients affected by different types of cancers. The partnership provides a reliable and cost effective system for the production of relevant long-lived PET radionuclides suitable for radiolabelling of biomolecules for research and clinical imaging applications.

In addition, the partnership is encouraging knowledge transfer between ANSTO, Ludwig Institute for Cancer Research, Austin Hospital staff, and the Australian scientific community.

This improved training means more patients can benefit from this innovative and highly effective technique to detect cancer.

Macquarie University

An agreement between ANSTO and Macquarie University is helping geologists and scientists better understand everything from where earthquakes might occur to where gold is deposited. The partnership provides joint funding for a senior level research appointment in the University's Department of Earth and Planetary Sciences. The appointee is helping lead work to replicate environments located 400 kilometres beneath the earth's surface: specifically a layer called the upper mantle, which is the source of most magma or molten rock beneath the surface. This research makes complimentary use of the Bragg Institute's neutron beam instruments and high energy X-rays at the Australian Synchrotron. The team is commissioning a high pressure sample press at the synchrotron, which was partly funded by a successful Linkage, Infrastructure, Equipment and Facilities (LIEF) proposal in 2012.

The study of the physical and chemical processes at these depths will provide a better understanding of the earth, including how mineral deposits are formed. Furthermore, by providing a fuller working model of the processes that occur in the earth's interior, scientists hope to better understand how to predict and anticipate geologic events such as earthquakes and volcanic eruptions.

Monash University

ANSTO's formal agreement with Monash University is helping facilitate knowledge sharing and creating new training and development opportunities for researchers from both organisations. In particular, the common research areas of biomedical imaging, cancer therapy, accelerator science and neutron science are benefiting from the agreement.

One additional area of collaboration is education. Monash University and ANSTO are involved in joint projects such as the annual 'Synchrotron, Accelerator and Neutron New User Symposium' together with other partners.

ANSTO, including the Australian Synchrotron, and Monash will take part in a second retreat in March 2016 to develop medium and long term strategic roadmaps for the collaboration. ANSTO and Monash have also jointly provided seed funding to seven collaborative research projects involving researchers from Monash, every ANSTO research institute and the Australian Synchrotron.

Shanghai Institute for Applied Physics

ANSTO and SINAP signed a research collaboration MOU in 2012, as part of an ongoing program to recognise and enhance the mutual research links between two of the region's key nuclear science and technology organisations.

A significant early result of this collaboration was the announcement, in December 2012, of the ANSTO-SINAP Joint Materials Research Centre, one of six joint research centres established under the Australia-China Science and Research Fund. The Centre is working on characterising materials for the Thorium Molten Salt Reactor project being undertaken by SINAP. ANSTO and SINAP materials researchers made extended reciprocal visits in 2014 to conduct joint research under the Joint Research Centre. A team of four ANSTO researchers spent three weeks at SINAP in June-July 2014, and a return visit to ANSTO by four SINAP researchers in December 2014.

The fourth ANSTO-SINAP workshop was hosted by ANSTO over May 4-6 2015. The program combined presentations on the progress of the Joint Research Centre activities and discussion of possible future activities and funding sources.

Tsukuba University

In October 2014, ANSTO and Tsukuba University in Japan signed an MOU to enable both parties to benefit from each other's expertise and experience in the areas of physics, materials science, nuclear science and technology, mathematical modelling and scientific computing, and allied disciplines. Materials science is a particular focus of this collaboration. The ongoing shutdown of Japan's research reactors following the Fukushima accident in 2011 has caused Japanese neutron beam researchers to look to secure access to world-class neutron beam facilities.

University of NSW

A collaboration between ANSTO, the University of NSW (UNSW) and the Centre for Nuclear Engineering at Imperial College, London, is delivering a nuclear engineering program, the only one of its kind in Australia.

The UNSW's Master of Engineering Science degree with a specialisation in Nuclear Engineering provides graduate students with the opportunity to train for a career in the nuclear industry.

The program featured contributions from national and international specialists in the nuclear engineering sector, including staff from ANSTO.

University of Sydney

ANSTO has a long standing MOU with the University of Sydney which enables scientists from the University of Sydney to undertake research using OPAL and, in return, ANSTO has access to experts and scientific facilities at the University, which ranks among the best research institutions in the world.

The MOU also ensures that representatives of both organisations meet regularly to consider opportunities for joint research and the sharing of facilities. One key area of collaboration is between ANSTO and the University's Brain and Mind Research Institute for research and educational purposes. The dedicated medical research cyclotron and radiochemistry facility form part of the National Imaging Facility (NIF) network.

As well as using current state-of-the-art technology, a key focus for the collaboration is to develop new radiopharmaceuticals, instruments and scientific methods that extend the potential applications of molecular imaging in the future. Molecular imaging plays an important role in unravelling the molecular mechanisms of disease.

University of Tokyo

In October 2014, the ISSP of the University of Tokyo (Japan) and ANSTO signed an MOU covering access by Japanese researchers to the neutron beam facilities at the Bragg Institute for collaborative non-proprietary research that is intended for publication in the open refereed literature.

ANSTO's Dr Margaret Elcombe (middle), the first Australian winner of the prestigious annual international Women in Nuclear (WiN) Global Award, with WiN Global President, Dr Se-Moon Park (left) and ANSTO CEO, Adi Paterson (right)

Staff achievements

Australian Nuclear Association 2014 Award

Dr Rob Robinson was selected for the Australian Nuclear Association 2014 Award. Rob was acknowledged for his outstanding contribution to the establishment of the Bragg Institute as a world class facility for using neutrons and X-rays for research and industry.

Japan Society for the Promotion of Science Fellowship

ANSTO's Dr Helen Maynard-Casely was awarded the prestigious Japan Society for the Promotion of Science Fellowship, and was hosted at the University of Tokyo for several months this year.

Sydney Engineering Excellence Award

The team behind ANSTO's Kowari Strain Scanner neutron beam instrument took home a highly commended distinction in the Research and Development category of the Sydney Engineering Excellence Awards (SEEA) 2014.

The team comprising researchers, engineers and technical support from the Bragg Institute and the Institute of Materials Engineering, were one of 49 finalists in over 13 categories.

Engineers Australia's SEEA Awards help to showcase the very best of engineering innovation to the wider community.

Women in Nuclear

ANSTO's Dr Margaret Elcombe was acknowledged in a prestigious international award 'Women in Nuclear'. Margaret is renowned for her pioneering work in the design, building and operation of neutron scattering instruments and won the award for her 'significant contribution to leadership, education, mentoring and communication, in the applications of nuclear science and technology'.

Capital investment

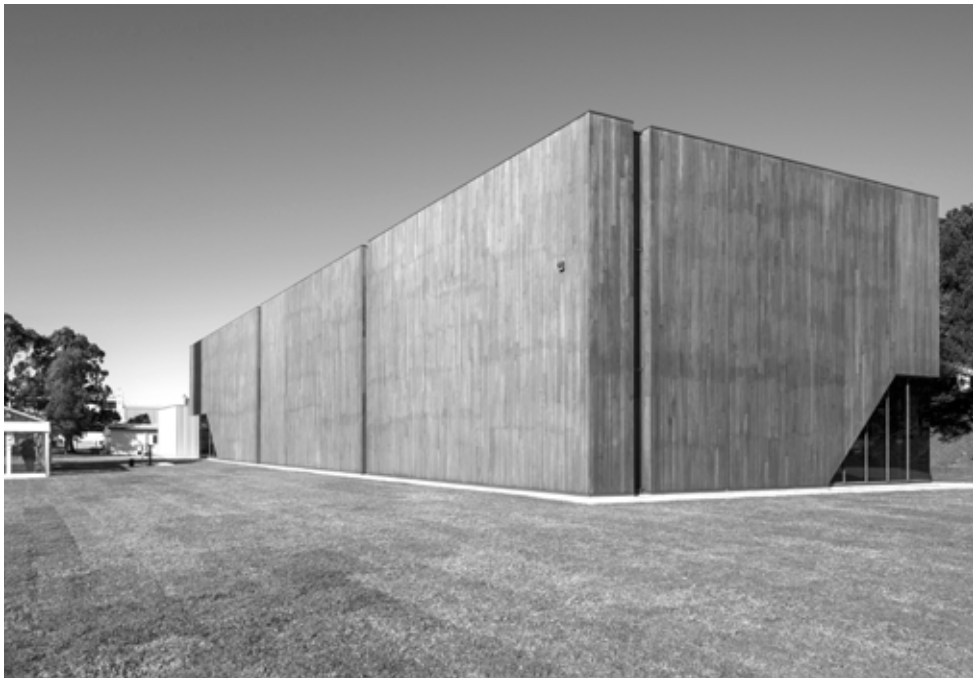
ANSTO continued to make significant capital investment in 2014-15 with some high quality facilities successfully completed or continued, during the financial year:

Completion of the Neutron Beam Expansion Program

The Neutron Beam Expansion Program was one of ANSTO's largest engineering construction programs and has significantly enhanced the OPAL research reactor's neutron science research capabilities. It will provide various university, government and industry-based user groups with new world-class facilities for investigating the structure and dynamics of condensed matter, with particular emphasis on the areas of nanoscience, soft matter dynamics and biology, which are key areas for future technological and industrial development in Australia.

Completion of the Electron Microscopy Building

The Electron Microscopy Building will provide world-class facilities for research and innovation in nuclear science and technology by providing a dedicated building to house ANSTO's current and future suite of electron microscopes in a stand-alone location. This new facility will enable ANSTO to conduct world class nuclear materials and radiation research. It will also advance ANSTO's research into the behaviour of materials in extreme environments, including high temperature, stress and radiation conditions which are encountered in advanced power generation systems such as supercritical steam, Generation IV and fusion nuclear power generation plants, as well as future innovative radioactive waste systems.



The purpose-built Electron Microscopy Building uses advanced architectural design features to mitigate external influences which can detract from the quality and performance of highly-sensitive electron microscopes

Completion of the Centre of Accelerator Science

The CAS Project which incorporates two new state-of-the-art linear accelerators, a major new sample preparation facilities building as well as ANSTO's existing Antares and Star accelerators, will keep ANSTO at the forefront of accelerator mass spectrometry, ion beam analysis and related techniques. The new accelerators were successfully commissioned during 2014-15.

Completion of the Interim Waste Store

The Intermediate Level Waste (ILW) Program is being undertaken to enable ANSTO to meet Australia's commitments relating to the return of Australia's nuclear waste (High Flux Australian Reactor (HIFAR) spent fuel) that has been conditioned in France and the United Kingdom. There are three components to the Program. The first component, the construction of an Interim Waste Store to accommodate the returned ILW at Lucas Heights, has been successfully completed. The second component, the return of the waste from France is on track for delivery in the first half of financial year 2015-16.

Work continuation on the ANSTO Nuclear Medicine Project

Construction of ANSTO's new nuclear medicine production facility commenced in mid-2014, and remains on target for completion and commencement of operations in 2016. The facility is part of the ANM Project that will secure Australia's supply of nuclear medicines for the domestic market, and deliver the ability to contribute significantly to international demand.

During the year the concrete foundations were completed, the basement, ground and first floor concrete and steel structures were erected and installation commenced on the connected major building services.

Construction is well underway for the ANSTO Nuclear Medicine (ANM) Project due for completion in 2016

PERFORMANCE AGAINST STRATEGIC OBJECTIVES

	2013-14	2014-15
Facility availability		
• Neutron Beam instruments – % days operated per days beamline availability	**72%**	**77%**
• Total availability of OPAL – % of days at power	**81%***	**84%**
• Planned availability of OPAL – % of actual operating to scheduled operating time	**98%**	**98%**
• Accelerators – average % of days operated per planned operation	**79%**	**77%**
Radiopharmaceutical doses		
• Potential Doses	**2,371,654**	**2,405,047**

**The OPAL total availability figure reported in the 2013-14 Annual Report was incorrectly reported as 97%, which represented the planned availability. This has been amended above to reflect the correct figure of 81%.*

Australian National Audit Office

INDEPENDENT AUDITOR'S REPORT

To the Minister for Industry and Science

I have audited the accompanying annual financial statements of the Australian Nuclear Science and Technology Organisation and the consolidated entity for the year ended 30 June 2015, which comprise:

- Statement by the Accountable Authority, Chief Executive and Chief Financial Officer;
- Statement of Comprehensive Income;
- Statement of Financial Position;
- Statement of Changes in Equity;
- Statement of Cash Flows;
- Schedule of Commitments; and
- Notes comprising a Summary of Significant Accounting Policies and other explanatory information.

The consolidated entity comprises the Australian Nuclear Science and Technology Organisation and the entities it controlled at the year's end or from time to time during the year.

Accountable Authority's Responsibility for the Financial Statements

The directors of the Australian Nuclear Science and Technology Organisation are responsible under the *Public Governance, Performance and Accountability Act 2013* for the preparation and fair presentation of annual financial statements that comply with Australian Accounting Standards and the rules made under that Act. The directors are also responsible for such internal control as is necessary to enable the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

My responsibility is to express an opinion on the financial statements based on my audit. I have conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. These auditing standards require that I comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not

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for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of the accounting policies used and the reasonableness of accounting estimates made by the Accountable Authority of the entity, as well as evaluating the overall presentation of the financial statements.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

Independence

In conducting my audit, I have followed the independence requirements of the Australian National Audit Office, which incorporate the requirements of the Australian accounting profession.

Opinion

In my opinion, the financial statements of the Australian Nuclear Science and Technology Organisation and the consolidated entity:

(a) comply with Australian Accounting Standards and the *Public Governance, Performance and Accountability (Financial Reporting) Rule 2015*; and

(b) present fairly the financial positions of the Australian Nuclear Science and Technology Organisation and the consolidated entity as at 30 June 2015 and their financial performance and cash flows for the year then ended.

Australian National Audit Office

Kristian Gage
Audit Principal

Delegate of the Auditor-General

Canberra
13 August 2015

Statement by Accountable Authority, Chief Executive and Chief Financial Officer

Australian Government

Australian Nuclear Science and Technology Organisation

In our opinion, the attached financial statements for the year ended 30 June 2015 comply with subsection 42(2) of the Public Governance, Performance and Accountability Act 2013 (PGPA Act), and are based on properly maintained financial records as per subsection 41(2) of the PGPA Act.

In our opinion, at the date of this statement, there are reasonable grounds to believe that the Australian Nuclear Science and Technology Organisation will be able to pay its debts as and when they fall due.

Signed in accordance with a resolution of the Board of Directors.

James McDowell Accountable Authority - Chairman	Adi Paterson Accountable Authority - Chief Executive Officer	Peter Arambatzis Group Chief Financial Officer
13 August 2015	13 August 2015	13 August 2015

Consolidated Statement of Comprehensive Income

For the year ended 30 June 2015

	Note	2015	2014
		$'000	$'000
Expenses			
Employee	4A	140,244	142,684
Suppliers	4B	74,261	67,380
Depreciation and amortisation	4C	70,106	65,873
Write down and impairment of assets	4D	3,261	1,701
Grants		3,419	3,700
Finance costs	4E	14,981	16,795
Foreign currency exchange losses	4F	11,204	2,090
Losses from asset sales		-	77
Total expenses		317,476	300,300
Own-source revenue			
Sales of goods and rendering of services	5B	74,733	67,835
Interest		5,288	4,081
Grants	5C	34,742	27,552
Other revenue	5D	22	2,282
Total own-source revenue		114,785	101,750
Other income			
Foreign currency exchange gains	5E	1,126	2,059
Gains from asset sales		47	86
Total income		1,173	2,145
Total own-source income		115,958	103,895
Net cost of services		201,518	196,405
Revenue from Government	5A	157,414	163,011
Deficit for the year before tax		(44,104)	(33,394)
Income tax (expense)/benefit	6	(85)	75
Deficit for the year		(44,189)	(33,319)
Other comprehensive income			
Items that will not be subsequently reclassified to net cost of services			
Changes in asset revaluation reserve	13	(1,799)	23,742
Items that may be subsequently reclassified to net cost of services			
Exchange differences on translation of foreign operations	13	28	2
Total other comprehensive income for the year		(1,771)	23,744
Total comprehensive deficit for the year		**(45,960)**	**(9,575)**
Total deficit for the year:			
Attributable to Australian Government		(44,189)	(33,319)
Attributable to non-controlling interest		-	-
		(44,189)	**(33,319)**
Total comprehensive deficit for the year:			
Attributable to Australian Government		(45,960)	(9,575)
Attributable to non-controlling interest		-	-
		(45,960)	**(9,575)**

The above statement should be read in conjunction with the accompanying notes

Consolidated Statement of Financial Position

As at 30 June 2015

	Note	2015	2014
		$'000	$'000
Assets			
Financial assets			
Cash and cash equivalents	8A	6,682	3,782
Trade and other receivables	8B	15,167	16,549
Investments	8C	197,025	135,692
Total financial assets		218,874	156,023
Non-financial assets			
Property, plant and equipment	9A	1,069,035	1,064,897
Intangible assets	9B	78,698	73,944
Inventories	9C	18,072	20,589
Deferred tax asset	6	920	1,005
Other		8,604	4,180
Total non-financial assets		1,175,329	1,164,615
Total assets		1,394,203	1,320,638
Liabilities			
Payables			
Supplier	10A	20,002	16,417
Employee	10B	6,330	6,987
Grants	10C	135	707
Other	10D	17,995	16,642
Total payables		44,462	40,753
Provisions			
Employee	11A	38,581	38,649
Decommissioning	11B	286,136	274,678
Intellectual property payment	11B	57,686	49,717
Other	11B	67	49
Total provisions		382,470	363,093
Total liabilities		426,932	403,846
Net assets		**967,271**	916,792
Equity			
Parent entity interest			
Contributed equity	12	705,420	608,981
Reserves	13	500,118	505,394
Accumulated deficit	14	(238,267)	(197,583)
Total parent entity interest		967,271	916,792
Non-controlling interest			
Contributed equity		-	-
Reserves		-	-
Accumulated deficit		-	-
Total non-controlling equity		-	-
Total equity		**967,271**	916,792

The above statement should be read in conjunction with the accompanying notes

Consolidated Statement of Changes in Equity

For the year ended 30 June 2015

	Accumulated deficit	Asset revaluation reserve	Other reserves	Contributed equity	Attributable to parent	Non-controlling interest	Total
	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Balance at 30 June 2013	**(164,598)**	**468,169**	**13,815**	**560,856**	**878,242**	**-**	**878,242**
Net results for the year							
Deficit for the year	(33,319)	-	-	-	(33,319)	-	(33,319)
Other comprehensive income							
Foreign currency translation	-	-	2	-	2	-	2
Revaluation increment	-	23,742	-	-	23,742	-	23,742
Total comprehensive deficit for the year	(33,319)	23,742	2	-	(9,575)	**-**	**(9,575)**
Transactions with owners							
Appropriation (equity injection)	-	-	-	48,125	48,125	-	48,125
Transfer between equity components	334	-	(334)	-	-	-	-
Balance at 30 June 2014	**(197,583)**	**491,911**	**13,483**	**608,981**	**916,792**	**-**	**916,792**
Deficit for the year	(44,189)	-	-	-	(44,189)	-	(44,189)
Other comprehensive income							
Foreign currency translation	-	-	28	-	28	-	28
Revaluation decrement	-	(1,799)	-	-	(1,799)	-	(1,799)
Total comprehensive deficit for the year	(44,189)	(1,799)	28	-	(45,960)	**-**	**(45,960)**
Transactions with owners							
Appropriation (equity injection)	-	-	-	96,439	96,439	-	96,439
Transfer between equity components	3,505	-	(3,505)	-	-	-	-
Balance at 30 June 2015	**(238,267)**	**490,112**	**10,006**	**705,420**	**967,271**	**-**	**967,271**

The above statement should be read in conjunction with the accompanying notes

Consolidated Statement of Cash Flows

For the year ended 30 June 2015

	Note	2015	2014
		$'000	$'000
Cash flows from operating activities			
Sales of goods and rendering of services		78,432	71,874
Grants received		34,010	25,247
Interest received		5,154	4,079
Receipts from Government		157,414	163,011
Payments to employees		(140,969)	(138,966)
Payments to suppliers		(84,663)	(74,145)
Net cash from operating activities	15	49,378	51,100
Cash flows from investing activities			
Proceeds from sale of property plant and equipment		109	919
Proceeds from investment sales		632,827	441,800
Purchase of property, plant and equipment		(81,722)	(67,655)
Purchase of investments		(694,160)	(474,409)
Net cash used in investing activities		(142,946)	(99,345)
Cash flows from financing activities			
Appropriation – contributed equity		96,439	48,125
Net cash from financing activities		96,439	48,125
Net increase/(decrease) in cash and cash equivalents		2,871	(120)
Effect of exchange changes on the balance of cash and cash equivalents held in foreign currencies		29	3
Cash and cash equivalents at the beginning of the reporting year		3,782	3,899
Cash and cash equivalents at end of the reporting year	8A	**6,682**	**3,782**

The above statement should be read in conjunction with the accompanying notes

Consolidated Schedule of Commitments

As at 30 June 2015

	Note	2015	2014
		$'000	$'000
BY TYPE			
Commitments receivable			
GST receivable from Australian Taxation Office on Commitments		9,911	11,225
Total commitments receivable		9,911	11,225
Commitments payable			
Infrastructure, plant and equipment	(a)	81,910	111,732
Total capital commitments		81,910	111,732
Replacement research reactor	(b)	165	165
Operating lease	(c)	1,445	1,596
Fuel Element purchase		4,448	8,492
Mo-99 plate purchase		21,056	1,495
Total other commitments		27,114	11,748
Total commitments payable		109,024	123,480
Net commitments by type		99,113	112,255
BY MATURITY			
Commitments receivable			
One year or less		2,932	2,140
From one to five years		6,979	9,085
Total commitments receivable		9,911	11,225
Capital commitments payable			
One year or less		81,199	11,801
From one to five years		711	99,931
Total capital commitments payable		81,910	111,732
Operating lease commitments			
One year or less		151	151
From one to five years		603	603
Over five years		691	842
Total operating lease commitments		1,445	1,596
Other commitments payable			
One year or less		10,711	1,790
From one to five years		14,958	2,580
Over five years		-	5,782
Total other commitments		25,669	10,152
Total commitments payable		109,024	123,480
Net commitments by maturity		99,113	112,255

(a) The majority of the committed funds on the ANSTO Nuclear Medicine (ANM) Program are related to the award of the design development and construction contract of the Molybdenum-99 (Mo-99) facility to Watpac Constructions with outstanding commitment of $64,200,000 at 30 June 2015 (2014: $82,965,000). Contracts were also awarded to Mo-99 and Synroc Molybdenum equipment suppliers. Some smaller contracts were awarded to consultant engineers.
(b) A contract was executed on 13 July 2000 between ANSTO and INVAP SE for the design, construction and commissioning of a replacement research reactor at Lucas Heights. The remaining $165,000 (2014: $165,000) is included in commitments.
(c) ANSTO has a twenty five year lease contract with Central Sydney Area Health Services that will expire on 29 January 2025 with an annual rental payable of $150,700 (2014: $150,700). The annual rental is subject to review every three years.

The amounts reported as commitments payable include GST where relevant. Recoveries due from the Australian Taxation Office in relation to commitments payable are disclosed as commitments receivable.

The above statement should be read in conjunction with the accompanying notes

Notes to the Financial Statements

Note 1. Objectives of Australian Nuclear Science and Technology Organisation

Australian Nuclear Science and Technology Organisation (ANSTO) is a not-for-profit Australian Government controlled entity. The objectives of ANSTO are to:

- Deliver world-class research and innovation in nuclear science and technology
- Expand ANSTO's reach and contribution, exploiting landmark technologies
- Serve the nuclear needs of government, industry, community and the people of Australia
- Drive organisational renewal

In the 2014-15 Portfolio Budget Statement ANSTO has only one outcome as reflected below:

Outcome 1: Improved knowledge, innovative capacity and healthcare through services and advice to Government, industry, the education sector and the Australian population.

ANSTO's activities contributing towards the outcome are classified as departmental. Departmental activities involve the use of assets, liabilities, revenues and expenses controlled or incurred by ANSTO in its own right. Administered activities involve the management or oversight on behalf of the Government of items controlled by them. ANSTO does not have any administered activities.

The continued existence of ANSTO in its present form and with its present programs is dependent on Government policy and on continuing funding by Parliament for the entity's administration and programs.

Reference to ANSTO means ANSTO and its controlled entities except in notes 2(p) and 26.

Note 2. Summary of significant accounting policies

(a) Basis of Preparation of the Financial Statements

The financial statements are general purpose financial statements and are required by section 42 of the Public Governance, Performance and Accountability Act 2013.

The financial statements have been prepared:

a) having regard to the provisions of the Australian Nuclear Science and Technology Organisation (ANSTO) Act 1987 (as amended)
b) in accordance with;
   i. Public Governance, Performance and Accountability (Financial Reporting) Rule (FRR) for reporting periods ending on or after 1 July 2014; and
   ii. Australian Accounting Standards and Interpretations issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period.

The financial statements have been prepared on an accrual basis and in accordance with the historical cost convention, except for certain assets and liabilities at fair value. Except where stated, no allowance is made for the effect of changing prices on the results or the financial position.

The financial statements are presented in Australian dollars and values are rounded to the nearest thousand dollars unless otherwise specified.

Notes to the Financial Statements (continued)

Unless an alternative treatment is specifically required by an accounting standard or the FRR, assets and liabilities are recognised in the statement of financial position when and only when it is probable that future economic benefits will flow to the entity or a future sacrifice of economic benefits will be required and the amounts of the assets or liabilities can be reliably measured. However, assets and liabilities arising under executor contracts are not recognised unless required by an accounting standard. Liabilities and assets that are unrecognised are reported in the schedule of commitments or the contingencies note.

Unless alternative treatment is specifically required by an accounting standard, income and expenses are recognised in the statement of comprehensive income when and only when, the flow, consumption or loss of economic benefits has occurred and can be reliably measured.

Where necessary the comparative information for the preceding financial year has been reclassified to achieve consistency in disclosure with current financial year amounts.

(b) Significant accounting judgements and estimates

In the process of applying the accounting policies listed in this note, the entity has made the following judgements that have the most significant impact on the amounts recorded in the financial statements:

- The fair value of property, plant and equipment and their useful lives
- Decommissioning provision
- Recoverable amount of the intangible asset relating to intellectual property and fair value of the associated liability

Apart from these assumptions and estimates no other accounting assumptions or estimates have been identified that have a significant risk of causing a material adjustment to carrying amounts of assets and liabilities within the next accounting period.

(c) Adoption of new Australian Accounting Standard requirements

No accounting standard has been adopted earlier than the application date as stated in the standard.

The following new standards/revised standards/Interpretations or amending standards were issued prior to the signing of the statement by the directors, which were applicable to the current reporting period.

Standard/Interpretation	**Nature of change in accounting policy, transition provisions, and adjustment to financial statements**
AASB 1055 *Budgetary Reporting* and AASB 2013-1 *Amendments to AASB 1049 – Relocation of Budgetary Reporting Requirements*	AASB 1055 establishes a reporting framework to enable the comparison of actual results to the Portfolio Budget Statements and explanation of major variances for entities that form the General Government Sector.

All other new/revised/amending/standards and interpretations that were issued prior to the sign-off date and are applicable to the current reporting period did not have a material effect, and are not expected to have a future material effect on ANSTO's financial statements.

Future Australian Accounting Standard requirements
With the exception of AASB 15 *Revenue from Contracts with Customers*, which is currently being assessed, there are no new standards/revised standards/Interpretations or amending standards issued by the Australian Accounting Standards Board prior to the signing of the Statement by Accountable Authority, Chief Executive Officer and Chief Financial Officer, which are expected to have a material financial impact on ANSTO for future reporting periods. AASB 15 is expected to be initially applied in the financial year ending 30 June 2019.

(d) Revenue recognition

Revenue from Government
Funding received or receivable from the Department of Industry and Science (DOIS) (appropriated to ANSTO as a Corporate Commonwealth Entity payment item for payment to ANSTO) is recognised as Revenue from Government when the entity gains control of the funding unless it is in the nature of an equity injection, such amounts are recognised directly in contributed equity in the year received.

Operating revenue from sale of goods and rendering of services
Revenue from the sale of goods and rendering of services is recognised when:

- The risks and rewards of ownership have been transferred to the buyer;
- ANSTO retains no managerial involvement nor effective control over the goods;
- The revenue, stage of completion and transaction costs incurred can be reliably measured; and
- It is probable that the economic benefits associated with the transaction will flow to ANSTO.

Receivables for goods and services are recognised at the nominal amounts due less any impairment allowance. Collectability of debts is reviewed at reporting date. Allowance is made when collectability of the debt is no longer probable. The stage of completion is determined by reference to the proportion that the completed physical contract work bears to the estimated total physical contract work.

Interest revenue
Interest revenue is recognised using the effective interest method as set out in AASB 139 *Financial Instruments: Recognition and Measurement*.

Grant revenue
Government grants and funding are recognised when ANSTO obtains control over the contribution. There are two types of grants being reciprocal grants and non-reciprocal grants.

For reciprocal grants, this is recognised in profit or loss on a systematic basis over the periods in which ANSTO recognises as expenses the related costs for which the grants are intended to compensate. Where the grants also include funds that relate to future related costs for which the grants are intended to compensate, this portion is recognised as deferred revenue.

For non-reciprocal grants, ANSTO is deemed to have assumed control when the grant is receivable or received. Government grants that are receivable as compensation for expenses or losses already incurred or for the purpose of giving immediate financial support to ANSTO with future related costs are recognised in profit or loss in the period in which they become receivable. Conditional grants may be reciprocal or non-reciprocal depending on the terms of the grant.

Parental Leave Payments Scheme
Parental Leave Payments Scheme Amounts received under the Parental Leave Payments Scheme not yet paid to employees are presented gross as cash and a liability (payable). Amounts received and not paid at 30 June 2015 amounted to $12,232 (2014: $9,959).

Notes to the Financial Statements (continued)

(e) Gains

Gains from sale of assets
Revenue is recognised when control of the asset has passed to the buyer.

Resources received free of charge
Resources received free of charge are recognised as revenue when and only when a fair value can be reliably determined and the services would have been purchased if they had not been donated. Use of those resources is recognised as an expense.

Resources received free of charge are recorded as either revenue or gains depending on their nature i.e. whether they have been generated in the course of the ordinary activities of ANSTO.

Contributions of assets at no cost or for nominal consideration are recognised as gains at their fair value when the asset qualifies for recognition.

(f) Employee benefits

Liabilities for 'short-term employee benefits' (as defined in AASB 119 *Employee Benefits*) and termination benefits expected within twelve months of the end of reporting period are measured at their nominal amounts.

The nominal amount is calculated with regard to the rates expected to be paid on settlement of the liability.

Other long-term employee benefits are measured as the total net present value of the defined benefit obligation at the end of the reporting period minus the fair value at the end of the reporting period of plan assets (if any) out of which the obligations are to be settled directly.

Leave
The provision for employee entitlements encompasses annual leave and long service leave that ANSTO has a present obligation to pay resulting from employee services provided up to reporting date. The leave liabilities are calculated on the basis of employees' remuneration, including employer superannuation contribution rates to the extent that the leave is likely to be taken during service rather than paid out on termination.

The Enterprise Agreement provides under the heading General Leave for an employee entitlement which combines sick leave, 'carer's leave and leave for 'other' prescribed purposes. No provision has been made for general leave as all such leave is 'non-vesting' and the average general leave taken by employees is less than the annual entitlement.

The liability for long service leave has been determined by reference to the work of an actuary as at May 2014. The estimate of the present value of the liability takes into account attrition rates and pay increases through promotion and inflation.

Separation and redundancy
Provision is made for separation and redundancy benefits payments. ANSTO recognises a provision for termination when it has developed a detailed formal plan for the termination and has informed those employees affected that it will carry out the termination. The total liability in the financial statements is for 5 staff and amounted to $403,542 (2014: 6 staff amounted to $589,000).

Superannuation
ANSTO contributes to the Commonwealth Superannuation (CSS) and the Public Sector (PSS) superannuation schemes or PSS accumulation plan (PSSap) that provide retirement, death and disability benefits to employees. The CSS and PSS are defined benefit schemes for the Australian Government. The PSSap is a defined contribution scheme.

The liability for defined benefits is recognised in the financial statements of the Australian Government and is settled by the Australian Government in due course. This liability is reported in the Department of Finance's administered schedules and notes.

ANSTO makes employer contributions to the employees' superannuation scheme at rates determined by an actuary to be sufficient to meet the current cost to the Government. ANSTO accounts for contributions as if they are contributions to defined contribution plans.

The liability for superannuation recognised as at 30 June represents outstanding contributions for the final fortnight of the year.

(g) Fair Value Measurement

For assets that are recognised in the financial statements at fair value on a recurring basis, the Group determines whether transfers have occurred between levels in the hierarchy by re-assessing categorisation (based on the lowest level input that is significant to the fair value measurement as a whole) at the end of each reporting period.

(h) Cash

Cash is recognised at its nominal amount. Cash and cash equivalents includes:

- cash on hand;
- demand deposits in bank accounts with an original maturity of 3 months or less that are readily convertible to known amounts of cash and subject to insignificant risk of changes in value.

(i) Financial instruments

ANSTO classifies its financial assets in the following categories:

- 'financial assets at fair value through profit or loss'
- 'held-to-maturity investments', and
- 'loans and receivables'.

The classification depends on the nature and purpose of the financial assets and is determined at the time of initial recognition. Financial assets are recognised and derecognised upon 'trade date'.

Effective interest method
The effective interest method is a method of calculating the amortised cost of a financial asset and of allocating interest income over the relevant period. The effective interest rate is the rate that discounts estimated future cash receipts through the expected life of the financial asset, or, where appropriate, a shorter period.

Income is recognised on an effective interest rate basis except for financial assets 'at fair value through profit or loss'.

Notes to the Financial Statements (continued)

Financial assets at fair value through profit or loss
Financial assets are classified as financial assets at fair value through profit or loss where the financial assets have been acquired principally for the purpose of selling in the near future. Assets in this category are classified as current assets.

Financial assets at fair value through profit or loss are stated at fair value, with any resultant gain or loss recognised in the profit or loss. The net gain or loss recognised in the profit or loss incorporates any interest earned on the financial assets.

Where a reliable fair value cannot be established for unlisted investments in equity instruments, cost is used less impairment if applicable.

Held-to-maturity investments
Non-derivative financial assets with fixed or determinable payments and fixed maturity dates that the group has the positive intent and ability to hold to maturity are classified as held-to-maturity investments. Held-to-maturity investments are recorded at amortised cost using the effective interest method less impairment, with revenue recognised on an effective yield basis.

Loans and receivables
Trade receivables, loans and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as 'loans and receivables'. Loans and receivables are measured at amortised cost using the effective interest method less impairment. Interest is recognised by applying the effective interest rate.

Impairment of financial assets
Financial assets are assessed for impairment at each reporting date.

- Financial assets held at amortised cost - If there is objective evidence that an impairment loss has been incurred for loans and receivables or held to maturity investments held at amortised cost, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows discounted at the asset's original effective interest rate. The carrying amount is reduced by way of an allowance account. The loss is recognised in the Statement of Comprehensive Income.

- Financial assets held at cost - If there is objective evidence that an impairment loss has been incurred the amount of the impairment loss is the difference between the carrying amount of the asset and the present value of the estimated future cash flows discounted at the current market rate for similar assets.

Financial liabilities
Financial liabilities are classified other financial liabilities and are recognised and derecognised upon 'trade date'.

Other financial liabilities
Other financial liabilities, including borrowings, are initially measured at fair value, net of transaction costs. These liabilities are subsequently measured at amortised cost using the effective interest method, with interest expense recognised on an effective yield basis.

The effective interest method is a method of calculating the amortised cost of a financial liability and of allocating interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments through the expected life of the financial liability, or, where appropriate, a shorter period.

Supplier and other payables are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

(j) Contingent liabilities and contingent assets

Contingent liabilities and contingent assets are not recognised in the statement of financial position but are reported in the notes. They may arise from uncertainty as to the existence of a liability or asset or represent an asset or liability in respect of which the amount cannot be reliably measured. Contingent assets are disclosed when settlement is probable but not virtually certain and contingent liabilities are disclosed when settlement is greater than remote.

(k) Acquisition of assets

Assets are recorded at cost on acquisition except as stated below. The cost of acquisition includes the fair value of assets transferred in exchange and liabilities undertaken. Financial assets are initially measured at their fair value plus transaction costs where appropriate.

Assets acquired at no cost, or for nominal consideration, are initially recognised as assets and revenues at their fair value at the date of acquisition, unless acquired as a consequence of restructuring of administrative arrangements. In the latter case, assets are initially recognised as contributions by owners at the amounts at which they were recognised in the transferor's accounts immediately prior to the restructuring.

(l) Property, plant and equipment

Asset recognition threshold
Items of buildings, infrastructure, plant and equipment and major facilities are recorded at cost of acquisition and depreciated as outlined below. Items of plant and equipment with a cost of less than $3,000 are expensed in the year of acquisition (other than where they form part a group of similar items which of are significant in total).

The initial cost of an asset includes an estimate of the cost of dismantling and removing the item and restoring the site on which it is located at the end of its useful life. This is particularly relevant to ‘make good’ or decommissioning provisions on buildings, infrastructure, plant and equipment and major facilities, taken up by ANSTO where there exists an obligation to restore the property to its original condition. These costs are included in the value of the asset it relates to with a corresponding provision for the ‘make good’ or decommissioning taken up.

Any changes to the initial decommissioning cost attributable to adjustments to the consumer price index (cpi) and discount rate at 30 June each year will be reflected as an adjustment to the provision for decommissioning and asset revaluation reserve.

The cost of assets constructed by the entity includes the cost of materials, direct labour and an appropriate proportion of fixed and variable overheads.

Notes to the Financial Statements (continued)

Revaluations
Following initial recognition at cost, buildings, infrastructure, plant and equipment and major facilities are carried at fair value less accumulated depreciation and accumulated impairment losses. Valuations are conducted with sufficient frequency to ensure that the carrying amounts of assets do not differ materially from the assets' fair values as at reporting date. The regularity of independent valuations depends upon the volatility of movements in market values for the relevant assets.

Revaluation adjustments are made on a class basis. Any revaluation increment is credited to equity under the heading of asset revaluation reserve except to the extent that it reverses a previous revaluation decrement of the same asset class that was previously recognised through profit and loss. Revaluation decrements for a class of assets are recognised directly through profit and loss except to the extent that they reverse a previous revaluation increment for that class.

Any accumulated depreciation as at the revaluation date is eliminated against the gross carrying amount of the asset and the asset restated to the revalued amount except for assets relating to decommissioning that are not subjected to revaluation.

All valuations are carried out by qualified parties, independent of ANSTO. The valuations were performed by independent valuers of the Australian Valuation Officers (AVO), Mr. Simon O'Leary (registered Valuer No. 1128), Mr. Christofer Fratzia (registered Valuer No. 3794) and Mr. Kashyap Budhbhatti at 30 June 2012, based on the asset list at 31 October 2011.

Depreciation
Items of buildings, infrastructure, plant and equipment and major facilities, but excluding freehold land, are depreciated over their estimated useful lives to ANSTO using the straight line method.

The depreciation rates (useful lives), residual values and methods are reviewed during each reporting period and necessary adjustments are recognised in the current, or current and future reporting periods, as appropriate.

Depreciation and amortisation rates applying to each class of depreciable asset are based on the following useful lives:

	2015	2014
Buildings on freehold land	**5 to 50 years**	5 to 50 years
Plant and equipment	**2 to 30 years**	2 to 30 years
Infrastructure	**20 years**	20 years
Landmark, national and major facilities	**5 to 40 years**	5 to 40 years

Impairment
All assets were assessed for indications of impairment at 30 June 2015. Where indications of impairment exist, the asset's recoverable amount is estimated and an impairment adjustment made if the asset's recoverable amount is less than its carrying amount.

The recoverable amount of an asset is the higher of its fair value less costs to sell and its value in use. Value in use is the present value of the future cash flows expected to be derived from the asset. Where the future economic benefit of an asset is not primarily dependent on the asset's ability to generate future cash flows, and the asset would be replaced if the entity were deprived of the asset, its value in use is taken to be its depreciated replacement cost.

De-recognition
An item of property, plant and equipment is derecognised upon disposal or when no further future economic benefits are expected from its use or disposal.

(m) Inventories

Inventories held for sale are valued at the lower of cost and net realisable value. Costs incurred in bringing each item of inventory to its present location and condition, are assigned as follows:

- raw material and stores (with the exception of reactor fuel) - purchase cost on a first-in first-out basis; and
- reactor fuel - average purchase price; and
- finished goods and work-in-progress - cost of direct materials and labour plus attributable costs that can be allocated on a reasonable basis.

(n) Intangibles

The useful lives of intangible assets are assessed as either finite or indefinite.

Intangible assets with finite lives are amortised over the useful economic life and assessed for impairment whenever there is an indication that the intangible asset may be impaired. Intangible assets with indefinite useful lives are not amortised, but are tested for impairment annually, either individually or at the cash-generating unit level.

Software
Items of software are recorded at cost and amortised as outlined below. Items with a cost of less than $3,000 are expensed in the year of acquisition. Software and licences are reported at cost. There is no material internal software development, though there are significant capitalised costs involved in the implementation of purchased software.

Intellectual property
ANSTO and NTP Radioisotopes (SOC) Limited (NTP) signed the Intellectual Property Licence Agreement on 15 May 2012 for the provision of NTP's IP to ANSTO to enable ANSTO to build a new Mo-99 processing plant at Lucas Heights.

Under the terms of the IP Agreement NTP granted to ANSTO an exclusive, irrevocable, perpetual licence to use, exploit, reproduce and modify the current IP and the future IP. The IP includes copyright designs, patents, know-how and trade secrets and confidential information owned by NTP and used in its own production plant. It includes the provision of all IP to assist ANSTO in the design, construction and operation of a large scale Mo-99 plant.

The IP Agreement makes provision for ANSTO to pay the sum of US$60,000,000 (capped) to NTP for the IP. The payments will continue at 22.5% of the sales volume up to the date of the commissioning and operation of the new Mo-99 plant at which time the percentage will decrease to 15% until full payment of the US$60,000,000. The payment will include any sums paid under the initial Commercial Agreement relating to IP to enhance the current production facility.

ANSTO has recognised this IP as an intangible asset with an indefinite life in relation to the IP rights conveyed, at estimated net present value of $51,210,000 (2014: $51,210,000) and a financial liability for the future payments required in relation to the asset. The $57,686,000 liability (2014: $49,717,000) has been derived from calculating the estimated commission to be paid to NTP based on expected future sales and then discounted back at 5.19% (2014: 4.3%).

This IP was initially recognised as its fair value and is subsequently at cost less impairment whilst the liability is fair valued each year.

Notes to the Financial Statements (continued)

Amortisation
Intangibles are amortised over their estimated useful lives to ANSTO using the straight line method.

Amortisation rates applying to intangibles are as follows:

	2015	2014
Purchased software	**2 to 7 years**	2 to 7 years
Licences	**3 years**	3 years
Intellectual property	**Indefinite life**	Indefinite life

Impairment
All intangible assets were assessed for impairment at 30 June 2015. Where indications of impairment exist, the asset's recoverable amount is estimated and an impairment adjustment made if the asset's recoverable amount is less than its carrying amount.

Patents
Due to the uncertain commercial value of patents and because benefits extending beyond one accounting period cannot be assured, the costs associated with the development and registration of patents are expensed in the year in which they are incurred, unless recoverability is assured beyond any reasonable doubt. At 30 June 2015 there were 141 patents (2014: 119) registered to ANSTO and no associated costs are recognised as an asset (2014: nil).

(o) Foreign currency

Transactions denominated in a foreign currency are converted to Australian currency at the rate of exchange prevailing at the date of the transaction. At reporting date, amounts receivable and payable in foreign currency are translated to Australian currency at the exchange rate prevailing at that date and any exchange differences are brought to account in the Statement of Comprehensive Income. ANSTO did not enter into speculative forward exchange contracts during the reporting period.

(p) Taxation

ANSTO is exempt from all forms of taxation in Australia except fringe benefits tax (FBT) and the goods and services tax (GST). ANSTO is not subject to exemption from any foreign taxation laws relative to its overseas operations.

Revenues, expenses and assets are recognised net of GST except:

- where the amount of GST incurred is not recoverable from the Australian Taxation Office; and
- for receivables and payables.

Subsidiaries
ANSTO's subsidiaries are subject to normal taxation except for Synchrotron Light Source Australia Pty Ltd which is a tax exempt entity, being a charitable institution.

ANSTO Inc. is a USA company and is subject to US tax laws. No deferred tax asset has been recognised at 30 June 2015 (2014: nil) in relation to ANSTO Inc. as the directors do not believe it is probable that sufficient profits will be generated to utilise the tax losses.

In respect of the subsidiaries, current tax assets and liabilities for the current and prior periods are measured at the amount expected to be recovered from or paid to the taxation authorities based on the current period's taxable income. The tax rates and tax laws used to compute the amount are those that are enacted or substantively enacted by reporting date.

Deferred income tax is provided on all temporary differences at reporting date between the tax bases of assets and liabilities and their carrying amounts for financial reporting purposes.

Deferred income tax liabilities are recognised for all taxable temporary differences except:

- when the deferred income tax liability arises from the initial recognition of goodwill or of an asset or liability in a transaction that is not a business combination and that, at the time of the transaction, affects neither the accounting profit nor taxable profit or loss; or
- when the taxable temporary difference is associated with investments in subsidiaries, associates or interests in joint ventures, and the timing of the reversal of the temporary difference can be controlled and it is probable that the temporary difference will not reverse in the foreseeable future.

Deferred income tax assets are recognised for all deductible temporary differences, carry forward of unused tax credits and unused tax losses, to the extent that it is probable that taxable profit will be available against which the deductible temporary differences and the carry forward of unused tax credits and unused tax losses can be utilised, except:

- when the deferred income tax asset relating to the deductible temporary difference arises from the initial recognition of an asset or liability in a transaction that is not a business combination and, at the time of the transaction, affects neither the accounting profit nor taxable profit or loss; or
- when the deductible temporary difference is associated with investments in subsidiaries, associates or interests in joint ventures, in which case a deferred tax asset is only recognised to the extent that it is probable that the temporary difference will reverse in the foreseeable future and taxable profit will be available against which the temporary difference can be utilised.

Unrecognised deferred income tax assets are reassessed at each reporting date and are recognised to the extent that it has become probable that future taxable profit will allow the deferred tax asset to be recovered.

Deferred income tax assets and liabilities are measured at the tax rates that are expected to apply to the year when the asset is realised or the liability is settled, based on tax rates (and tax laws) that have been enacted or substantively enacted at reporting date. Deferred tax assets and deferred tax liabilities are offset only if a legally enforceable right exists to set off current tax assets against current tax liabilities and the deferred tax assets and liabilities relate to the same taxable entity and the same taxation authority.

(q) Principles of consolidation

The consolidated financial statements incorporate the financial statements of ANSTO and entities it controls. Control is achieved when ANSTO has all of the following:

- power over the investee;
- is exposed, or has rights, to variable returns from its involvement with the investee;
- the ability to use its power to affect its returns.

Consolidation of a subsidiary begins when ANSTO obtains control over the subsidiary and ceases when they lose control of the subsidiary. All intragroup assets and liabilities, equity, income, expenses and cash flows relating to transactions between members of the Group are eliminated in full on consolidation. Profit or loss and each component of other comprehensive income are attributed to the owners of the entity and to the non-controlling interests. Total comprehensive income of subsidiaries attributed to the owners of the entity and to the non-controlling interests even if this results in the non-controlling interests having a deficit balance.

Notes to the Financial Statements (continued)

Changes in the Group's ownership interests in subsidiaries that do not result in the Group losing control over the subsidiaries are accounted for as equity transactions. The carrying amounts of the Group's interests and the non-controlling interests are adjusted to reflect the changes in their relative interests in the subsidiaries. Any difference between the amount by which the non-controlling interests are adjusted and the fair value of the consideration paid or received is recognised directly in equity and attributed to ANSTO.

Note 3. Events subsequent to reporting date

No events have arisen since the end of the financial year which requires disclosure or the financial statements to be adjusted.

Note 4. Expenses

	2015	2014
	$'000	$'000
4A. Employee benefits		
Wages and salaries	109,475	108,758
Superannuation	19,171	19,508
Leave and other entitlements	11,203	13,980
Separation and redundancy	395	438
Total employee expenses	**140,244**	**142,684**
4B. Suppliers		
Goods from external entities	30,011	34,211
Services from related entities	26,317	27,931
Workers compensation premiums – related		
Service from external entities	1,210	974
	16,723	4,264
Total supplier expenses	**74,261**	**67,380**
4C. Depreciation and amortisation		
Depreciation of property, plant and equipment	67,495	62,165
Impairment of property, plant and equipment/(reversal of impairment)	190	(253)
Amortisation of intangible assets – software	1,523	2,830
Amortisation of intangible assets – other	898	1,131
Total depreciation and amortisation expenses	**70,106**	**65,873**
4D. Write-down and impairment of assets		
Financial assets:		
(Reversal of write-down)/write-down of receivables	(2)	199
Non-financial assets:		
Materials – write off obsolete stock	63	22
Property, plant and equipment write down	453	1,480
Intangibles write down	2,747	-
Total write-down and impairment of assets expenses	**3,261**	**1,701**

	2015	2014
	$'000	$'000
4E. Finance costs		
Unwinding of discount on decommissioning and royalty costs	14,981	16,795
Total finance costs	**14,981**	**16,795**
4F. Foreign exchange losses – non speculative		
Realised	916	754
Unrealised	10,288	1,336
Total foreign exchange losses	**11,204**	**2,090**

Note 5. Income

	2015	2014
	$'000	$'000
5A. Revenue from Government		
Corporate Commonwealth entity payment from Department of Industry and Science	**157,414**	**163,011**
5B. Sales of goods and rendering of services		
Sales of goods		
Radioisotope sales	44,344	37,839
Total sales of goods	44,344	37,839
Rendering of services		
Service and contract research	17,892	18,015
Silicon irradiation	6,365	5,860
CSIRO site support	1,045	1,060
Training courses	413	291
Land management	3,641	3,556
AINSE interactions	1,033	1,214
Total rendering of services	30,389	29,996
Total sales of goods and rendering of services	**74,733**	**67,835**
Provision of goods to:		
Related entities	-	-
External entities	44,344	37,839
Total sales of goods	**44,344**	**37,839**
Rendering of services to:		
Related entities	11,678	7,438
External entities	18,711	22,558
Total rendering of services	**30,389**	**29,996**

Notes to the Financial Statements

	2015	2014
	$'000	$'000
5C. Grants		
Related entities	25,330	17,666
External entities	9,412	9,886
Total grants	**34,742**	**27,552**
5D. Other revenue		
Asset free of charge	-	2,282
Other revenue	22	-
Total other revenue	**22**	**2,282**
5E. Foreign exchange gains		
Foreign exchange gains – non-speculative	**1,126**	**2,059**

Note 6. Income tax (expense)/benefit

	2015	2014
	$'000	$'000
Prima facie tax on results of taxable subsidiaries	(34)	(29)
(Over)/Under provision in respect of prior years	(51)	104
Total income tax (expense)/benefit	**(85)**	**75**

ANSTO and Synchrotron Light Source Australia Pty Ltd are exempt from income tax. Unbooked deferred tax assets in relation to un-recouped tax losses including timing difference in ANSTO Inc., is $891,094 (2014: $726,539). The total deferred tax assets recognised as at 30 June 2015 in relation to PETNET Australia Pty Ltd is $755,000 (2014: $940,000) and ANSTO Nuclear Medicine Pty Ltd is $165,000 (2014: $65,000).

Note 7. Fair value measurement

The following tables provide an analysis of assets and liabilities that are measured at fair value. The different levels of the fair value hierarchy are defined below.

Level 1: Quoted prices (unadjusted) in active markets for identical assets or liabilities that the entity can access at measurement date.

Level 2: Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly.

Level 3: Unobservable inputs for the asset or liability.

7A. Fair Value Measurement

Fair value measurements at the end of the reporting period by hierarchy for assets in 2015:

	Fair value measurements at the end of the reporting period using			
	Fair value $'000	**Level 1 inputs $'000**	**Level 2 inputs $'000**	**Level 3 inputs $'000**
Non-financial assets:				
Land and buildings	317,770	-	-	317,770
Infrastructure, plant and equipment	751,265	-	18,383	732,882
Total non-financial assets	**1,069,035**	**-**	**18,383**	**1,050,652**

The highest and best use of all non-financial assets is the same as their current use.

Fair value measurements at the end of the reporting period by hierarchy for assets in 2014:

	Fair value measurements at the end of the reporting period using			
	Fair value $'000	**Level 1 inputs $'000**	**Level 2 inputs $'000**	**Level 3 inputs $'000**
Non-financial assets:				
Land and buildings	308,189	-	-	308,189
Infrastructure, plant and equipment	756,708	-	21,277	735,431
Total non-financial assets	**1,064,897**	**-**	**21,277**	**1,043,620**

The highest and best use of all non-financial assets is the same as their current use.

Notes to the Financial Statements (continued)

7B. Valuation technique and inputs for Level 2 and Level 3 fair value measurements

Level 2 and 3 fair value measurements - valuation technique and the inputs used for assets

Non-financial assets	Category	Fair value 2015 $'000	Fair value 2014 $'000	Valuation technique[1]	Inputs used[1]
Land	**3**	**97,200**	97,200	Market approach	Adjusted market transactions (zoning, access, existing use, size, topography, location)
Buildings	**3**	**220,570**	210,989	Depreciated replacement cost (DRC)	Replacement cost of a new/consumed economic benefit/ obsolescence of asset
Infrastructure, plant and equipment	**2**	**18,383**	21,277	Market approach	Adjusted market transactions
	3	**732,882**	735,431	Depreciated replacement cost (DRC)	Replacement cost of a new/consumed economic benefit/ obsolescence of asset

1. The valuation techniques and inputs used in 2015 and 2014 are consistent.

Recurring and non-recurring Level 3 fair value measurements - valuation processes

The Australian Valuation Office (AVO) undertook a comprehensive valuation of all non-financial assets at 31 October 2011. The entity tests the procedures of the valuation model as an internal management review at least once every 12 months (Valuations are conducted with sufficient frequency to ensure that the carrying amounts of assets do not differ materially from the assets' fair values as at reporting date). If a particular asset class experiences significant and volatile changes in fair value (i.e. where indicators suggest that the value of the class has changed materially since the previous reporting period), that class is subject to specific valuation in the reporting period, regardless of the timing of the last specific valuation. In 2014, the entity engaged Australian Valuation Solutions (AVS) to provide written assurance that the models developed comply with AASB 13.

Land, Infrastructure, Plant & Equipment

Assets that do not transact with enough frequency or transparency to develop objective opinions of value from observable market evidence have been measured utilising the cost (Depreciated replacement cost or DRC) approach. Under the DRC approach the estimated cost to replace the asset is calculated and then adjusted to take into account its consumed economic benefit / asset obsolescence (accumulated depreciation). Consumed economic benefit / asset obsolescence has been determined based on professional judgment regarding physical, economic and external obsolescence factors relevant to the asset under consideration.

7C. Reconciliation for recurring Level 3 fair value measurements
Recurring Level 3 fair value measurements - reconciliation for assets

	Land and Buildings 2015 $'000	Infrastructure, plant and equipment 2015 $'000	Total 2015 $'000
Opening balance	308,189	735,431	1,043,620
Total gains/(losses) recognised in net cost of services	(11,862)	(51,985)	(63,847)
Purchases	24,713	47,823	72,536
Settlements	(1,218)	(439)	(1,657)
Transfer between class of assets	(2,052)	2,052	-
Closing balance	**317,770**	**732,882**	**1,050,652**

	Land and Buildings 2014 $'000	Infrastructure, plant and equipment 2014 $'000	Total 2014 $'000
Opening balance	299,292	758,593	1,057,885
Total gains/(losses) recognised in net of services	(29,035)	(67,537)	(96,572)
Total gains/(losses) recognised in other comprehensive income	76	116	192
Purchases	38,135	46,951	85,086
Sales	(279)	(2,692)	(2,971)
Closing balance	**308,189**	**735,431**	**1,043,620**

Note 8. Financial assets

	2015 $'000	2014 $'000
8A. Cash and cash equivalents	**6,682**	**3,782**
8B. Trade and other receivables		
Goods and services		
Related entities	195	2,946
External entities	11,951	11,212
Total receivables for goods and services	**12,146**	**14,158**
Less impairment allowance	66	68
Net receivables for goods and services	**12,080**	**14,090**

Notes to the Financial Statements (continued)

	2015	2014
	$'000	$'000
Other receivables		
Interest accrued	587	453
Other	1,894	1,259
GST receivable from the Australian Taxation Office	606	747
Total other receivables	**3,087**	**2,459**
Total net trade and other receivables	**15,167**	**16,549**
Receivables are expected to be recovered in:		
No more than 12 months	15,167	16,549
More than 12 months	-	-
Total net trade and other receivables	**15,167**	**16,549**
a) **Gross receivables are aged as follows:**		
Neither overdue nor impaired	10,384	12,794
Overdue but not impaired:		
Less than 30 days	3,060	2,721
30 to 60 days	701	597
60 to 90 days	237	154
More than 90 days	851	351
Total gross trade and other receivables	**15,233**	**16,617**

b) The allowance for doubtful debts $66,000 (2014: $68,000) represents certain debts aged more than 90 days (2014: aged more than 90 days).

Reconciliation of the impairment allowance account:		
Opening balance	68	2,008
Amount used	-	(1,741)
Amount reversed	(2)	(199)
Closing balance	**66**	**68**

8C. Investments		
Bank bills	179,443	125,543
Term deposits	12,582	5,149
Investment in Australian Synchrotron Holding Company Pty Limited	5,000	5,000
Total investments	**197,025**	**135,692**

8D. Investment in subsidiaries

			2015	2014
Name	**Place of incorporation**	**%**	**$**	**$**
PETNET Australia Pty Ltd (a)	Australia	100	10,957,588	10,957,588
Synchrotron Light Source Australia Pty Ltd (b)	Australia	100	1	1
ANSTO Inc. (c)	U.S.A	100	-	-
ANSTO Nuclear Medicine Pty Ltd (d)	Australia	99	100	2
Total investment in subsidiaries			**10,957,689**	**10,957,591**

(a) ANSTO continues to own 100% of PETNET and assessed the carrying value of its investment, including a review of the cash flow projections. The resulting PETNET valuation based on a discount rate of 13.45% (2014: 14.62%) and 23 years (2014: 12 years) cash flow plus the value of cash on hand (surplus asset) was $10,958,000 (2014: $10,958,000) compared to a carrying value of the investment of $10,958,000 (2014: $10,958,000), giving a nil impairment (2014: nil impairment).

(b) ANSTO established and has always owned 100% of Synchrotron Light Source Australia Pty Ltd. In March 2012, the Australian and Victorian Governments had secured the future of the Australian Synchrotron through a $100 million, four-year funding arrangement. Following that announcement, ANSTO on 26 October 2012 was appointed as the operator of the Australian Synchrotron effective from 1 January 2013. Synchrotron Light Source Australia Pty Ltd (SLSA) a wholly-owned subsidiary of ANSTO was incorporated on 14 August 2012 as the company that replaced the previous operator of the Australian Synchrotron. In its 2015 May Budget, the Commonwealth Government announced it will provide $20.5 million of the $30 million required to fund the Australian Synchrotron's operations in 2016-17 to ANSTO to partially meet the costs of operating SLSA for the year to 30 June 2017 as part of its budget for 2016-2017. Negotiations are on-going with the Victorian and New Zealand Government's as well as the New Zealand Synchrotron Group for the remaining of 2016-2017. There are on-going discussions regarding the future support of the Synchrotron after 30 June 2017.

(c) ANSTO Inc. was incorporated in Delaware, USA on 27 October 1999 with ANSTO owning 100% of the issued equity. At 30 June 2015: US$100 (2014: US$100) of capital has been invested in this wholly owned subsidiary. This investment has been written off in prior periods. In November 2004, the Board decided to utilise ANSTO Inc. to promote the commercialisation of ANSTO Technology in the USA. For the financial year ended 30 June 2015 the financial statements of ANSTO Inc. were audited by Wipfli LLC who merged with the 2014 auditors, Galusha, Higgins & Galusha, P.C. during the year.

(d) ANSTO formed ANSTO Nuclear Medicine Pty Ltd (ANM) in 2013 owning 100% of the issued equity. During 2015, the shares were split into two classes, A and B. The existing shares were classified as B class shares. ANSTO owns all the B class shares on issue. The B class shares are not entitled to any dividends but do have operational control. There was one A class share issued to the Minister of Industry and Science on behalf of the Commonwealth. The A class share is entitled to dividends.

8E. Investment in joint venture

			2015	2014
Name	**Place of incorporation**	**%**	**$**	**$**
Southern Radioisotopes Alliance Inc. (previously Element 42 LLC)	U.S.A	50	625	625
Total investment in joint venture			**625**	**625**

Investment is USD 600 (2014: USD 600).

8F. Investment – other

			2015	2014
Name	**Place of incorporation**	**%**	**$**	**$**
Clarity Pharmaceuticals Pty Ltd	Australia	3	-	-
Total investment – other			**-**	**-**

Clarity Pharmaceuticals Pty Ltd. was incorporated in New South Wales, Australia on 17 September 2010. Current Shareholding 100,000 shares, 2.83% (2014: 4.19%).

Notes to the Financial Statements (continued)

Note 9. Non-financial assets

	2015	2014
	$'000	$'000
9A. Property, plant and equipment		
Land and buildings		
Land – 30 June fair value	**97,200**	**97,200**
Buildings – 30 June fair value	211,483	196,372
Less accumulated depreciation	34,079	22,217
	177,404	174,155
Buildings under construction	43,166	36,834
Total buildings	220,570	210,989
Total land and buildings	**317,770**	**308,189**
Infrastructure, plant and equipment and major facilities		
Plant and equipment		
Plant and equipment – 30 June fair value	312,714	326,873
Less accumulated depreciation	173,670	159,194
	139,044	167,679
Plant and equipment under construction	151,849	128,431
Total plant and equipment	**290,893**	**296,110**
Infrastructure		
Electrical/site service facilities – 30 June fair value	33,416	31,329
Less accumulated depreciation	10,298	6,744
	23,118	24,585
Landmark research facilities		
Landmark research facilities – 30 June fair value	504,584	466,823
Less accumulated depreciation	85,339	50,068
	419,245	416,755
National research facilities		
National research facilities – 30 June fair value	15,701	15,194
Less accumulated depreciation	3,109	1,555
	12,592	13,639
Major research facilities		
Major research facilities – 30 June fair value	6,147	6,147
Less accumulated depreciation	730	528
	5,417	5,619
Total infrastructure, plant and equipment	**751,265**	**756,708**
Total property, plant and equipment	**1,069,035**	**1,064,897**

Movement summary 2014-2015 for all consolidated assets irrespective of valuation basis (excluding intangibles)

	Land	Buildings	Total Land and Buildings	Infrastructure, plant, equipment national and major facilities	Total
	$'000	$'000	$'000	$'000	$'000
Gross value as at 1 July 2014	97,200	233,206	330,406	974,797	1,305,203
Additions - new assets	-	24,713	24,713	48,841	73,554
Decommissioning cost	-	538	538	-	538
Transfers/reclassifications	-	(3,806)	(3,806)	2,052	(1,754)
Asset written-off	-	(2)	(2)	(1,090)	(1,092)
Disposals	-	-	-	(189)	(189)
Gross value as at 30 June 2015	**97,200**	**254,649**	**351,849**	**1,024,411**	**1,376,260**
Accumulated depreciation/amortisation and impairment losses 1 July 2014	-	22,217	22,217	218,089	240,306
Depreciation/amortisation	-	11,862	11,862	55,633	67,495
Impairment losses	-	-	-	190	190
Revaluation adjustment	-	-	-	(639)	(639)
Adjustment for disposals	-	-	-	(127)	(127)
Accumulated depreciation/amortisation and impairment losses 30 June 2015	**-**	**34,079**	**34,079**	**273,146**	**307,225**
Net book value as at 30 June 2015	**97,200**	**220,570**	**317,770**	**751,265**	**1,069,035**

Notes to the Financial Statements (continued)

Movement summary 2013-2014 for all consolidated assets irrespective of valuation basis (excluding intangibles)

	Land	Buildings	Total Land and Buildings	Infrastructure, plant, equipment national and major facilities	Total
	$'000	$'000	$'000	$'000	$'000
Gross value as at 1 July 2013	97,200	217,289	314,489	927,820	1,242,309
Additions – new assets	-	11,565	11,565	45,212	56,777
Additions – new assets (free of charge)	-	-	-	2,282	2,282
Revaluation adjustment	-	76	76	116	192
Decommissioning cost	-	117	117	-	117
Transfers/reclassifications	-	4,652	4,652	1,403	6,055
Asset written-off	-	(493)	(493)	(776)	(1,269)
Disposals	-	-	-	(1,260)	(1,260)
Gross value as at 30 June 2014	**97,200**	**233,206**	**330,406**	**974,797**	**1,305,203**
Accumulated depreciation/amortisation and impairment losses 1 July 2013	-	11,858	11,858	167,012	178,870
Depreciation/amortisation	-	10,719	10,719	51,446	62,165
Impairment losses	-	-	-	293	293
Asset written-off	-	(56)	(56)	(70)	(126)
Reversal of impairment losses	-	(304)	(304)	(242)	(546)
Adjustment for disposals	-	-	-	(350)	(350)
Accumulated depreciation/amortisation and impairment losses 30 June 2014	**-**	**22,217**	**22,217**	**218,089**	**240,306**
Net book value as at 30 June 2014	**97,200**	**210,989**	**308,189**	**756,708**	**1,064,897**

	2015	2014
	$'000	$'000
9B. Intangible assets		
Intellectual property at fair value	51,210	51,210
Less accumulated impairment losses	-	-
	51,210	51,210
Software at cost	38,719	39,586
Less accumulated amortisation	31,519	31,539
	7,200	8,047
Other intangible assets	4,953	4,953
Less accumulated amortisation	4,420	3,522
	533	1,431
Intangible assets under construction or development	19,755	13,256
Total Intangible assets	**78,698**	**73,944**

There were no impairment indicators in relation to the intangible assets in 2015 or 2014. No intangible assets are expected to be disposed of within the next 12 months.

Movement summary 2014-2015 for all consolidated intangibles irrespective of valuation basis

	Intellectual property $'000	Software $'000	Other $'000	Total $'000
Gross value as at 1 July 2014	51,210	52,842	4,953	109,005
Additions - new assets	-	8,168	-	8,168
Transfers/reclassifications	-	1,754	-	1,754
Asset write-off	-	(4,290)	-	(4,290)
Gross value as at 30 June 2015	**51,210**	**58,474**	**4,953**	**114,637**
Accumulated depreciation/amortisation and impairment losses 1 July 2014	-	31,539	3,522	35,061
Depreciation/amortisation	-	1,523	898	2,421
Asset write-off	-	(1,543)	-	(1,543)
Accumulated depreciation/amortisation and impairment losses 30 June 2015	**-**	**31,519**	**4,420**	**35,939**
Net book value as at 30 June 2015	**51,210**	**26,955**	**533**	**78,698**

Notes to the Financial Statements (continued)

Movement summary 2013-2014 for all consolidated intangibles irrespective of valuation basis

	Intellectual property $'000	Software $'000	Other $'000	Total $'000
Gross value as at 1 July 2013	51,210	49,206	4,246	104,662
Additions - new assets	-	10,327	551	10,878
Decommissioning cost	-	(6,211)	156	(6,055)
Transfers/reclassifications	-	(480)	-	(480)
Gross value as at 30 June 2014	**51,210**	**52,842**	**4,953**	**109,005**
Accumulated depreciation/amortisation and impairment losses 1 July 2013	-	28,786	2,391	31,177
Depreciation/amortisation	-	2,830	1,131	3,961
Adjustment for disposals	-	(77)	-	(77)
Accumulated depreciation/amortisation and impairment losses 30 June 2014	**-**	**31,539**	**3,522**	**35,061**
Net book value as at 30 June 2014	**51,210**	**21,303**	**1,431**	**73,944**

	2015 $'000	2014 $'000
9C. Inventories		
Raw materials and stores – not held for resale		
Stores – at cost	14,080	14,733
Cobalt-60 sources – at net realisable value	127	145
Reactor fuel and heavy water – at average purchase price	2,619	4,484
	16,826	19,362
Work in progress – at cost	1,012	705
Finished goods – at cost	234	522
Total inventories	**18,072**	**20,589**
Inventories expected to be realised within		
No more than 12 months	15,344	15,978
More than 12 months	2,728	4,611
Total inventories	**18,072**	**20,589**

Note 10. Payables

	2015	2014
	$'000	$'000
10A. Supplier		
Trade creditors	**20,002**	**16,417**
Supplier payables expected to be settled within 12 months		
Related parties	871	194
External parties	19,131	16,223
Total supplier payables	**20,002**	**16,417**
10B. Employee		
Accrued salaries and wages	4,007	3,544
Redundancy payments	404	589
Incentives	1,919	2,854
Total employee payables	**6,330**	**6,987**
All employee payables are expected to be settled within 12 months		
10C. Grants – not-for-profit entities	**135**	**707**
All grants payable are with external parties and are expected to be settled within 12 months		
10D. Other		
Revenue received in advance	17,943	16,639
Other payables	52	3
Total other	**17,995**	**16,642**
Other payables expected to be settled within		
No more than 12 months	16,966	15,520
More than 12 months	1,029	1,122
Total other payables	**17,995**	**16,642**

Note 11. Provisions

	2015	2014
	$'000	$'000
11A. Employee		
Annual leave	12,164	12,485
Long service leave	26,417	26,164
Total employee provisions	**38,581**	**38,649**
Employee provisions expected to be settled within		
No more than 12 months	29,330	31,662
More than 12 months	9,251	6,987
	38,581	**38,649**

Notes to the Financial Statements (continued)

		2015	2014
		$'000	$'000
11B. Other provisions			
Decommissioning	(a)	286,136	274,678
Intellectual property		57,686	49,717
Other claims		67	49
Total other provisions		**343,889**	**324,444**
Other provisions expected to be settled within			
No more than 12 months		28,003	27,989
More than 12 months		315,886	296,455
		343,889	**324,444**

Other provisions movement reconciliation

	Decommissioning $'000	Intellectual Property Payment $'000	Other claims $'000
Carrying amount 1 July 2013	**286,568**	**48,680**	**47**
Additional provision made	722	-	2
Amounts used	(5,797)	(2,527)	-
Change in accounting estimate	(23,550)	3,504	-
Unwinding discount	16,735	60	-
Carrying amount 30 June 2014	**274,678**	**49,717**	**49**
Additional provision made	2,187	-	18
Amounts used	(7,430)	(3,269)	-
Change in accounting estimate	1,799	11,159	-
Unwinding discount	14,902	79	-
Carrying amount 30 June 2015	**286,136**	**57,686**	**67**

(a) This provision includes decommissioning costs relating to property, plant & equipment and infrastructure and local and overseas legacy waste and current OPAL waste disposition.

Note 12. Contributed equity

	2015	2014
	$'000	$'000
Opening balance	608,981	560,856
Equity injections from Government	96,439	48,125
Total contributed equity	**705,420**	**608,981**

Note 13. Reserves

	2015	2014
	$'000	$'000
Asset revaluation		
Opening balance	491,911	468,169
Revaluation – decommissioning	(1,799)	23,550
Revaluation – assets	-	192
Closing balance	**490,112**	**491,911**

		2015	2014
		$'000	$'000
OPAL depreciation	(a)	**9,061**	**9,061**
Regional security of radioactive sources	(b)		
Opening balance		-	160
Transfer to accumulated deficit		-	(160)
Closing balance		**-**	**-**
Low dose nuclear waste repository	(c)		
Opening balance		-	1,074
Transfer to accumulated deficit		-	(1,074)
Closing balance		**-**	**-**
Intermediate low level waste (ILLW) return	(d)		
Opening balance		4,121	3,221
Transfer to accumulated deficit		(3,505)	900
Closing balance		**616**	**4,121**
Foreign currency reserve	(e)		
Opening balance		301	299
Movement		28	2
Closing balance		**329**	**301**
Total Reserves		**500,118**	**505,394**

(a) OPAL depreciation reserve
This reserve represents unused funding for OPAL depreciation. This was due to a delay in final commissioning of OPAL.

(b) Regional security of radioactive sources
This reserve relates to RSRS/NRSE project that has now been closed and remaining balance was transferred to accumulated deficit.

(c) Low dose nuclear waste repository
This reserve relates to funding for low level waste facility at ANSTO for its own use and used by other Commonwealth agencies. This reserve has now been fully utilised.

(d) Intermediate low level waste (ILLW) return
This reserve relates to unspent appropriation for ILLW return.

(e) Foreign currency reserve
This reserve relates to foreign currency translation at reporting date.

Note 14. Accumulated deficit

	2015	2014
	$'000	$'000
Opening balance	(197,583)	(164,598)
Transfer from regional security of radioactive sources	-	160
Transfer from low dose nuclear waste repository	-	1,074
Transfer from (to) intermediate low level waste (ILLW)	3,505	(900)
Deficit for the year	(44,189)	(33,319)
Closing balance	**(238,267)**	**(197,583)**

Notes to the Financial Statements (continued)

Note 15. Cash flow reconciliation

	2015	2014
	$'000	$'000
Reconciliation of net cost of services to net cash from (used by) operating activities:		
Net cost of services	(201,518)	(196,405)
Revenue from Government	157,414	163,011
Income tax (expense)/benefit	(85)	75
Adjustment for non-cash items		
Depreciation/amortisation	70,106	65,873
Net (gain) loss in disposal of non-financial assets	(47)	(9)
Reversal of inventory write-down	(22)	-
Write-down and impairment of assets	3,261	1,701
Unrealised foreign exchange (gain)/loss	10,288	1,336
Unwinding of discount – decommissioning and royalty costs	14,981	16,795
Asset free of charge		(2,282)
Movement in assets and liabilities		
Assets		
Decrease/(increase) in trade receivables	(8,318)	(4,393)
(Increase)/decrease in other receivables	(635)	1,768
Decrease/(increase) in GST receivables	141	(81)
Increase in accrued interest	(134)	(2)
Increase in other non-financial assets	(4,424)	(1,488)
Decrease in inventories	2,517	1,047
Increase/(decrease) in deferred tax assets	85	(75)
Liabilities		
Increase in payables	3,585	2,557
(Decrease)/increase in employee entitlements	(725)	3,718
Increase in revenue received in advance	732	2,305
Increase in other provision	8,036	900
Decrease in decommissioning provision	(5,860)	(5,251)
Net cash from operating activities	**49,378**	**51,100**

Note 16. Contingent liabilities

Unquantifiable Contingencies

At 30 June 2015, ANSTO still has the likelihood of claims in relation to asbestos related diseases. It is not possible to estimate the amounts of any eventual payments that may be required in relation to these claims. Such claims are however covered by the Department of Finance provision dealing with asbestos related claims against any Commonwealth Authorities including ANSTO in the event of any litigation or claim for compensation.

Contingent Liabilities

During the year ANSTO and PETNET Australia Pty Ltd settled the proceedings bought against them by Cyclopharm Limited's wholly owned subsidiary, CycloPet Pty Ltd. The settlement was covered under insurance with ANSTO and PETNET Australia Pty Ltd paying the policy excess.

Note 17. Key management personnel remuneration

	2015	2014
	$	$
Short-term employee benefits:		
Salary	3,333,706	3,095,257
Performance bonuses	508,396	491,412
Motor vehicle and other allowance	32,780	32,780
Total short-term employee benefits	**3,874,882**	**3,619,459**
Post-employment benefits:		
Superannuation	443,540	405,385
Total post-employment benefits	**443,540**	**405,385**
Other long-term benefits:		
Annual leave accrued	237,134	235,095
Long service leave	83,536	77,523
Total other long-term benefits	**320,670**	**312,618**
Termination benefits	-	-
Total	**4,639,092**	**4,337,462**

The total number of key management personnel that are included is 19 (2014: 19). Represented by 6.08 non-executive board members (pro-rated) (2014: 6.96) and 10.33 full time equivalent (FTE) (2014: 10 FTE) members of the Executive Standing Committee.

Note 18. Related party transactions

Several ANSTO Board Members were associated with entities with which ANSTO had commercial transactions during the year as part of their role in hospitals or universities. All such transactions were in accordance with ANSTO's normal commercial terms and conditions. None of those transactions led to any conflict of interest.

Note 19. Financial instruments

a) Categories of financial instruments

		Carrying amount	Fair Value	Carrying amount	Fair Value
	Note	2015	2015	2014	2014
Financial assets		$'000	$'000	$'000	$'000
Loans and receivables					
Cash and cash equivalents	8A	6,682	6,682	3,782	3,782
Investments held to maturity	8C	192,025	192,025	130,692	130,692
Investments	8C	5,000	5,000	5,000	5,000
Receivables for goods and services	8B	12,080	12,080	14,090	14,090
Interest accrued	8B	587	587	453	453
Other	8B	1,894	1,894	1,259	1,259
Total financial assets (recognised)		**218,268**	**218,268**	**155,276**	**155,276**
Total financial liabilities					
Amortised cost					
Trade creditors	10A	20,002	20,002	16,417	16,417
Employees	10B	6,330	6,330	6,987	6,987
Grant received in advance	10C	135	135	707	707
Other	10D	17,995	17,995	16,642	16,642
Total financial liabilities (recognised)		**44,462**	**44,462**	**40,753**	**40,753**

Notes to the Financial Statements (continued)

b) Net income from financial assets

	2015	2014
	$'000	$'000
Loans and receivables		
Cash and cash equivalents	67	77
Investment held to maturity	5,221	4,004
Net income from financial assets	**5,288**	**4,081**

c) Net expenses from financial liabilities

There were no expenses from financial liabilities for 2015 (2014: $0).

Financial assets
The net fair values of cash, deposits on call and non-interest-bearing monetary financial assets are in accord with their carrying amounts. Loans receivable are carried at cost, which is above their net fair value, because it is intended to hold them to maturity.

Financial liabilities
The net fair values for trade creditors and revenue received in advance, all of which are short-term in nature, are in accord with their carrying amounts.

d) Credit risk exposure

The maximum exposure to credit risk is the risk that arises from potential default of a debtor. This is equal to the total amount of trade and other receivables as per note 8B. ANSTO has assessed the risk of the default on payment and has provided for doubtful debts as per note 8B(b).

ANSTO manages its credit risk by undertaking background and credit checks prior to allowing a debtor relationship. In addition, the Organisation has policies and procedures that guide employees to apply debt recovery techniques. The Organisation holds no collateral to mitigate against credit risk.

e) Liquidity risk

ANSTO financial liabilities are payables and other interest bearing liabilities. The exposure to liquidity risk is based on the notion that ANSTO will encounter difficulty in meeting its obligations associated with financial liabilities. This is highly unlikely due to Australian Government appropriation funding and mechanism available to the ANSTO and internal policies and procedures put in place to ensure there are appropriate resources to meet its financial obligations.

2015	Note	Carrying amount $'000	On demand $'000	1 year or less $'000	1 to 2 years $'000	More than 2 years $'000	Total contractual cash flows $'000
Financial liabilities							
Trade creditors	10A	20,002	-	20,002	-	-	20,002
Employees	10B	6,330	-	6,330	-	-	6,330
Grants received in advance	10C	135	-	135	-	-	135
Other	10D	17,995	-	17,995	-	-	17,995
Total financial liabilities		**44,462**	**-**	**44,462**	**-**	**-**	**44,462**

2014	Note	Carrying amount $'000	On demand $'000	1 year or less $'000	1 to 2 years $'000	More than 2 years $'000	Total contractual cash flows $'000
Financial liabilities							
Trade creditors	10A	16,417	-	16,417	-	-	16,417
Employees	10B	6,897	-	6,897	-	-	6,897
Grants received in advance	10C	707	-	707	-	-	707
Other	10D	16,642	-	16,642	-	-	16,642
Total financial liabilities		**40,753**	**-**	**40,753**	**-**	**-**	**40,753**

Notes to the Financial Statements (continued)

f) Market risk

(i) Interest rate risk

This refers to the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates. ANSTO is exposed to interest rate risk primarily from Investment held to maturity. The impact as shown below:

Risk variable	Change in variable		Effect on		Effect on	
	2015	2014	Profit or loss 2015 $'000	Equity 2015 $'000	Profit or loss 2014 $'000	Equity 2014 $'000
Investment held to maturity ($'000)	192,025	130,692				
Interest	0.40%	0.60%	768	768	784	784
Interest	(0.40%)	(0.60%)	(768)	(768)	(784)	(784)

Interest rate sensitivity analysis has been calculated on a 'reasonably possible' change basis. A 'reasonably possible' change has been estimated using both statistical and non-statistical analyses. The statistical analysis has been based on the cash rate for the past five years issued by the Reserve Bank of Australia (RBA) as the underlying dataset. This information is then revised and adjusted for reasonableness under the current economic circumstances.

As a result of the analyses above, a standard rate of 40 basis points (2014: 60 basis points) shock level was selected as a 'reasonably possible' change in market interest rate. 40 (2014: 60) basis points is management's best estimate of future volatility.

(ii) Foreign currency risk

This refers to the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in foreign currency rates. ANSTO is exposed to foreign currency rate risk primarily from trade creditors. The impact only relates to assets and not profit and loss or equity.

Risk variable	Change in variable		Effect on		Effect on	
	2015	2014	Profit or loss 2015 $'000	Equity 2015 $'000	Profit or loss 2014 $'000	Equity 2014 $'000
USD Currency ($'000)	437	437				
Foreign currency	10.90%	11.50%	48	48	50	50
Foreign currency	(10.90%)	(11.50%)	(48)	(48)	(50)	(50)

The method used to arrive at the possible risk of 10.9% (2014: 11.5%) was based on both statistical and non-statistical analyses. The statistical analysis has been based on main currencies movement for the last five years. The two main currencies ANSTO has exposure to are the USD and the EURO. This information is then revised and adjusted for reasonableness under the current economic circumstances.

10.9% (2014: 11.5%) is management's best estimate of future major currencies foreign exchange volatility.

g) Reconciliation of level 3 fair value hierarchy

	2015	2014
	$'000	$'000
Opening balance	5,000	5,000
Total gains or losses for the year recognised in profit and loss	-	-
Closing balance	**5,000**	**5,000**

The investment in the Australian Synchrotron Holding Company of $5M is assessed as not requiring impairment testing due to the certainty regarding future funding with the changed circumstances resulting in securing sufficient operating funding to 30 June 2017 and ANSTO being chosen as the operator from 1 January 2013 and ongoing discussions regarding future support of the Australian Synchrotron.

Note 20. Government funding

	2015	2014
	$'000	$'000
Revenue from Government	157,414	163,011
Government equity injection	96,439	45,125
Education Investment Fund equity injection	-	3,000
Total government funding	**253,853**	**208,136**

Appropriations are made to the Department of Industry and Science and then paid to ANSTO. ANSTO does not receive any Departmental Capital Budget.

Note 21. Trust money

ANSTO receives money from trade creditors as security deposits for contracts to be performed. These monies are held in a trust account and refunded to the respective trade creditors on satisfactory completion of the contract.

	2015	2014
	$'000	$'000
Opening balance	8	8
Add receipts	-	-
Deduct payments	-	-
Closing balance	**8**	**8**

Note 22. Other comprehensive income

	2015	2014
	$'000	$'000
Changes in asset revaluation reserve		
Revaluation – decommissioning	(1,799)	23,550
Revaluation – assets	-	192
Total revaluation adjustments in other comprehensive income	**(1,799)**	**23,742**

Notes to the Financial Statements (continued)

Note 23. OPAL Nuclear Research Reactor

In the 2014-2015 financial year the OPAL research reactor operated for 307 days at high power, which translates to a total availability of 84.1% and a planned availability against the schedule of 98%. OPAL continues to demonstrate it remains one of the world's most highly available multipurpose research reactors.

Successful production of reactor-based radiopharmaceuticals, neutron activation analysis for scientific research, and irradiation of neutron transmutation doped (NTD) silicon was achieved during the year with ANSTO becoming the world's largest producer of NTD silicon. The efficiency of the delivery of these products and services was enhanced through the ANSTO-wide operational excellence initiative.

The Cold Neutron Source, which supplies important low energy neutrons for research, has operated with a planned availability of 99% for the second consecutive year since completion of engineering modifications to the CNS compressors. The increased reliability of the Cold Neutron Source is now producing world-class research on all of the Bragg Institute instruments.

ANSTO plans to operate OPAL for 300 days in 2015-2016.

Note 24. Insurances

Insurance risks, including professional indemnity, general liability, industrial special risk for property used substantially for commercial purposes, directors and officers, and travel, are placed through Comcover, the Government's insurable risk managed fund. Workers compensation is insured through Comcare Australia and by virtue of statute under the *Safety Rehabilitation and Compensation Act 1988*.

A Deed of Indemnity between the Commonwealth Government and ANSTO, under which the government has formally agreed to indemnify ANSTO and ANSTO Officers from any loss or liability arising from claims caused by ionising radiation, remains in place until August 2018. This indemnity does not specify that subsidiaries are included.

Note 25. Remuneration of auditors

	2015	2014
	$	$
Amounts received or due and receivable by ANAO for:		
Audit of the ANSTO Group	256,500	245,500
Special audits required by regulators	5,500	5,000
Amounts received or due and receivable by entities other than the ANAO for:		
Audit of entities within the ANSTO Group	8,005	8,372
Other non-audit related services (a)	46,634	51,545
Total remuneration of auditors	**316,639**	**310,417**

(a) The audit of New Policy Proposals spending (2014: DOIS requested and paid for the due diligence work on Australian Synchrotron Holding Company (ASHCo)).

No other services were provided by the Auditor-General during the reporting period.

Note 26. Information relating to ANSTO (the parent entity)

	2015	2014
	$'000	$'000
Current assets	224,106	162,221
Non-current assets	1,148,088	1,138,747
Total assets	**1,372,194**	**1,300,968**
Current liabilities	82,798	81,026
Non-current liabilities	324,042	305,010
Total liabilities	**406,840**	**386,036**
Net assets	**965,354**	**914,932**
Contributed equity	705,420	608,981
Asset revaluation reserve	489,506	491,636
Other reserves	10,006	13,182
Accumulated deficit	(239,578)	(198,867)
Total equity	**965,354**	**914,932**
Deficit of the parent entity	**(44,215)**	**(33,184)**
Other comprehensive income of the parent entity	**(1,799)**	**23,551**
Total comprehensive income of the parent entity	**(46,016)**	**(9,633)**

As at 30 June 2015 ANSTO issued a letter of support to Synchrotron Light Source Australia Pty Ltd, for the $13 million of revenue from Government that will be allocated to ANSTO for the operation of the Australian Synchrotron in 2016-17. (30 June 2014: ANSTO issued a letter of support to ANSTO Nuclear Medicine Pty Ltd).

The commitments shown in the Consolidated Schedule of Commitments only relate to ANSTO.

Note 27. Budgetary reports and explanations of major variances

The following tables provide a comparison between the 2014–15 Portfolio Budget Statements (PBS) budget and the final financial outcome in the 2014–15 financial statements. The Budget is not audited and does not reflect additional budget estimates provided in the 2014–15 Portfolio Additional Estimates Statements (PAES) or the revised budget provided as part of the 2015–16 Portfolio Budget Statements (PBS). However, major changes in budget have been explained as part of the variance analysis where relevant. The ANSTO PBS does not include ANSTO Nuclear Medicine Pty Ltd (ANM), the $168.8M nuclear medicine initiative, as it is a Public Non-Financial Corporation (PNFC) but does contain ANSTO's other controlled entities. PNFC's do not form part of the General Government Sector (GGS) and are outside of the scope of AASB 1055 *Budgetary Reporting*. ANM is included in the Actual figures as it is controlled by ANSTO.

A budget has not been provided for in the PBS, for non-cash items such as asset revaluations, foreign exchange and sale of asset adjustments. Unless the variance is considered to be 'major', no explanation has been provided.

Notes to the Financial Statements (continued)

Consolidated Statement of Comprehensive Income

For the year ended 30 June 2015	Actual 2015	Budget 2015	Variance 2015
	$'000	$'000	$'000
Expenses			
Employees	140,244	122,413	17,831
Suppliers	74,261	89,158	(14,897)
Depreciation and amortisation	70,106	77,926	(7,820)
Write down and impairment of assets	3,261	-	3,261
Grants	3,419	2,000	1,419
Finance costs	14,981	16,651	(1,670)
Foreign currency exchange loss	11,204	-	11,204
Total expenses	317,476	308,148	9,328
Revenue			
Goods and services	74,733	75,700	(967)
Interest	5,288	2,400	2,888
Grants	34,742	35,200	(458)
Other revenue	22	-	22
Total revenue	114,785	113,300	1,485
Other income			
Foreign currency exchange gains	1,126	500	626
Gains from asset sales	47	200	(153)
Total other income	1,173	700	473
Total own-source income	115,958	114,000	1,958
Net cost of services	201,518	194,148	7,370
Revenue from Government	157,414	159,113	(1,699)
Deficit for the year before tax	(44,104)	(35,035)	(9,069)
Income tax expense	(85)	-	(85)
Deficit after tax attributable to Australian Government	(44,189)	(35,035)	(9,154)
Other comprehensive income			
Changes in asset revaluation reserve	(1,799)	-	(1,799)
Items that may be subsequently reclassified to net cost of services			
Exchange differences on translation of foreign operations	28	-	28
Total other comprehensive income for the Year	(1,771)	-	(1,771)
Total comprehensive deficit for the Year attributable to Australian Government	(45,960)	(35,035)	(10,925)
Total deficit for the year:			
Attributable to Australian Government	(44,189)	(35,035)	(9,154)
Attributable to non-controlling interest	-	-	-
	(44,189)	(35,035)	(9,154)
Total comprehensive deficit for the year:			
Attributable to Australian Government	(45,960)	(35,035)	(10,925)
Attributable to non-controlling interest	-	-	-
	(45,960)	(35,035)	(10,925)

Consolidated Statement of Financial Position

As at 30 June 2015	Actual 2015 $'000	Budget 2015 $'000	Variance 2015 $'000
Assets			
Financial assets			
Cash and cash equivalents	6,682	3,899	2,783
Trade and other receivables	15,167	15,334	(167)
Investments	197,025	201,569	(4,544)
Total financial assets	218,874	220,802	(1,928)
Non-financial assets			
Land and buildings	317,770	297,724	20,046
Property, plant and equipment	751,265	762,661	(11,396)
Intangible assets	78,698	66,085	12,613
Inventories	18,072	21,636	(3,564)
Deferred tax asset	920	-	920
Other	8,604	3,622	4,982
Total non-financial assets	1,175,329	1,151,728	23,601
Total assets	1,394,203	1,372,530	21,673
Liabilities			
Payables			
Suppliers	20,002	13,860	6,142
Employees	6,330	6,204	126
Grants	135	682	(547)
Other	17,995	14,501	3,494
Total payables	44,462	35,247	9,215
Provisions			
Employee	38,581	35,714	2,867
Decommissioning	286,136	302,340	(16,204)
Intellectual property payment	57,686	48,727	8,959
Other	67	-	67
Total provisions	382,470	386,781	(4,311)
Total liabilities	426,932	422,028	4,904
Net assets	**967,271**	**950,502**	**16,769**
Equity			
Parent entity interest			
Contributed equity	705,420	702,671	2,749
Reserves	500,118	481,984	18,134
Accumulated deficit	(238,267)	(234,153)	(4,114)
Total parent entity interest	967,271	950,502	16,769
Non-controlling interest			
Contributed equity	-	-	-
Reserves	-	-	-
Accumulated deficit	-	-	-
Total non-controlling equity	-	-	-
Total equity	**967,271**	**950,502**	**16,769**

Notes to the Financial Statements (continued)

Consolidated Statement of Changes in Equity

For the year ended 30 June 2015	Accumulated deficit			Asset revaluation reserve			Other reserves		
	Actual 2015	Budget 2015	Variance 2015	Actual 2015	Budget 2015	Variance 2015	Actual 2015	Budget 2015	Variance 2015
	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
Balance at 1 July 2014	(197,583)	(199,118)	1,535	491,911	468,169	23,742	13,483	13,815	(332)
Deficit for the year	(44,189)	(35,035)	(9,154)	-	-	-	-	-	-
Other comprehensive income									
Foreign currency translation	-	-	-	-	-	-	28	-	28
Revaluation increment	-	-	-	(1,799)	-	(1,799)	-	-	-
Total comprehensive deficit for the year	(44,189)	(35,035)	(9,154)	(1,799)	-	(1,799)	28	-	28
Transactions with owners									
Appropriation (equity injection)									
Transfer between equity components	3,505	-	3,505	-	-	-	(3,505)	-	(3,505)
Balance at 30 June 2015	**(238,267)**	**(234,153)**	**4,114**	**490,112**	**468,169**	**21,943**	**10,006**	**13,815**	**(3,809)**

	Contributed equity			Total		
	Actual 2015	Budget 2015	Variance 2015	Actual 2015	Budget 2015	Variance 2015
	$'000	$'000	$'000	$'000	$'000	$'000
Balance at 1 July 2014	608,981	608,981	-	916,792	891,847	24,945
Deficit for the year	-	-	-	(44,189)	(35,035)	(9,154)
Other comprehensive income						
Foreign currency translation	-	-	-	28	-	28
Revaluation increment	-	-	-	(1,799)	-	(1,799)
Total comprehensive deficit for the year	-	-	-	(45,960)	(35,035)	(10,925)
Transactions with owners						
Appropriation (equity injection)	96,439	93,690	2,749	96,439	93,690	2,749
Transfer between equity components	-	-	-	-	-	-
Balance at 30 June 2015	**705,420**	**702,671**	**2,749**	**967,271**	**950,502**	**16,769**

Consolidated Statement of Cash Flows

For the year ended 30 June 2015	Actual 2015 $'000	Budget 2015 $'000	Variance 2015 $'000
Cash flows from operating activities			
Sales of goods and rendering of services	78,432	75,700	2,732
Grants received	34,010	35,200	(1,190)
Interest received	5,154	2,400	2,754
Receipts from Government	157,414	159,113	(1,699)
Other receipts	-	(500)	500
Payments to employees	(140,969)	(120,413)	(20,556)
Payments to suppliers	(84,663)	(96,648)	11,985
Payment of borrowing costs	-	(200)	200
Other payments	-	(2,000)	2,000
Net cash from operating activities	49,378	52,652	(3,274)
Cash flows from investing activities			
Proceeds from sale of property plant and equipment	109	200	(91)
Proceeds from investment sales	632,827	230,000	402,827
Purchase of property, plant and equipment	(81,722)	(65,506)	(16,216)
Purchase of investments	(694,160)	(311,536)	(382,624)
Net cash from investing activities	(142,946)	(146,842)	3,896
Cash flows from financing activities			
Appropriation – contributed equity	96,439	93,690	2,749
Other – foreign exchange	-	500	(500)
Net cash from financing activities	96,439	94,190	2,249
Net decrease in cash and cash equivalents	2,871	-	2,871
Effect of exchange changes on the balance of cash and cash equivalents held in foreign currencies	29	-	29
Cash and cash equivalents at the beginning of the reporting year	3,782	3,899	(117)
Cash and cash equivalents at end of the reporting year	6,682	3,899	2,783

Explanation of major variances

Affected line item and statement	Explanation
Statement of Comprehensive Income	The 2014-15 budget was developed early 2014 based on six months of actuals for 2013-14. This was then adjusted for any non-reoccurring items and new developments. When the 2013-14 actuals were available a determined effort was commenced post PBS to ensure more accurate figures were reflected in the October 2014 MYEFO process.
Expenses	
Employees	The 2014-15 budget included OPAL operational funding as employee expenses. Instead of being apportioned between employees and suppliers. At MYEFO, Employee expenses were adjusted to $144,020,000.
Suppliers	The 2014-15 budget did not include OPAL operational funding. It was reflected entirely as employee expenses instead of being apportioned between employees and suppliers. At MYEFO, Suppliers expenses were adjusted to $67,271,000.
Depreciation and amortisation	The difference is a combination of (i) over-estimating the amount of Assets under Construction that would be capitalised during year and therefore depreciation commenced and (ii) lower than expected capital expenditures ($10,000,000) on depreciable assets than budgeted.
Write down and impairment of assets	The actual figure is a result of annual asset impairment testing. Two assets were impaired accounting for $3,000,000. Given the nature of impairment these items are not budgeted for.
Grants	The budget figures were based on estimates from the divisional heads. Grants are awarded only on merit based research science. At MYEFO, grants expenses were adjusted to $5,017,000.
Finance costs	The budget was based on the parameters current at the time. The decrease reflects the result of the annual review of Decommissioning provision. The annual revision looks not only at individual costing of the line items but the timing of the expected spend, including the impact of discount rates and CPI.
Foreign currency exchange loss	The unbudgeted increase is largely unrealised and was mainly due to change in USD rate moving from 0.9420 to 0.7860 increasing the required provision for future royalty payments to NTP by $9,900,000.
Revenue	
Interest	Interest revenue is higher than budgeted as cash investment holdings increased due to lower than expected capital expenditures with a delay in the ANM project being a major factor. This is despite the reduction in interest rates throughout the year from 5% to 3%.
Other income	
Foreign currency exchange gains	This variance is due to movements in the exchange rate which cannot be accurately budgeted for, based on prior year experience a nominal gain and no foreign currency loss was budgeted.
Other comprehensive income	
Changes in asset revaluation reserve	As this is a non-cash item it is not budgeted.

Affected line item and statement	Explanation
Statement of Financial Position	The 2014-15 budget was developed early 2014 and was based on MYEFO 2014-15, with a number of line items not being adjusted. Therefore, in an attempt to bridge the gap between estimates and actuals a determined effort was commenced post PBS to ensure more accurate figures were reflected in the October 2014 MYEFO process.
Financial assets	
Cash and cash equivalents	In 2014-15 SLSA a subsidiary of ANSTO's received a 2015-16 contribution in advance of year-end.
Non-financial assets	
Intangible assets	The budget, also did not factor in several large additions, including the capitalisation of ANSTO IP development costs. The budget figure also excluded $3,778,000 expenditure on the ANSTO Enterprise (SAP upgrade) project.
Inventories	The difference between budget and actual results relates to the timing of purchases of target plates. This also resulted in a corresponding increase in other assets (prepayments).
Other assets	The difference between budget and actual results relates to the timing of purchases of target plates and nuclear fuel for OPAL. Resulting in a corresponding decrease in inventory.
Liabilities	
Payables	
Suppliers	Timing difference only, the budget was based on estimated actual for 2013-14 and did not allow for impact of ANM payables.
Other	Timing difference only, the budget was based on estimated actual for 2013-14.
Provisions	
Intellectual property payment	The variance reflects future IP payments based on USD exchange rate of 0.7680 at 30 June 2015 from 0.9420 at 30 June 2014 which was not budgeted. The foreign exchange impact was $9,900,000.
Equity	
Parent Entity interest	
Reserves	Due to the timing of the 2014-15 budget this figure was based on the 2013-14 estimated actuals. The variance is due to the impact of the $23,600,000 change in the Revaluation reserve resulting from changes in the underlying assets forming part of the Decommissioning provision.

Affected line item and statement	Explanation
Consolidated Statement of Cash Flows	
Cash flows from operating activities	
Payments to employees	The 2014-15 budget included OPAL operational funding as entirely payments to employees, instead of being apportioned between payments to employees and payments to suppliers. At MYEFO, payments to employees were adjusted to $142,020,000.
Payments to suppliers	The 2014-15 budget included OPAL operational funding entirely as payments to employees, instead of apportioned between payments to employees and payments to suppliers. At MYEFO, Payments to suppliers were adjusted to $74,761,000.
Other payments	The variance is caused by the budget being based on prior year estimate, not actuals.
Cash flows from investing activities	
Proceeds from investment sales	This relates to the frequency of Investment rollovers. Due to delay in the ANM project additional investments were made in short term deposits. This nets off against the variance below for Purchase of investments.
Purchase of investments	See above comment for Proceeds from investment sales.
Purchase of property, plant and equipment	The variance is due to the actuals including AUC capital expenditures on ANM ($25,200,000). The Budget reflects this expenditure as purchase of investments due to the fact that ANM is a PNFC and outside the GGS.

CORPORATE GOVERNANCE

ANSTO Statement on Corporate Governance

ANSTO is an Australian Government Corporate Commonwealth entity with its own Board that is established and constituted under the provisions of the *Australian Nuclear Science and Technology Organisation (ANSTO) Act 1987*. ANSTO forms part of the portfolio responsibilities of the Minister for Industry and Science.

The *ANSTO Act* defines the organisation's functions and powers, details the ANSTO Board and the Chief Executive Officer's responsibilities and duties to manage the organisation and defines staffing, financial management and governance arrangements necessary for the efficient and effective management of the organisation.

As a Corporate Commonwealth entity, ANSTO's operations and governance arrangements (commencing in the reporting period 2014-15) are also subject to the provisions of the *Public Governance, Performance and Accountability (PGPA) Act 2013* and the *Rules* issued pursuant to that Act. The PGPA Act, together with its associated Rules and guidance, came into effect from 1 July 2014 and replaced the *Commonwealth Authorities and Companies (CAC) Act*.

The *PGPA Act* promotes and mandates high standards of governance, performance and public accountability and establishes a core set of obligations that apply to an entity's accountable authority (i.e. the governing Board) and 'officials' employed or otherwise engaged by a Commonwealth entity.

Over the 2014-15 reporting period, ANSTO has continued to align its operational frameworks and corporate governance arrangements to meet the requirements of the *PGPA Act* and the associated Rules.

ANSTO's governance structures and processes are underpinned by its corporate values and Code of Ethics. ANSTO's values and business ethics standards and culture are regularly reviewed and adapted, when appropriate, to accommodate organisational change and to reflect national and international best practice.

In October 2014, ANSTO prepared and lodged an annual *'Commonwealth Authorities and Companies (CAC) Act – Compliance Report'* with the Minister for Finance and ANSTO's responsible Minister (covering the reporting period 2013-14). This report confirmed ANSTO's compliance with the CAC Act and Regulations and the General Policy Orders of the Commonwealth Government applicable to ANSTO at that time. In addition, the report confirmed ANSTO's ongoing financial sustainability.

Commencing for the period 2014-15, the *CAC Act - Compliance Report is to be replaced by a PGPA – Annual Compliance Report.*

Ministerial Oversight

In 2014-15 the Minister responsible for ANSTO was the Minister for Industry, who became the Minister for Industry and Science in December 2014.

Under the *ANSTO Act* and *PGPA Act*, the relevant Minister and the Finance Minister may provide the ANSTO Board with directions in writing in respect of the performance of the functions or the exercise of the powers of the Board or the organisation, including compliance with Government Policy Orders.

No Ministerial Directions, issued under either the *ANSTO Act* or *PGPA Act*, were received by the ANSTO Board in 2014-15.

In June 2015 the Minister for Industry and Science provided the ANSTO Board with a Statement of Expectations (SOE) relative to the government's policy context; partnerships and collaboration; science assets and staff; and communication with the Minister's office and the department. The ANSTO Board has provided a response to the SOE in the form of a Statement of Intent that sets out how the ANSTO Board will meet the Minister's expectations as articulated within the SOE.

Notification of 'Significant' Events

Under section 19 of the *PGPA Act* and in accordance with the Minister's *Statement of Expectations*, ANSTO is required to provide ANSTO's responsible Minister with written notification of specified events and, more generally, to keep the Minister informed of its operations and those of its subsidiaries.

During the period 2014-15, notifications were provided to the Minister in relation to:

- the subscription by ANSTO and the Minister for Industry and Science, on behalf of the Commonwealth, for shares in ANSTO Nuclear Medicine (ANM) Pty Ltd;
- the entering into of a loan agreement with ANM to fund the commissioning and initial operation of the new nuclear medicine facility and associated Synroc plant; and
- a decision to enter into a Joint Venture with NTP Radioisotopes Limited, a wholly owned subsidiary of the South African Nuclear Energy Cooperation (Necsa).
- In addition, 58 briefs on ANSTO's operations were provided to the Minister.

ANSTO Board

ANSTO is governed by a Board which is the 'accountable authority' responsible to the Australian Government under the *PGPA Act* for the overall direction, performance and governance of the organisation. ANSTO's operational and corporate governance frameworks support the effective operation of the ANSTO Board in the execution of its statutory and fiduciary duties under relevant legislation, particularly the *ANSTO* and *PGPA Acts*.

The general functions of the Board, as set out in the *ANSTO Act*, are to ensure the proper and efficient performance of the functions of the organisation and to determine the policy of the organisation with respect to any matter, having regard to the current policies of the Commonwealth Government.

The responsibilities and duties of the Board and its relationship with Executive Management are set out in a Board Charter. These responsibilities reflect the mandatory duties that apply to accountable authorities under sections 15 to 19 of the *PGPA Act*.

The principal governance responsibilities of the Board are to:

- select, appoint and monitor the performance of the Chief Executive Officer;
- establish and monitor the strategic direction of the organisation;
- determine and approve 'major' policies of the organisation;
- oversee the operations of the organisation ensuring the organisation operates in a safe, responsible and ethical manner, and is compliant with legal and regulatory obligations;
- monitor financial performance; and
- ensure the establishment of effective organisational governance, risk management, compliance, and assurance mechanisms.

A key obligation under the PGPA Act is the need for Board members to disclose a material personal interest in any matter being considered by the Board. The PGPA Act also prohibits participation, deliberation and decision-making by any member on such matters. For the reporting period 2014-15 the Board is satisfied that it has discharged its duties and obligations in accordance with relevant requirements.

The effectiveness and performance of the Board and the individual members of the Board are evaluated annually. The Board Chair leads the evaluation process. The remuneration and allowances payable to members of the Board, including the Chief Executive Officer, are determined by the Australian Government Remuneration Tribunal.

Composition of the Board

As of 30 June 2015, the ANSTO's Board comprised the ANSTO Chief Executive Officer and six non-executive members drawn from the broader community who are not involved in the day-to-day management of the organisation. All non-executive members are appointed by the Governor-General in Council. The Chief Executive Officer is appointed by the ANSTO Board, in consultation with the Minister.

The Chief Executive Officer manages the affairs of ANSTO, subject to the directions of, and in accordance with, policies determined by the Board. Senior management attends Board meetings as required to report on matters relevant to their individual areas of responsibility.

Each Board member brings complementary skills and experience to the Board relevant to the principal activities and operations of ANSTO.

Board members are able to seek independent professional advice in accordance with their duties, responsibilities and obligations as members of the Board. Newly appointed Board members are inducted in the organisation's operations and activities, and their duties and responsibilities as a Board member of a Corporate Commonwealth entity.

The Board meets regularly in accordance with a formally approved timetable and agenda. Six Board meetings were held during the 2014-15 financial year. Details of the number of Board meetings attended by each member during the financial year 2014-15 are outlined in **Table 1**.

Board committees

The ANSTO Board operates a Risk and Audit Committee (RAC), in accordance with the PGPA Act and Rules and corporate governance best practice, and a Remuneration and Nominations Committee.

Risk and Audit Committee

The overall purpose of the RAC is to assist the ANSTO Board in the discharge of its responsibilities by providing independent oversight, advice and assurance to the Board on the appropriateness of financial reporting processes, performance reporting arrangements, systems of risk oversight and management, and systems of internal control.

The role, purpose and responsibilities of the RAC are set out in the RAC Charter, which was updated in 2014-15 to address *PGPA Act* and *Rule* requirements.

The Board is responsible for the appointment of RAC members, including the RAC Chair. The RAC consists of at least three members drawn from the Board who are required to have appropriate qualifications, knowledge, skills or experience to assist the RAC to perform

Table 1

Member	Eligible to attend	Attended
Mr Jim W McDowell (Chair)	6	6
Ms Erica Smyth (Deputy Chair)	6	6
Professor David Copolov, OAM	6	5
Ms Penelope J Dobson	6	6
Professor Judy A Raper	6	6
Professor Andrew M Scott	6	6
Dr Adrian (Adi) Paterson (Chief Executive Officer)	6	6

its functions, including but not limited to an appropriate level of understanding of systems of risk oversight and management and systems of internal control. At least one member is required to be a qualified accountant or other financial professional or with appropriate executive experience and understanding of financial reporting processes and performance reporting arrangements. Membership of the RAC is to be reviewed in 2015-16 to ensure consistency with the revised RAC Charter.

The Chair of the Board, the ANSTO Chief Executive Officer, and the ANSTO Group Chief Financial Officer cannot be members of the RAC. However, the Chair of the Board and other Board members may attend RAC meetings, as observers. Members of the ANSTO management team (including the Group Chief Financial Officer, Head of Internal Audit and Legal Counsel) attend meetings of the RAC as advisors and observers, by invitation of the RAC Chair.

Representatives from the Australian National Audit Office (ANAO) and their contracted service provider (currently Deloitte) also attend RAC meetings, by invitation of the RAC Chair.

The Risk and Audit Committee meets four times a year. Details of the number of RAC meetings attended by each member during the financial year 2014-15 are provided in **Table 2**.

Table 2

Member	Eligible to attend	Attended
Ms Erica Smyth (Chair)	4	4
Professor David Copolov OAM	4	3
Ms Penelope J Dobson	4	4
Mr Jim W McDowell	1	1
Professor Judy A Raper	4	4
Professor Andrew M Scott	4	4

Remuneration and Nominations Committee

The objective of the Remuneration and Nominations Committee is to assist the Board in fulfilling its responsibilities regarding the overall remuneration policy and strategy; performance and remuneration of the Chief Executive Officer (CEO); statutory and regulatory compliance of remuneration policies; and succession planning and nominations for Board Members and the position of the CEO.

The objectives, duties and responsibilities of the committee are set out in the Remuneration and Nominations Committee Charter.

The Remuneration and Nominations Committee consists of at least two non-executive members of the Board and the CEO. The committee is chaired by a non-executive member nominated by the Board. The General Manager, Human Resources attends committee meetings by invitation as do other relevant parties by invitation of the committee chair.

The committee met on two occasions during the 2014-15 financial year. Details of the number of Remuneration and Nominations Committee meetings attended by each member during the financial year 2014-15 are provided in **Table 3**.

Table 3

Member	Eligible to attend	Attended
Mr Jim W McDowell (Chair)	2	2
Ms Penelope J Dobson	2	2
Professor David Copolov, OAM	2	2
Dr Adrian (Adi) Paterson (Chief Executive Officer)	2	2

External Audit

The Commonwealth Auditor-General, through the Australian National Audit Office (ANAO), is the external auditor for ANSTO.

For the year 2014-15, the ANAO contracted Deloitte Touche Tohmatsu to assist with the ANSTO external audit and during the financial year Deloitte Touche Tohmatsu has provided other services to ANSTO with prior written consent from the ANAO. Prior to approving the other services the ANAO considered the independence implications of the other services provided. The services provided are summarised as tax consulting and audit of New Policy Proposal (NPP) spending.

Risk management

Under section 16 of the *PGPA Act*, the ANSTO Board is responsible to establish and maintain an appropriate system of risk oversight and management; and an appropriate system of internal control.

Management is accountable to the ANSTO Board for designing, implementing and monitoring the risk management framework and its integration into the day-to-day activities of the organisation. ANSTO's risk management framework is based on the following key principles:

- adoption of a common risk management approach and language
- positioning risk management as an integral part of all organisational processes, including decision making processes
- applying a systematic and structured risk management process that is responsive to change
- establishing a comprehensive and effective internal control system that provides 'reasonable assurance' regarding the effectiveness and efficiency of operations; the reliability of financial and non-financial reporting; and compliance with applicable laws and regulations
- the delegation of responsibility and accountability
- promotion of an enterprise-wide philosophy that seeks to identify and exploit opportunity responsibly; and anticipate and treat risks before they occur

The ANSTO Board determines the nature and extent of the risk they are willing to accept in achieving the organisation's strategic objectives, consistent with ANSTO's risk appetite and the prudent, proper and ethical use and management of public resources. The ANSTO Board has a particular interest in those risks that may negatively impact the sustainability and reputation of the organisation.

The RAC receives regular reports and briefings on ANSTO's key risks, risk management activities and the risk management maturity of the organisation.

Internal Control

The ANSTO Board is ultimately responsible to establish and maintain a system of internal controls that provides 'reasonable assurance' that ANSTO's objectives will be achieved relative to the effectiveness and efficiency of its operations, the reliability of financial and non-financial reporting and compliance with applicable laws and regulations.

ANSTO is currently implementing the *COSO Internal Control – Integrated Framework and the Three Lines of Assurance Defense* model to assist in the development, deployment and evaluation of internal control systems and arrangements.

Fraud Control

Section 10 of the *PGPA Rule* places a legal obligation on the ANSTO Board to take all reasonable measures to prevent, detect and deal with fraud, including by:

- conducting fraud risk assessments;
- developing and implementing a fraud control plan;
- having an appropriate mechanism for preventing fraud;
- having an appropriate mechanism for detecting incidents of fraud or suspected fraud;
- having an appropriate mechanism for investigating or otherwise dealing with incidents of fraud or suspected fraud; and
- having an appropriate mechanism for recording and reporting incidents of fraud or suspected fraud.

In accordance with the above obligations, ANSTO conducts risk assessments of its exposure to possible fraud, corrupt conduct and other forms of unacceptable behaviour, and has prepared a comprehensive Fraud Control Plan that details fraud control governance arrangements and risk mitigation strategies.

ANSTO has also established fraud control and ethics policies, standards and procedures that serve to minimise the incidence of fraud and other forms of unacceptable behaviour, including procedures and processes for fraud prevention, detection and reporting as well as investigation standards.

In addition, ANSTO has a *Public Interest Disclosure Act 2013 (PID Act)* Scheme (including a PID reporting scheme) which is consistent with the requirements of the *PID Act* and the guidance provided by the Commonwealth Ombudsman. This scheme provides a mechanism for reporting, amongst other, incidents of fraud.

Business Ethics

ANSTO's Code of Ethics provides all ANSTO employees and contracted staff with a framework for ethical decision-making and articulates the standards of behaviour, values and actions expected of all individuals who work for or on behalf of ANSTO. The Code explains the principles covering appropriate conduct in a variety of contexts and informs employees on how to deal with their work colleagues, stakeholders, other organisations and the community in an appropriate manner.

The Code is supported by a range of policies, guidelines and instructions that specifically address matters canvassed within the Code, including managing conflicts of interest, harassment and bullying, gifts and benefits, hospitality, email and internet usage, and insider trading.

ANSTO's ethical values and standards are reinforced through various means, including training and awareness, staff engagement surveys, and the ANSTO Enterprise Agreement.

Business Resilience

The continuity of ANSTO's operations is critical and is a key focus area of the Board, the Chief Executive Officer and senior management. Many of the services delivered by ANSTO are critical to the economic and social well-being and health of the Australian community.

ANSTO regularly reviews and tests all aspects of its Business Resilience Framework to ensure its continued robustness, reliability and readiness. This includes response planning in relation to ANSTO's OPAL reactor and other critical infrastructure.

Legal and Regulatory Compliance

ANSTO operates within a complex and highly regulated business environment. In recognition of this environment, ANSTO has established a range of strategies, policies, systems, responsibility and accountability arrangements that mitigate the risk of non-compliance with relevant laws and regulations. The continuing development and improvement of ANSTO's compliance framework remains a key focus.

Internal Audit

The ANSTO Board has established an Internal Audit function as a key component of ANSTO's governance framework.

The primary purpose of Internal Audit is to provide the ANSTO Board and Chief Executive Officer with independent and objective assurance and advisory services that 'add value' and help improve operational performance.

The scope of Internal Audit's activities encompasses all financial and non-financial functions, systems, programs, projects, activities and processes, across all ANSTO Institutes, Divisions, and Business Units.

Internal Audit engagements generally involve:

- appraising the adequacy and effectiveness of the internal control environment
- reviewing the adequacy and effectiveness of arrangements established by management to ensure compliance
- assessing the adequacy of risk management activities as they relate to specific business functions, systems, programs, projects or activities
- reviewing the means of safeguarding physical and intangible assets
- reviewing the reliability and integrity of financial and non-financial information
- appraising the economy, efficiency and effectiveness with which resources are acquired and deployed relative to the achievement of business objectives

The Head of Internal Audit prepares strategic and annual work plans that are risk based, and which reflect focus areas that may be highlighted by the RAC and executive management. These plans are updated, as appropriate, in line with ANSTO's dynamic business environment. The annual Internal Audit Plan is reviewed by the RAC and approved by the ANSTO Board.

The findings and recommendations arising from each internal audit engagement are presented to the RAC. Follow-up reviews are conducted to ensure that all internal audit recommendations are properly closed-out.

In order to ensure the independence of the Internal Audit function, the Head of Internal Audit reports directly to the RAC and has unrestricted access to the RAC Chair and members, as well as the Chair of the Board. The Head of Internal Audit reports for administrative purposes only to the Group Chief Financial Officer.

The Head of Internal Audit attends executive management meetings and has unrestricted access to Board and Committee minutes and submissions.

The role, purpose, scope and authority of the Internal Audit function is set out in the Internal Audit Charter. This Charter is reviewed by the RAC and approved by the ANSTO Board.

'Combined' Assurance

ANSTO continues to derive significant benefits from its 'combined assurance' approach by eliminating unnecessary duplication of assurance activity and improved assurance coverage of key risk areas.

Judicial decisions and reviews by outside bodies

There were no judicial decisions or decisions of administrative tribunals that had a significant impact on the operations of ANSTO during the reporting year.

There were no specific reports issued by the Commonwealth Auditor-General, other than their report issued in relation to the 2014-15 financial statements.

There were no reports on the operations of ANSTO by a Parliamentary Committee, the Commonwealth Ombudsman or the Office of the Australian Information Commissioner during the reporting year.

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Indemnities and insurance premiums for officers

ANSTO's insurance coverage with Comcover includes professional indemnity and directors' and officers' liability. Certain sections of the *PGPA Act* contain prohibitions against ANSTO giving indemnities and paying insurance premiums relating to liabilities arising from conduct involving a lack of good faith by officers. There have been no exceptions to these provisions and no claims were made against ANSTO in respect of such liability that required a claim on ANSTO's insurer, Comcover. It should be noted that ANSTO subsidiaries are fully covered under ANSTO's overarching Comcover policies. Workers compensation coverage is dependent on whether employees of a subsidiary are Commonwealth Government employees or employed under State labour legislation.

Nuclear liability

A *Deed of Indemnity* (executed on 27 August 2008, for a period of ten years) commits the Commonwealth Government to meeting any damages awarded against ANSTO, its employees and contractors for damage caused by ionising radiation. This indemnity is supplemental to ANSTO's coverage under cover provided with the Commonwealth's insurance body, Comcover. Neither that Deed nor its predecessor (executed in 1998) has been invoked.

APPENDIX 1

Equality of Employment Opportunity

ANSTO's 2012-2014 Enterprise Agreement reaffirmed the organisation's commitment to:

1. Supporting staff achieve a balance in their work and personal life including reviewed working from home and phased retirement provisions
2. Providing a positive working environment through preventing workplace bullying and harassment
3. Recognising the value of diversity in the workplace and making all reasonable endeavours to improve the diversity of ANSTO's workforce, including Aboriginal Torres Strait Islander employees, employees with a disability and employees from a culturally and linguistically diverse background.

The Enterprise Agreement also contains extended maternity leave and paid paternity leave entitlements.

Family services and childcare centre

The ANSTO KU Children's Centre is an employer sponsored centre, offering child care services to ANSTO staff as well as members of ANSTO subsidiaries and the wider community. ANSTO staff and its subsidiaries also have the ability to salary package child care fees.

Gender equity at ANSTO

Gender equity is about creating workplace and employment opportunities for all staff (both male and female) ensuring ANSTO remains an employer of choice in the scientific community.

A Gender Equity Committee was formed in 2014 with a mandate and strategy to support the delivery of improved employment flexibility, challenge outdated work practices and foster opportunities for multiple career paths.

Benefits and performance

ANSTO is committed to providing a workplace that is equally appealing to both women and men to ensure that our organisation attracts and maintains a strong talent pool.

By increasing our reputation as an employer of choice through family friendly principles and balanced staff policies we will be attracting the best candidates for the job each and every time.

Women in Engineering

During the financial year, ANSTO sponsored the University of NSW (UNSW) Women In Engineering Society who are doing their part to support, inspire and recognise women in the engineering field.

The group is made up of UNSW engineering students who want to provide a support network and equal opportunities for young engineers studying at UNSW. By working together with engineering students, the engineering faculty and organisations like ANSTO, are aiming to create a community that displays an understanding of the importance of inclusion.

APPENDIX 1

Equality of Employment Opportunity

Health and Wellbeing Programs

ANSTO's Health and Wellbeing Programs continued to offer benefits for employees. A number of health promotion activities have been undertaken, which include annual flu vaccines, bowel screening (through provision of bowel screening kits in conjunction with a Rotary Club community initiative); site physiotherapy services as part of early intervention for injury management and return to work programs; and a health program that focuses on work place conditioning for workers. ANSTO also offers a fully functioning health centre with a registered nurse and fully functioning treatment room (Monday to Friday) as part of the organisation's early intervention and wellness service.

Phased retirement

ANSTO recognises the knowledge, skills and expertise held by mature aged employees, and the contribution they can make to the organisation. A full review of ANSTO's Phased Retirement program was undertaken in 2014 to ensure ANSTO's guidelines and initiatives offer relevant and personally rewarding options to staff. The intention is to ensure the program offers a range of mutually beneficial options and activities to staff considering a phased approach to their retirement. Staff feedback from an initial series of focus groups formed the basis of employee and manager training sessions and policy reviews were undertaken.

Harassment prevention and management

ANSTO is committed to the prevention of workplace harassment, discrimination and bullying. This is communicated to staff through our recruitment process, induction process and site wide bullying and harassment sessions, which cover information in the Maintaining a Workplace Free from Harassment, Bullying or Discrimination Policy.

Business ethics

ANSTO is conducting an analysis of policies, codes and procedures that define, guide and influence workplace ethical behaviour and culture to identify the most important and frequent ethical issues facing ANSTO staff and management and evaluate the way in which current policies and systems deal with them.

ANSTO, like all Commonwealth Government agencies, has an obligation to establish, foster and maintain the highest standards of ethical behaviour. This obligation extends to all workers at ANSTO, and is a core responsibility of the ANSTO Board.

An effective ethics framework encompasses the ethical tone and culture of an organisation and is a key governance attribute of high performing, successful and trusted organisations. A focused approach on ethics is a fundamental aspect of good management practice.

ANSTO is continually working to foster and enhance its compliance capabilities and ethical leadership. ANSTO has appointed the St James Ethics Centre to review ANSTO's business ethics culture and systems. A random sample survey phase has been completed. The final phase of the review was undertaken in July 2015, and involved small focus groups.

APPENDIX 1

Equality of Employment Opportunity

ANSTO refreshed the organisational values in 2014 with the introduction of six core values that reflect the mission and vision of ANSTO as a leading science, technology and engineering organisation.

The ANSTO values are: Working Together; Curiosity; Excellence; Leadership; Trust and Respect and Safe, Secure, Sustainable.

Talent management

ANSTO recognises the importance of talent management. To assist individuals in their personal development, ANSTO has developed a Talent Management Framework with regular Executive level reviews. The Talent Management Framework balances individual development needs in line with organisational requirements to create a sustainable and healthy talent pipeline for the future.

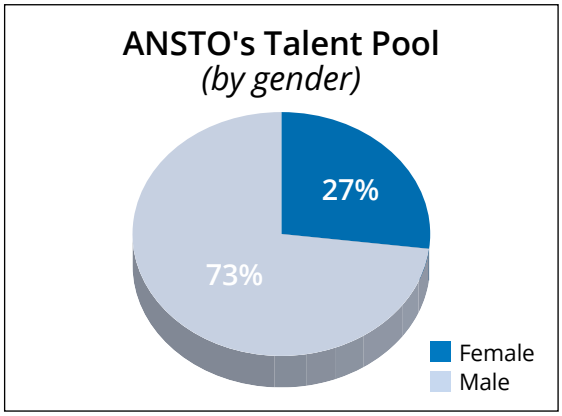

Figure 1: ANSTO Talent Pool by gender

27 per cent of the identified high potential talent at ANSTO is female (Figure 1).

In 2014, there was a large focus on Women in Leadership programs and development. Over 20 per cent of our female workforce was involved in these initiatives which included both internal and external development opportunities.

Equality of employment opportunity for 2014-15

	Number employed	% of Total Staff	Average Salary
Female	313	29%	$84,035
Male	775	71%	$99,199
People with disabilities	6	1%	$94,069
Aboriginal and Torres Strait Islanders	7	1%	$78,930
Non-English-speaking background	218	20%	$101,645

APPENDIX 2

Functions and powers of the organisation under the *ANSTO Act*

This appendix describes the functions and powers of the organisation under the *Australian Nuclear Science and Technology Organisation Act 1987* (ANSTO Act), which is ANSTO's enabling legislation. In the text below, 'Organisation' means the Australian Nuclear Science and Technology Organisation.

Section 5: Functions of the Organisation

(1) The functions of the Organisation are:

(a) to undertake research and development in relation to:

(i) nuclear science and nuclear technology; and

(ia) the application and use of nuclear science and nuclear technology; and

(ii) the production and use of radioisotopes, and the use of isotopic techniques and nuclear radiation, for medicine, science, industry, commerce and agriculture; and

(iii) such other matters as the Minister directs; and

(b) to encourage and facilitate the application and use of the results of such research and development; and

(ba) to condition, manage and store radioactive materials and radioactive waste, arising from:

(i) the Organisation's activities (including the production of radioactive materials for other persons); or

(ii) the activities of companies in which the Organisation holds a controlling interest (including the production of radioactive materials for other persons); or

(iii) the use by other persons of radioactive materials produced by the Organisation or such companies; or

(iv) the activities of other persons who are specified in the regulations; and

(bb) to condition, manage and store radioactive materials and radioactive waste generated, possessed or controlled by the Commonwealth or a Commonwealth entity; and

(bc) to condition, manage and store radioactive materials and radioactive waste at the request of:

(i) a law enforcement agency; or

(ii) a Commonwealth, State or Territory agency responsible for the management of emergencies or disasters; including, but not limited to, radioactive materials or radioactive waste involved in, or arising out of, a radiological incident or a radiological emergency; and

(bd) to condition, manage and store radioactive waste that has been, or is to be, sent to Australia under contractual arrangements relating to the conditioning or reprocessing of ANSTO spent nuclear fuel; and

APPENDIX 2

Functions and powers of the organisation under the *ANSTO Act*

(c) to produce, acquire, provide and sell goods, and to provide services, that are:

  (i) in connection with the production and use of radioisotopes, and the use of isotopic techniques and nuclear radiation, for medicine, science, industry, commerce and agriculture; or

    (ia) in connection with the conditioning, management and storage of radioactive materials or radioactive waste; or

    (ib) in connection with nuclear science and nuclear technology; or

    (ic) in connection with the application and use of nuclear science and nuclear technology; or

  (ii) otherwise in connection with matters related to its activities; and

(d) to act as a means of liaison between Australia and other countries in matters related to its activities; and

(e) to provide advice on aspects of:

  (i) nuclear science and nuclear technology; and

  (ii) the application and use of nuclear science and nuclear technology; and

  (iii) other matters related to its activities; and

(ea) to make available to other persons, on a commercial basis, the knowledge, expertise, equipment, facilities, resources and property of the Organisation by:

  (i) providing training and management expertise; or

  (ii) selling or leasing equipment; or

  (iii) leasing land, buildings and facilities; or

  (iv) taking any other action that the Organisation thinks appropriate; and

(f) to cooperate with appropriate authorities of the Commonwealth, the States and the Territories, and with other organisations and institutions in Australia or elsewhere, in matters related to its activities; and

(g) to publish scientific and technical reports, periodicals and papers on matters related to its activities; and

(h) to collect and sell or distribute, as appropriate, information and advice on matters related to its activities; and

(j) to arrange for training, and the establishment and award of scientific research studentships and fellowships, in matters related to its activities; and

(k) to make grants in aid of research into matters related to its activities; and

(m) to make arrangements with universities and other educational research institutions, professional bodies and other persons for the conduct of research or of other activities in matters related to its activities.

APPENDIX 2

Functions and powers of the organisation under the *ANSTO Act*

(1A) A regulation made for the purposes of subparagraph (1)(ba)(iv) must not have the effect of authorising the premises on which the Lucas Heights Research Laboratories are situated to become a national nuclear waste repository.

(1B) In subsection (1A):

national nuclear waste repository means a site chosen by the Commonwealth, after the commencement of this subsection, for the storage of nuclear waste with a view to it never being moved to another site.

(1C) Without limiting paragraph 5(1)(bb):

(a) radioactive materials and radioactive waste generated by a Commonwealth contractor under a contract between the Commonwealth contractor and the Commonwealth or a Commonwealth entity are taken to be generated by the Commonwealth or the Commonwealth entity, as the case requires; and

(b) radioactive materials and radioactive waste possessed or controlled by a Commonwealth contractor under a contract between the Commonwealth contractor and the Commonwealth or a Commonwealth entity are taken to be possessed or controlled by the Commonwealth or the Commonwealth entity, as the case requires.

(2) The Organisation shall not undertake research or development into the design or production of nuclear weapons or other nuclear explosive devices.

(3) In undertaking its functions, the Organisation is to have regard to:

(a) the Commonwealth Government's national science, technology and energy policy objectives; and

(b) the Commonwealth Government's commercialisation objectives for public research institutions.

(4) The Minister shall not give a direction under subparagraph (1)(a)(iii) to the Organisation to undertake research or development in relation to a matter unless the Minister is satisfied that research or development by the Organisation in relation to that matter would be an effective use of the staff of the Organisation, and would not duplicate unnecessarily any activity being carried on, or proposed to be carried on, by any other agency or authority of the Commonwealth.

(5) The Organisation may perform its functions to the extent only that they are not in excess of the functions that may be conferred on it by virtue of any of the legislative powers of the Parliament, and, in particular, may perform its functions:

(a) in so far as it is appropriate for those functions to be performed by the Organisation on behalf of the Government of the Commonwealth as the national Government of Australia; and

(b) for purposes for which it is appropriate for the Parliament as the national Parliament of Australia to authorise the Organisation to perform functions; and

APPENDIX 2

Functions and powers of the organisation under the *ANSTO Act*

(c) by way of expenditure of money that is available for the purposes of the Organisation in accordance with an appropriation made by the Parliament; and

(d) in the course of, or in relation to, trade and commerce with other countries, among the States, between Territories or between a Territory and a State; and

(e) for purposes related to external affairs; and

(f) for purposes in or in relation to a Territory; and

(g) for purposes related to the defence of the Commonwealth.

Section 6: General powers of Organisation

(1) Subject to this Act, the Organisation has power to do all things necessary or convenient to be done for or in connection with the performance of its functions and, in particular, has power:

(a) to enter into contracts;

(b) to acquire, hold and dispose of real or personal property;

(c) to occupy, use and control any land or building owned or held under lease by the Commonwealth and made available for the purposes of the Organisation;

(d) to erect buildings and structures and carry out works;

(e) to form, or participate in the formation of, a company or partnership;

(f) to appoint agents and attorneys, and to act as an agent for other persons;

(g) to engage persons to perform services for the Organisation;

(h) to design, produce, construct and operate equipment and facilities; and

(j) to do anything incidental to any of its powers.

(2) The powers of the Organisation may be exercised within or outside Australia.

(3) To avoid doubt, the Organisation has the power to construct buildings and facilities for the sole purpose of performing the function referred to in paragraph 5(1)(ea).

APPENDIX 3

Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act), section 516A

Environmental Protection

ANSTO's commitment to environmental protection and sustainability principles is defined in its Corporate strategic plans, WHSE Policy and Organisational core values. We are committed to effective stewardship, the sustainability of our operations and to responsibly interact with the local ecology and biosphere, and to protect it. We minimise our environmental footprint through the sustainable use of resources and by the prevention, minimisation and control of pollution.

ANSTO undertakes education, research and innovation to enhance the scientific understanding of the environment and to provide solutions for a sustainable planet.

These values are integral to ANSTO's Business Management System – the framework that defines how business is conducted to deliver outcomes to our customers and stakeholders in a safe, consistent and environmentally responsible manner. Objectives and targets for safe, secure and sustainable operations are implemented through documented operational and business plans.

Environmental protection is formally considered when planning and undertaking major capital works and any proposed radiation facilities are assessed for referral to the Department of Sustainability, Environment, Water, Population and Communities under the EPBC Act. Proposals for new (or modifications to existing) facilities or activities also undergo a rigorous internal safety, regulatory and environmental assurance process.

Environmental awareness is promoted throughout the organisation through site inductions, training and communication programs.

Environmental management system

To provide assurance that ANSTO is maintaining sound environmental protection practices, we maintain an environmental management system (EMS) that is certified to the International Standard ISO 14001. This standard requires that environmental risks and legal requirements are understood, managed and mitigated; an effective measurement and review system is in operation; and that there is an organisational commitment to continual improvement. Our extensive environmental monitoring program also operates within a quality framework that is certified to the ISO 9001:2000 standard for Quality Management Systems.

ANSTO has developed a 5-year Environmental Management Strategy. The Executive Committee for Workplace Health Safety and Environment supports the implementation of this strategy and provides oversight of the environmental management system.

Environmental performance

ANSTO aims to reduce its environmental footprint by minimising the generation of waste wherever possible and monitoring the consumption of resources such as fuel, electricity and water, and by recycling consumables. We also monitor our carbon footprint and have participated in the Sustainability Advantage Program run by the NSW Office of Environment and Heritage.

The performance indicators below show that over the past 5 years, ANSTO's power and water consumption have remained reasonably steady; for 2014-15 slightly more waste was discharged to sewer and sent to landfill than the previous year. Whilst operation of the research reactor and other major facilities account for the majority of ANSTO's water and power usage, both of these

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indicators were up this year, partly due to the hot summer which increased the requirement for air conditioning and the evaporation of water from the OPAL cooling towers. Conversely, high rainfall events increased the amount of stormwater runoff entering the ageing sewer system. Recycling levels are still quite variable year-on-year due to project activities, clean-up events and an overall reduction in the use of printed material. ANSTO also recycles ferrous metals, garden waste, concrete, batteries, toner cartridges, mobile phones and redundant computer equipment.

		First reported	Previous year	Current year	% change from previous year
Resource Usage [1]	units	2010-2011	2013-2014	2014-2015	
Electricity	GWh	37.12	37.51	40.59	8.2%
Water	m3	280,086	279,915	337,432	20.5%
Waste Disposal [2]					
Waste sent to landfill	tonnes	307.5	227.98	231.7	1.6%
Wastewater discharged to sewer	m^3	111,055	89,162	100,342	12.5%
Recycled Waste [2]					
Cardboard	tonnes	20.2	32.3	23.9	-26.0%
Co-mingled containers	tonnes	4.2	8.6	5.8	-32.6%
Paper [3]	tonnes	20.7	17.0	9.5	-44%

Notes: 1. Data for both Lucas Heights & Camperdown sites (excluding all tenants).
2. Data for the Lucas Heights site only (includes tenants).
3. Excludes 'classfied' paper waste.

Environmental monitoring program

ANSTO conducts an extensive environmental monitoring program that measures radioactivity in authorised emissions to air and liquid effluent discharges to the sewer; and in samples of air, surface water, ground water, sediment and biota from the local environment. Local environmental radiation and weather conditions are reported online via the ANSTO webpage. Many of the monitoring results are independently verified.

Results of environmental monitoring in 2014-15 continue to demonstrate that ANSTO's authorised releases of radioactive material to the air and sewer continue to be effectively controlled, complied with regulatory limits and had minimal impact on humans or the environment.

✔ Good water quality

Stormwater runoff from the Lucas Heights site does not contribute to any public drinking water supply, however ANSTO regularly monitors stormwater leaving the site, as well as sampling the nearby Woronora River. Results show that concentrations of tritium in water in the local environment have decreased since the HIFAR reactor closed in 2007, and are well below the level considered safe for Australian drinking water. Gross alpha and beta measurements were below the radiological levels set for surface waters under the previous NSW Protection of the Environment Operations Act 1997. In fact, the majority of results were below the screening levels for alpha and beta radioactivity set in the Australian Drinking Water Guidelines.

An extensive network of shallow and deep groundwater wells is designed to monitor potential sources of contamination to groundwater, water quality and groundwater movement.

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Groundwater from the Lucas Heights site contains only naturally-occurring radionuclides and low levels of tritium. Groundwater near fuel storage tanks is also analysed for petroleum hydrocarbons, to check for evidence of leaks from tanks, however none have been detected to date.

✔ Authorised discharges within limits
Liquid effluent discharged from ANSTO sites into the sewer system complied with the acceptance limits for trade wastewater set by the Sydney Water Corporation. Compliance with these limits, together with effluent dilution studies, ensures that water at the Cronulla wastewater treatment plant meets World Health Organisation drinking water standards for radioactivity.

Air ventilated from laboratories and facilities that handle radioactive materials is treated and/or filtered prior to discharge and continuously monitored. ARPANSA sets limits for airborne radioactive discharges from licenced ANSTO facilities and all airborne emissions were within the annual operating compliance limits.

✔ Detailed reporting
Reports on airborne and liquid effluent discharges are submitted to the relevant regulatory authorities on a quarterly basis. Details of our environmental monitoring program are on the ANSTO website and the results and findings are available on request. In addition, ANSTO reports real-time environmental radiation dose-rates recorded in the nearby suburb of Engadine via the ANSTO webpage. The Lucas Heights weather data is also available on ANSTO's website and published by the Bureau of Meteorology.

ANSTO reports annually to the Energy Efficiency in Government Operations (EEGO) and National Greenhouse and Energy Reporting (NGER) programs, also to the Department of Sustainability, Environment, Water, Population and Communities about any of its activities that fall under the National Environmental Protection Measures. All safety and environmental incidents are reported, investigated and actioned via ANSTO's event reporting and tracking system.

✔ Referrals under the EPBC Act
A proposed Nuclear Action, regarding the transport of intermediate level radioactive waste from the reprocessing of HIFAR spent fuel, was referred to the Department of the Environment; there were no actions affecting Commonwealth land during the period.

Safe waste management

ANSTO has maintained safe and effective management of its radioactive wastes for many years. There is minimal environmental impact from the storage of solid radioactive waste since there are no ongoing emissions or energy requirements, apart from the packaging process and building footprint. One of the waste minimisation strategies involves concentration of intermediate level liquid waste using a drum dryer; the electricity consumption is offset by the reduction of packaging, handling & space required.

Liquid wastewater comprising trade waste and sewage is treated and tested for compliance with limits for radioactivity before being discharged to the sewer. Concentration limits for non-radioactive materials such as ammonia, zinc and total dissolved solids were also met. Sydney Water conducts independent testing of ANSTO's liquid effluent discharges and the Trade Waste Agreement is periodically reviewed to provide assurance that ANSTO's discharges are fully characterised, remain within authorised limits and pose no threat to the environment. Effluent from the Sutherland Shire undergoes tertiary treatment at the

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Cronulla treatment plant and is ultimately discharged to the ocean at Potter Point. Analyses of marine biota (fish, seaweed and barnacles) from Potter Point confirm that wastewater from ANSTO has no measureable effect on the local marine environment.

Little Forest Legacy Site

ANSTO is responsible for the Little Forest Legacy Site (LFLS) located within the 1.6km buffer zone. This site, formerly known as the Little Forest Burial Ground (LFBG), was used by the Australian Atomic Energy Commission and other government agencies during the 1960's to dispose of waste containing low levels of radioactivity and non-radioactive beryllium oxide, in a series of shallow trenches. There has been ongoing monitoring, maintenance and management of the site since 1966 including routine air, soil and groundwater testing, results of which are publically available and confirm that the site is being safely managed.

Today the site is subject to a licence issued by ARPANSA and is managed by ANSTO on behalf of the Government. ANSTO is currently conducting a detailed scientific study of the LFLS site, in order to investigate options for the final disposition of the radioactive material and to ensure the continued safe management of the site.

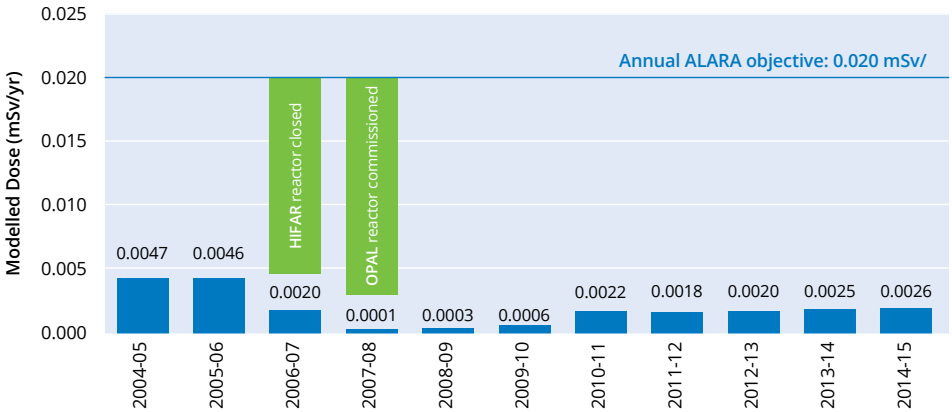
Dose levels low

Environmental radiation levels are measured at the Lucas Heights site, in surrounding suburbs and at the Cronulla wastewater treatment plant; are within the range of normal background levels.

Studies previously carried out for ANSTO's liquid effluent discharges have confirmed that the radiological risk to the environment or humans (working at the Cronulla wastewater treatment plant or swimming in the sea near the Potter Point ocean outfall) is negligible.

Computer modelling is used to estimate the potential radiation dose to people from operations at the Lucas Heights site. The model inputs include the quarterly stack emission results, local weather data and conservative assumptions about environmental exposure pathways. The maximum potential dose to local residents from ANSTO's airborne emissions in 2014-15 was 0.0026 mSv. This is less than 0.3 per cent of the annual public dose limit of 1 mSv established by ARPANSA.

Figure 1: Maximum annual effective dose from LHSTC airborne discharges at the boundary of ANSTO's 1.6 km buffer zone.



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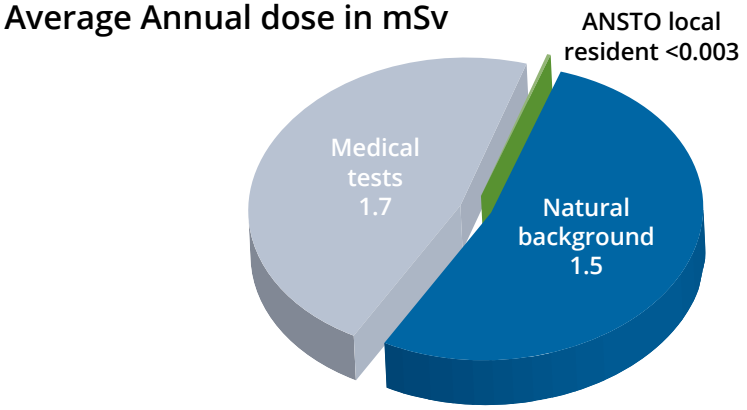
Doses from ANSTO's airborne emissions in 2014-15 remain well below the 0.02 mSv ALARA performance objective; despite increased production of beneficial medical isotopes (see Figure 1). For its closest neighbours, ANSTO's activities added less than 0.2 per cent to the 1.5 mSv dose that every Australian receives from natural background radiation each year, as shown in Figure 2.

Figure 2: Average annual doses received by Australians from various sources compared to the maximum potential airborne dose to ANSTO's nearest residents in 2014-15.



Source: ARPANSA Fact Sheet http://www.arpansa.gov.au/pubs/factsheets/IonisingRadiationandHealth.pdf

Mitigating environmental impacts

ANSTO encourages staff to cycle, carpool or take public transport to get to work and to walk rather than drive around the site. ANSTO provides staff with a carpooling website and regular shuttle-bus services to and from the local railway station. Numerous paths, tracks, bike racks, lockers and shower facilities are available for use by the avid walker/cyclist.

The 1.6 km buffer zone around the Lucas Heights site comprises developed areas, various landfill sites as well as natural bushland and waterways. The area has numerous bush walking trails, and is actively managed through a program of regular inspections, maintenance, culling of feral animals and weed reduction programs.

The ANSTO online 'swap shop' continues to provide a forum for staff to pass on unwanted goods. From furniture to chemicals to analytical equipment, by exchanging useful products staff can help save time, money and the environment by reducing waste going to landfill. The online Equipment Database tool also allows staff to share resources and knowledge whilst optimising the procurement of expensive items of equipment.

In line with ANSTO's focus on digitisation of records, the ANSTO Content Server is facilitating our transition to paperless offices by providing a secure platform for electronic document control and storage. Many processes and services such as budgeting, business planning, procurement, maintenance, recruitment and training are now delivered through online user interfaces. To further reduce the demand for paper-based information and records, the ANSTO Digital Mailroom no longer accepts hardcopy mail.

Overall, ANSTO commits significant resources to effectively monitor, manage and report on its environmental impacts and responsibilities.

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Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act), section 516A

Accordance with ecologically sustainable development (ESD) principles

Organisational Excellence (OE) is a model for integrated planning and decision making that ANSTO is deploying across the business, to optimise the management of all that we do. By managing our people, resources, and infrastructure more effectively, we aim to increase scientific productivity thereby enhancing the environmental sustainability of our operations.

ANSTO is integrating environmental protection into management processes by requiring environmental risk assessments at the project planning phase. Major capital projects such as construction of major facilities must have environmental protection plans in place to prevent environmental impacts such as soil erosion, dust, noise and discharges to stormwater. We have implemented an improved building code with minimum 4.5 star NABERS rating for new and renovated office accommodation, to improve the energy and water efficiency of buildings and numerous water tanks have been installed for the collection & use of rainwater. The ANSTO building code will be used to guide the sustainable development of ANSTO sites into the future.

Other ANSTO activities that contribute to improved social, environmental and economic outcomes include our research into significant environmental issues such as air quality, soil erosion, natural water systems and water resource management, wetland health, biodiversity, climate variability; and global warming impacts such as rising sea levels and temperatures on marine ecosystems.

The ANSTO Citizen Science program provides a forum for our scientists to engage with the community and the ANSTO Plastics Project has teams of volunteers collecting data on the distribution of plastics in their local environment, with the aim of tracing their passage through aquatic ecosystems.

ANSTO's support of nuclear non-proliferation ideals and the development of nuclear safeguards also accords with ESD principles; we contribute to the global non-proliferation agenda through the Global Initiative to Combat Nuclear Terrorism and collaborate with bodies such as the International Atomic Energy Agency and the Comprehensive Test Ban Treaty Organisation.

ANSTO continues to support a national approach to safe waste management, including the establishment of a National Radioactive Waste Management Facility.

Finally, ANSTO's commitment to environmental protection means that special emphasis is placed on reducing our environmental footprint by minimising waste and the consumption of resources and by recycling consumables. Our scientific research provides practical, science-based advice to inform decision makers, creating opportunities to conserve resources and sustain our fragile environment. It also ensures that we manage our past and current waste in a manner that protects human health and the environment, now and in the future.

APPENDIX 4

Work Health and Safety Act 2011

Safety commitment

ANSTO remains committed to the target of zero harm to its workforce and ensures that senior Work, Health and Safety (WH&S) leadership is an important aspect in achieving continuous WH&S improvement. During 2014-15 the Work, Health and Safety and Environment (WHS&E) Senior Executive Committee provided continued leadership and oversight in this respect with the endorsement of key safety-related projects eg. electrical upgrades, contamination surveys of buildings and the asbestos management plan. Additional reviews have been undertaken of pressure and lifting equipment.

ANSTO also recognises the advantages of an agile and flexible workforce aligned to the business' WH&S requirements. To this end the WHS and Human Resource (HR) units were merged allowing a consolidation of the two groups and the formation of a solution focused service. This will allow WH&S responsibilities and functions to be closely aligned with the human resource capabilities which will further progress and highlight the importance of line management accountability for the WH&S aspects of the business. A dedicated WH&S reporting and compliance resource was defined in the HR WH&S structure. This will ensure proactive trend analysis, strategy development and effective communication of relevant WH&S information throughout the organisation.

In the later part of 2014 ANSTO has been working closely with Comcare to improve the level of consultation during times of change. Key deliverable's in this improvement program include; review of the Change Management and Consultative policy and processes, incorporation of the organisational risk matrix and consultation triggers, risk assessment of all Change Management projects and additional training.

ANSTO conducted an engagement survey during the early part of 2015. When compared to the external group, the results indicated that the safety engagement drivers were on par with or above those of the external reference group.

The practice of occupational hygiene is a fundamental part of WH&S risk assessment. The occupational hygiene capabilities have been improved with additional capital investment into a dedicated hygiene laboratory facility and key equipment will allow improved services to site. These services support site operations and ANSTO projects.

A key element of ANSTO's proactive approach is the implementation of the 2010-2015 Safety Strategy with 30 out of the 36 identified actions now completed; the remaining six actions will be completed by the end of 2015.

To enhance safety in specific areas two subject matter safety groups have been established; Bio-safety and the Chemical / Radio Chemistry. These groups, drawn from across ANSTO, provide expert input and review of our WH&S practices.

In the later part of 2013-14 several key programs and initiatives were developed, these included the Mindful Leadership Program and the cross training of workers in WHS. The aims of these programs are to up skill line management and workers, encouraging a proactive WH&S workforce.

The Safety Coach program was introduced to provide a trained independent voice to General Managers/Heads of Institutes on safety matters. This key role assists the

APPENDIX 4

Work Health and Safety Act 2011

General Managers / Heads Of Institutes in gathering and reviewing key WH&S data for their divisions and assists in the establishment of collective best practices across ANSTO.

ANSTO continued with the update, development, review and implementation of key WHS&E

Standards and Practices. ANSTO continued its asset renewal program with the construction of new facilities during 2014-15 with the WH&S group continuing to provide safety advice and oversight to these projects which were completed without serious injury.

The WH&S communication to all workers continued by providing; a risk based WH&S focus program, a renewed poster program, intranet stories with specific talking points to encourage discussion. Further improvements were made to the tenant landing page which provides key safety information to ANSTO's tenants and external contractors. Key WH&S hazards communicated to workers during 2014-15 included Safety Systems, Hazardous Manual Tasks, Bush Fire Preparation, Risk Management, Life Long Commitment to Safety and Radiation Safety.

The WH&S pre-qualification project was successfully implemented which has improved the level of WH&S compliance. The contracted receive ANSTO WH&S Alerts and are able to upload key WH&S documents.

The early intervention strategies implemented by the ANSTO Health Centre continue to support the timely return of workers to pre injury duties and keep the workers engaged with ANSTO during the treatment and rehabilitation processes. The program focuses on providing early assessment and treatment to reduce the consequences of injuries. This has proved successful in meeting ANSTO's goal of returning workers to normal duties, as a productive team member as soon as possible. During 2014-15 the ANSTO rehabilitation program was certified against the SRC Act demonstrating effective procedures and programs are in place. Key Performance Indicators have been developed for the rehabilitation program and are reported monthly. The overall impact of these physiotherapy interventions along with other initiatives have contributed to an overall reduction in ANSTO's Workers Compensation Insurance premiums.

Accidents and incidents

ANSTO continued to monitor and report on key WH&S performance indicators. This included; total number of recorded events, number of opportunities for improvement, Lost Time Injury Frequency Rate (LTIFR) and Lost Shift Injury Frequency Rate (LSIFR). A review has been undertaken of the format and information presented in the WH&S reports to ensure they meet the requirements of the business and facilitate decision making. The implementation of the Governance Risk and Compliance project has progressed and will consolidate the existing event recording and reporting processes. The ANSTO investigation process has ensured that appropriate response and controls have been adopted in each case. Additional event investigation training is being implemented. All Comcare reportable events have been closed by the regulator with no further action or information required.

APPENDIX 4

Work Health and Safety Act 2011

Recorded events

Workers are encouraged to report all events within ANSTO's 'No Blame – Full disclosure' principle. ANSTO's ongoing commitment to improving our reporting culture is reflective in the number of events reported this year 1128 compared to 952 for 2013-14, 795 for 2012-13 and 761 for 2011-12.

The number of Opportunities for Improvements (OFIs) is also a key measure of ANSTO's reporting culture. In 2014-15 there was an increase in the percentage of OFIs reported; 84.7 compared to the previous three year average of 83.3%. Actual OFIs for 2014-15 (955) compared to 2013-14 (792), 2012-13 (660) and 2011-12 (637).This data helps to identify emerging WH&S trends and hazards allowing the implementation of controls early in the hazard identification process.

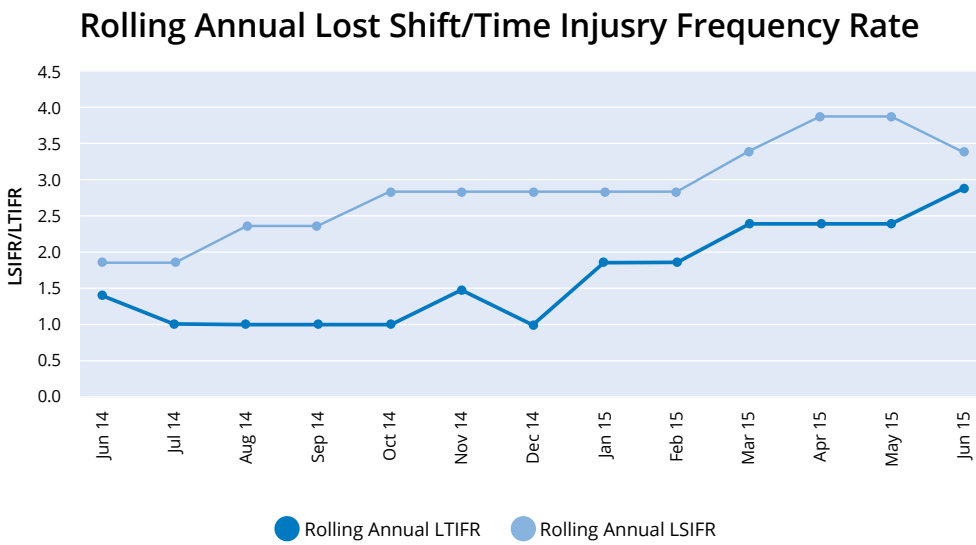
Lost shift and lost time injuries

Lost Shift Injury Frequency Rates (LSIFR) and Lost Time Injury Frequency Rates (LTIFR) are a principle safety performance measure at ANSTO. These classifications are used to separate serious injuries (LTI) from less serious injuries (LSI). These indicators are sensitive to the number of small injuries recorded.

The increase in the LSIFR 2014-15 to 3.4 from 1.9 in 2013-2014 represents the sensitivity of this indicator as a performance measure where small numbers are recorded. These injuries were random and isolate and all workers have resumed normal duties.

There has also been an increase in the LTIFR in 2014-15, 2.9 compared to 1.4 in 2013-2014. The effective management of these injuries by appointed rehabilitation coordinators has resulted in a decrease in the time taken off. All these injuries have resulted in a temporary modification to the work conducted by the worker.

Refer to the chart below.



APPENDIX 4

Work Health and Safety Act 2011

Safety Alerts

Safety Alerts are issued where a site wide safety hazard is identified and immediate action is required. The number of Safety Alerts communicated to workers for 2013-14 was eight. This is compared with 2011-12 (12), 2012-13 (4), 2013-14 (8) and 2014 -15 (11). Safety Alerts for 2014-15 included, Design-Related Factors, Safety Critical Equipment, Magnetic Lifting Devices, Chemicals Requiring Regulatory Approval, Notebook Power Cords, USB Style Chargers and Workshop Equipment Guarding.

Australian Radiation Protection and Nuclear Safety Regulations 1999, Statutory Rules 1999 No. 37 as amended.

Everyone in the world is exposed to ionising radiation from natural sources. People may also be exposed to radiation from non-natural sources, including nuclear medical procedures for diagnosis and treatment of certain illnesses. Personal radiation exposure ('dose') is measured in sieverts (Sv), however, typical annual exposures are so small that they are usually expressed in units of one thousandth of a sievert, known as a millisievert (mSv).

According to the most recent data from ARPANSA, the average dose an Australian receives from natural background radiation (excluding medical sources) is 1.5 mSv per year. Federal and state regulations require that a member of the public should receive no more than 1 mSv per year from radiation sources in addition to background radiation and medical procedures. The regulatory limit for radiation workers is 20 mSv per year, averaged over five years, with no more than 50 mSv in any one year.

This is derived from recommendations made by the International Commission on Radiation Protection (ICRP) that have specified three basic principles for radiation protection, which are applied at ANSTO:

1. All exposures to ionising radiation shall have a positive net benefit
2. All exposures shall be maintained as low as reasonably achievable (ALARA), accounting for social and economic factors
3. All exposures shall be less than the relevant statutory limit.

The application of these principles requires us to ensure that our occupational exposures are not just less than the statutory dose limit(s), but are as far below them as we can reasonably achieve. To this end ANSTO has imposed its own annual dose constraint of 15 mSv to any member of staff.

The radiation exposure of ANSTO's workers, who are routinely engaged in working with ionising radiation, is monitored by our specialist dosimetry service, with records of all exposures maintained.

Monitoring results for 2014 show that the radiation doses received by ANSTO workers remain significantly below regulatory limits. In 2014 the average effective dose across all ANSTO workers was 0.4mSv.

Table 1 shows the maximum, average and collective effective doses for the past five years. Collective effective dose is the total cumulative dose to an exposed group, in this case all ANSTO personnel registered with our radiation dosimetry service.

APPENDIX 4

Work Health and Safety Act 2011

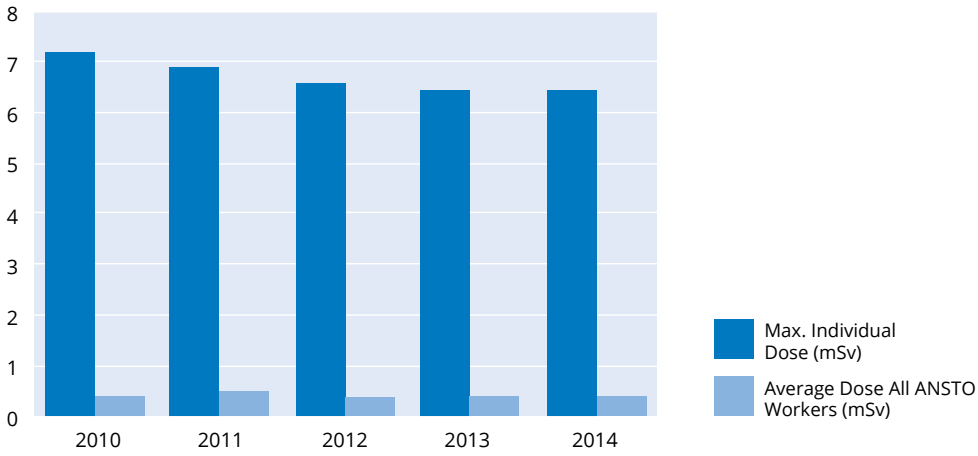
Table 1: Effective dose

Calendar Year					
Effective Dose	2010	2011	2012	2013	2014
Max. Individual Dose (mSv)	7.17	6.9	6.6	6.44	6.44
Average Dose All ANSTO Workers (mSv)	0.4	0.5	0.4	0.4	0.4
Collective Effective (Person-mSv)	358.6	446.6	407.7	416.4	446.9

Table 2: Distribution of individual effective dose

Calendar Year					
Effective Dose Range	2010	2011	2012	2013	2014
0 to O.99mSv	833	854	914	893	894
1 to 1.99mSv	22	66	32	40	47
2 to 4.99mSv	26	22	18	20	21
5 to 9.99mSv	7	5	4	2	4
>10mSv	0	0	0	0	0

Figure 1: Comparison of Maximum and Average Effective Doses



Regulations give annual dose limits for radiation workers for the whole body (effective dose), for the skin (shallow dose) and for extremities such as hands or feet.

The respective dose limits are:
• whole body 20 mSv, averaged over five years
• shallow (skin) 500 mSvto
• extremities 500 mSv.

Exposures to ANSTO workers for the last year have all been well below all statutory dose limits.

APPENDIX 5

Freedom of Information Act 1982, subsection 8

The Freedom of Information Act 1982 (FOI Act) provides the public with a general right of access to documents held by Australian Government agencies, by requiring agencies, such as ANSTO, to publish the information and provide a right of access to the documents.

This general right, is limited by exception, to protect essential public interests, including the privacy of individuals and the business affairs of those who give information to the agency.

In the reporting year to 30 June 2015, ANSTO has received 7 requests for information under the FOI Act.

ANSTO is required to publish information to the public as part of the Information Publication Scheme (IPS). The IPS is part of reforms to the FOI Act designed to promote open and transparent communication of government information.

Set out below is the information required to be published by ANSTO under section 8 of the FOI Act.

1. **ANSTO's Agency Plan**

   ANSTO's Information Publication Scheme plan is currently available on the ANSTO website at www.ansto.gov.au/AboutANSTO/About.

2. **Details of the structure of the Agency's organisation**

   An organisational chart detailing the structure of ANSTO can be found on ANSTO's website.

3. **Details of ANSTO's functions, including its decision making powers and other powers affecting members of the public**

   Information in relation to ANSTO's powers and functions can be found at page 112 of this report and a link to this information including information about ANSTO's purpose, Board composition, Corporate Plan and Research and Service Charters can be found on ANSTO's website at www.ansto.gov.au/AboutANSTO/About.

4. **Details of officer appointments at ANSTO**

   Details of officer appointments can be found at page 5 of this report and a link to this information can be found on ANSTO's website at www.ansto.gov.au/AboutANSTO/About.

5. **ANSTO's Annual Report**

   A link to this annual report and annual reports of previous years can be found on ANSTO's website at www.ansto.gov.au/AboutANSTO/About.

6. **Details of arrangements for members of the public to comment on specific policy proposal for which ANSTO is responsible**

   ANSTO regularly communicates with its stakeholders, which includes the local community and councils, relevant federal ministers and other government-related personnel, both state and federal, to ensure that they are kept up to date about what is happening at ANSTO. The community is kept informed of ANSTO's operations via the website which publishes news updates such as media releases. A link to this information can be found on ANSTO's website at www.ansto.gov.au/AboutANSTO/About.

APPENDIX 5

Freedom of Information Act 1982, subsection 8

7. Information which ANSTO routinely gives access to in response to requests for access under the FOI Act (excluding documentations exempt from production under the FOI Act)

During 2014-15 there was no requested documentation falling within this category.

8. ANSTO's FOI Disclosure Log

The FOI Disclosure Log lists information which has been released in response to a FOI access request. The disclosure log requirement does not apply to:

- personal information about any person if publication of that information would be unreasonable
- information about the business, commercial, financial or professional affairs of any person if publication of that information would be 'unreasonable'
- other information covered by a determination made by the Australian Information Commissioner if publication of that information would be 'unreasonable'
- any information if it is not reasonably practicable to publish the information because of the extent of modification that would need to be made to delete the information listed in the above dot points.

A link to ANSTO's disclosure log can be found on ANSTO's website at www.ansto.gov.au/AboutANSTO/About.

9. Information held by ANSTO which is provided to Parliament

A link to the information which ANSTO provides to parliament can be found on ANSTO's website at www.ansto.gov.au/AboutANSTO/About.

10. Contact details of ANSTO officers who can be contacted about access to information or documents under the FOI Act

Direct enquiries in relation to FOI process to the:

Mail:
FOI Coordinator
ANSTO
Locked Bag 2001
Kirrawee DC NSW 2232

Email:
foi@ansto.gov.au

Telephone:
+61 2 9717 3111 (request to be directed to the FOI Coordinator)

These contact details can be found on ANSTO's website.

11. Operational information required under section 8 of the FOI Act, that is, information held by ANSTO to assist in the performance or exercise of ANSTO's functions or powers in making decisions or recommendations affecting members of the public

ANSTO has a range of publications, reports, information available for the public, including our annual reports, information on safety, research reports, educational books and leaflets, and DVDs. ANSTO also provides access to a searchable database of all of ANSTO's science publications, as well as an online archive for older publications.

APPENDIX 6

Index of compliance with reporting guidelines

Index of compliance with reporting guidelines Index of compliance with reporting guidelines under various Acts, Regulations and Orders applicable to ANSTO as a Commonwealth authority

ANSTO Act 1987

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Section 46 of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act) and section 7AB of the *Public Governance, Performance and Accountability (Consequential and Transitional Provisions) Rule 2014* (the CTP Rule). The CTP Rule extends the annual report requirements contained in the *Commonwealth Authorities (Annual Reporting) Orders 2011* to apply to the 2014-15 annual reports of Corporate Commonwealth entities in the same way as they applied for the financial year ending on 30 June 2014.

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ACRONYMS

ACAS	Australian Collaboration for Accelerator Science
AINSE	Australian Institute of Nuclear Science and Engineering
AMS	Accelerator mass spectroscopy
ANAO	Australian National Audit Office
ANSTO	Australian Nuclear Science and Technology Organisation
ANM Project	ANSTO Nuclear Medicine Project
AOFSRR	Asia Oceania Forum for Synchrotron Radiation Research
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ATSE	Australian Academy of Technological Sciences and Engineering
BOSTES	Board of Studies, Teaching and Educational Standards
CAC Act	Commonwealth Authorities and Companies Act 1997
CAS	Centre for Accelerator Science
CEA	French Commissariat à l'énergie atomique et aux énergies alternatives or French Atomic Energy Agency
CERN	European Organization for Nuclear Research
CRC-P	Cooperative Research Centre for Polymers
CRP	Cooperative Research Project
CTP	Consequential and Transitional Provisions
DSTO	Defence Science and Technology Organisation
EIF	Education Investment Fund
FNCA	Forum for Nuclear Cooperation in Asia
FOI Act	Freedom of Information Act 1982
HIFAR	High Flux Australian Reactor
HZB	Helmholtz-Zentrum Berlin
I-124	Iodine-124
IAEA	International Atomic Energy Agency
ILW	Intermediate level waste
INLEX	International Expert Group on Nuclear Liability
IR	Infra-red
ISSP	Institute of Solid State Physics (University of Tokyo)

JAEA	Japan Atomic Energy Agency
LEU	Low enriched uranium
LIEF	Linkage, Infrastructure, Equipment and Facilities
Lu-177	Lutetium-177
Mo-99	Molybdenum-99
MOU	Memorandum of understanding
MS	Mass spectrometry
MX	Macromolecular crystallography
NDF	National Deuteration Facility
NIF	National Imaging Facility
NIMS	National Institute of Materials Science
NMR	Nuclear magnetic resonance
NORM	Managing naturally occurring radioactivity
NPT	Non-proliferation treaty
NTD	Neutron transmutation doping
OLEDs	Organic light emitting diodes
OPAL	Open Pool Australian Light-water
PET	Positron emission tomography
PGPA Act	Public Governance, Performance and Accountability Act 2013
RCA	Regional Collaborative Agreement
SAXS	Small angle X-ray scattering
SEEA	Sydney Engineering Excellence Awards
SINAP	Shanghai Institute of Applied Physics
STEM	Science, technology, engineering and mathematics
Tc-99m	Technetium-99m
TGA	Therapeutic Goods Administration
TLE	Temporal lobe epilepsy
TSPO	Translocator protein
UNSW	University of New South Wales
UTS	University of Technology Sydney

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Public information

ANSTO produces regular updates on its science and technology, has available a range of publications and conducts free tours of its site. For bookings, information or to get on our database, call +61 2 9717 3111 or email enquiries@ansto.gov.au

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Cover images

Top Left Year In Industry Intern, Marina Sara has been carrying out laboratory tests to support research and commercial projects undertaken by the ANSTO Minerals team

Top Right Macquarie University currency experts and ANSTO researchers in the neutron beam instrument halls

Bottom row left OPAL is one of the world's most effective multi-purpose research reactors

Bottom row middle ANSTO's nuclear medicines are used to diagnose a wide range of illnesses including cardiac conditions, cancers and skeletal injuries

Bottom row right ANSTO researcher Zeljko Pastuovic with the new Sirius 6MV tandem accelerator

Australian Government

ansto

Locations

Lucas Heights Campus

Camperdown Campus

Clayton Campus

Website

www.ansto.gov.au