Australian Government

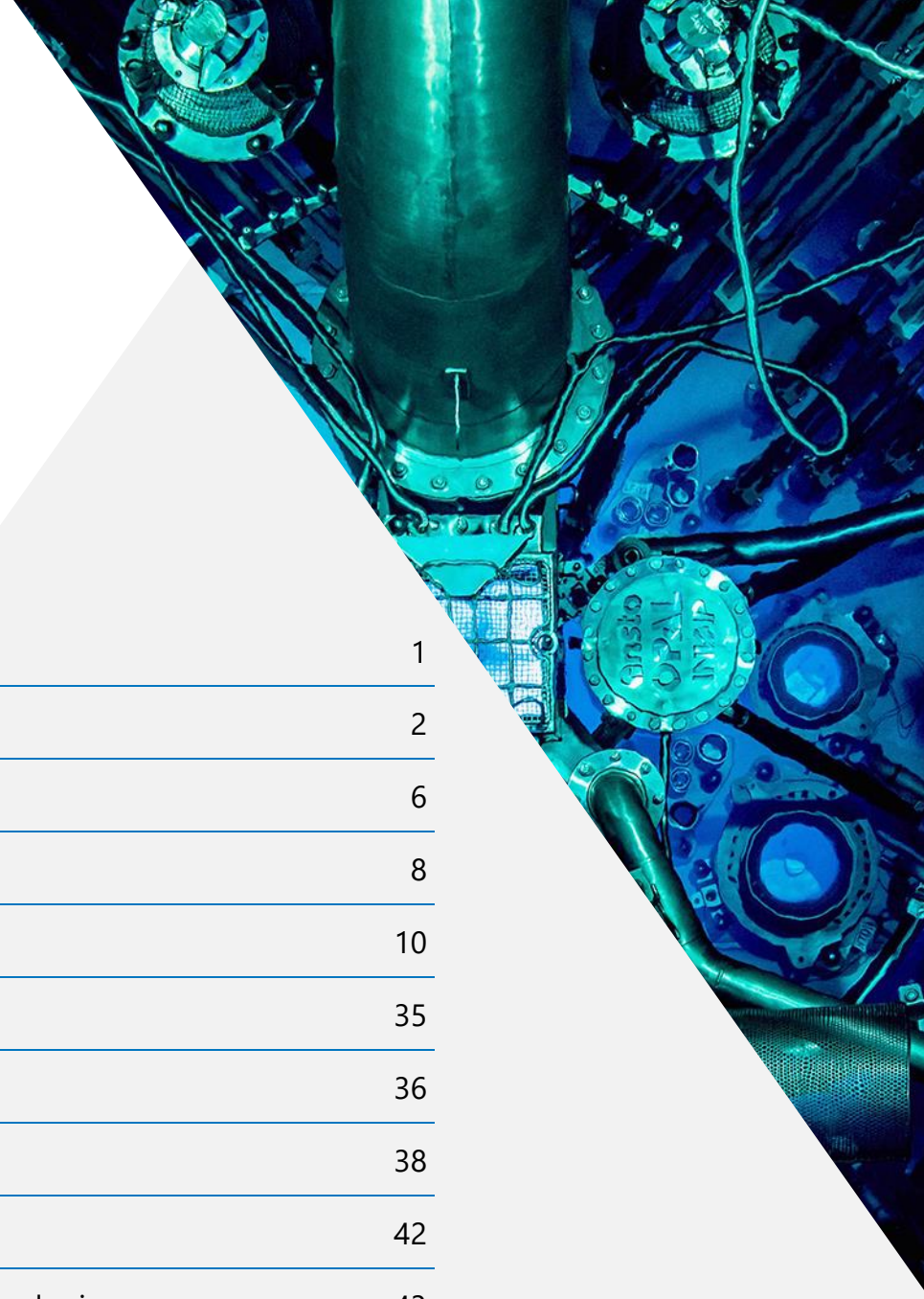
ANSTO

# Annual Report

2019 - 2020

Science. Ingenuity. Sustainability.

# Contents



# Letter of transmittal

13 October, 2020

**The Hon Karen Andrews MP**
**Minister for Industry, Science and Technology**
**Parliament House**
**CANBERRA ACT 2601**

I am pleased to present the Annual Report of the Australian Nuclear Science and Technology Organisation (ANSTO) for the period 1 July 2019 to 30 June 2020.

This report has been prepared in accordance with the requirements of the *Australian Nuclear Science and Technology Organisation Act 1987 (ANSTO Act)* and section 46 of the *Public Governance, Performance and Accountability Act 2013 (PGPA Act).*

The report has been approved for presentation to you by a resolution of the ANSTO Board members on 13 October, 2020.

Yours sincerely

**Honourable Dr Annabelle Bennett AC SC**
**Chair**

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# About ANSTO

- ANSTO leverages great science to deliver big outcomes.
- We partner with scientists and engineers and apply new technologies to provide real-world benefits.
- Our work improves human health, saves lives, builds our industries and protects the environment.

ANSTO is the home of Australia's most significant landmark and national infrastructure for research including the Open Pool Australian Light-water (OPAL) multi-purpose nuclear reactor, the Australian Synchrotron, the Centre for Accelerator Science (CAS), the Australian Centre for Neutron Scattering (ACNS) and the National Deuteration Facility (NDF).

Every year, thousands of scientists from industry and academia benefit from gaining access to these state-of-the-art facilities.

As part of enabling a strong national collaborative network, ANSTO is connected with 40 Australian and New Zealand universities through the Australian Institute of Nuclear Science and Engineering (AINSE), providing researchers with access to Australia's nuclear science, technology and engineering expertise and national infrastructure which, in turn, facilitates greater national science collaboration.

ANSTO has nearly 50 bilateral international memoranda of understanding (MOU) agreements with world-leading research institutes and universities that ensure that Australian scientists are well placed to drive innovation for Australia.

These important partnerships give Australian scientists access to some of the world's most sophisticated research techniques, enabling discoveries that benefit both Australia and the world.

ANSTO's nuclear medicines benefit thousands of Australians every week, supporting the accurate diagnosis of heart disease, skeletal conditions and cancer.

Australia has a strong international role in nuclear science and technology through ANSTO. As a member of the International Atomic Energy Agency (IAEA) Board of Governors, Australia is committed to the peaceful application of nuclear science and technology. ANSTO's long-term partnership with the IAEA has given our country important global responsibilities and recognition.

ANSTO has two main campuses at Lucas Heights in New South Wales and Clayton in Victoria. ANSTO also works from and operates a facility in Camperdown in New South Wales.

Aerial image of ANSTO's Lucas Heights campus

# Our vision

To be a global science, research and engineering partner with a reputation for tackling complex problems and delivering outcomes to create a more sustainable world.

# Our Corporate Plan 2019–2020

ANSTO's Corporate Plan is the enabling document for the organisation to achieve its purpose and implement its strategic objectives and vision. Approved by the ANSTO Board, the plan is a public document available via https://www.ansto.gov.au/corporate-plan

# Strategic objectives

ANSTO's strategic objectives for the financial year 2019–2020 included:

- **Putting our people first** — Provide a safe, sustainable and inclusive environment that empowers our people and supports a culture of collaboration and engagement
- **World leading research and technology outcomes** — Be part of a global network of researchers, delivering innovative solutions to complex problems, through strategic partnerships
- **Strategic management of landmark and national infrastructure** — To serve users, enable world-class research and create economic impact and benefit
- **Nuclear and related expertise and advice** — To provide expert advice, education, and services to support Australian policy and to strengthen Australia's nuclear science knowledge base
- **Business and innovation** — Deliver nuclear or related products and services to our customers, and partner with others to develop impactful products and services for a sustainable future

# Responsible Minister

The Hon Karen Andrews MP Minister for Industry, Science and Technology

# Chair report

The COVID-19 global pandemic has dramatically changed how we work and live. ANSTO has demonstrated great resilience and agility, and has responded to secure Australia's interest in key areas, including the continuity of vital nuclear medicine supplies for Australian patients.

ANSTO's research infrastructure is the engine room for Australian science, enabling and supporting the work of research partners and collaborators. Therefore, ANSTO has played a critical role in how our nation responds to the challenges that have arisen from COVID-19 and the horrific bushfire season that preceded the pandemic.

ANSTO contributed to national discussions on the health and environmental impacts of the 2019-2020 bushfire season, making submissions to federal and NSW inquiries looking at the consequences of the bushfires and providing information to the *Royal Commission into National Natural Disaster Arrangements*. ANSTO's CEO also participated in several roundtables on Bushfire Science chaired by the Minister for Industry, Science and Technology, the Hon. Karen Andrews MP.

ANSTO's Australian Synchrotron has played an important role in Australia's nationwide research response to COVID-19, supporting other researchers by providing clarity through imaging of the features of the virus to inform the development of a vaccine and testing potential treatments. Congratulations to all of those involved in this important work.

Importantly, throughout the pandemic and the effect on world supply chains, ANSTO has continued to provide Australians with nuclear medicines. This serves to reinforce the importance to Australia of ANSTO's science infrastructure.

The establishment of the Innovation Precinct at the ANSTO Campus in Southern Sydney continued to progress during the year. During the reporting period, ANSTO welcomed the Greater Sydney Commission's *ANSTO Collaboration Area Place Strategy*. ANSTO also granted the second round of industry foundation scholarships, supported by the NSW Government. The nandin innovation centre also continues to grow, with 16 start-ups and entrepreneurs now working alongside ANSTO on its Sydney campus to support a range of different industries through innovation.

During the year, it was an honour to stand with Dharawal elders and representatives and Her Excellency the Hon. Margaret Beazley AC QC, Governor of New South Wales (NSW), to launch ANSTO's Innovate Reconciliation Action Plan, surrounded by beautiful gum trees and native bushland that is so characteristic of ANSTO's campuses.

ANSTO plays a critically important role in enabling Australia to have an informed debate on nuclear power and to keep Australia abreast of developments globally. In particular, ANSTO made a number of public submissions to parliamentary inquiries.

Thank you to our Minister and department for their continued support and advice, to the other Board members for their sage counsel and expertise, and can I offer a warm welcome to our new Board member, Andrea Sutton.

Thank you to our staff for the effort and commitment to keep ANSTO running during these difficult and challenging times.

Like many other Australian entities, ANSTO has faced challenges over the past year, many of them arising directly and indirectly from the COVID-19 pandemic. Despite these ongoing challenges, the Board and management are committed to delivering on ANSTO's responsibilities to the Australian Government and people. I am certain that ANSTO will continue to rise to the challenges and continue to carry on successfully, delivering the many benefits that nuclear science and technology provide to our country.

**Honourable Dr Annabelle Bennett AC SC**
**Chair**

# CEO report

On behalf of Dr Adi Paterson and the Senior Leadership team, the financial year 2019-2020 has presented unprecedented challenges, and I am proud of the role ANSTO has played in supporting both Government and industry in responding to these challenges.

Despite living and working in a pandemic, our staff have shown great resilience, agility and unfailing dedication to continuing to safely deliver essential research, nuclear medicines and other products and services to support Australia.

The macromolecular crystallography beamline at ANSTO's Australian Synchrotron on our Clayton campus has played a key role in Australia's fight against COVID-19. The beamline essentially produced a molecular map of the protein structures within the virus that causes COVID-19. This information is vital for the development of a vaccine and in screening potential therapeutic drugs to block the ability of the virus to infect and replicate in the body.

Despite COVID-19, ANSTO has made progress across our key projects, including the installation of supporting infrastructure for the first of the new beamlines for the Australian Synchrotron as part of BRIGHT Project. ANSTO's Innovation Precinct continued to build momentum, and I welcome the ongoing support from the NSW Government in the development of the Greater Sydney Commission's ANSTO Collaboration Area Place Strategy in May 2020.

Industry graduates are key to delivering ingenious thinking and new solutions for industry. In December 2019 we launched the Graduate Institute, with the first cohort of graduates being supported by the NSW Government. We have called for applications for a second wave of graduates in recent months. I am excited to see this develop alongside the success of nandin, which now has 16 start-ups or entrepreneurs working within the ANSTO precinct in Southern Sydney.

ANSTO manufactures and distributes nuclear medicines that are essential to the diagnosis of a range of cancers as well as heart, brain, bone and endocrine diseases. ANSTO also produces therapeutic nuclear medicine products. Applied Molecular Therapies Pty Ltd (AMT), a joint venture company between ANSTO and Australian radiopharmaceutical company Cyclotek, is in now in the establishment phase. The venture

was formed to develop, manufacture and supply therapeutic radiopharmaceuticals within Australia and in the Asia-Pacific, and will be a focus for the next four years.

Enabled by our OPAL multi-purpose reactor, ANSTO is a global leader in the irradiation of silicon, which is ultimately used in high power high voltage applications such as power infrastructure. Experiencing a growth of 13 per cent over the reporting period, Australia now holds more than 58 per cent of the global market ANSTO is also well placed to become a global leader in the advanced manufacturing of nuclear medicines as the new Molybdenum-99 (Mo-99) Manufacturing Facility continues to develop.

Our people are at the heart of our successes and I am pleased that so many ANSTO staff members have been acknowledged this year.

As part of the University of Wollongong (UOW) led 'Blue Carbon Horizons Team', Dr Debashish Mazumder and Atun Zawadski won the 2019 Australian Museum Eureka Prize for Environmental Research.

Long-time employee Michael Druce was awarded a Public Service Medal in the 2020 Australia Day honours for his outstanding service to nuclear medicine production.

Professor Vanessa Peterson was the first female ever to receive both the 2020 Bob Cheary Award for Excellence in Diffraction Analysis by the Australian X-ray Analytical Association and the Australian Neutron Beam Users Group (ANBUG) neutron award for "Outstanding research in neutron science and leadership promoting the Australian neutron scattering community".

To support the next generation of science, technology, engineering and mathematics (STEM) experts, ANSTO proudly supported this year's International Youth in Nuclear Conference (IYNC) in Sydney in March, which was attended by 298 of the world's brightest young STEM minds from 43 different countries.

ANSTO is in a strong position for future research and developments. The appointment of a new Chief Operating Officer and a Group Executive Research Translation will strengthen our Senior Leadership team into the future. The establishment of the Nuclear Precinct on the Lucas Heights Campus in Sydney will ensure we continue to manage our activities in a safe, secure and sustainable manner.

I would like to thank our Board for their contribution and good governance of ANSTO over the past year, and again acknowledge the tremendous efforts of our staff during this challenging period.

**Shaun Jenkinson**
**Acting Chief Executive Officer**

# Annual Performance Statement

## Introductory statement

We, the Australian Nuclear Science and Technology Organisation (ANSTO) Board, as the accountable authority of ANSTO, present the 2019-2020 Annual Performance Statements of ANSTO, as required under paragraph 39(1)(a) of the *Public Governance, Performance and Accountability Act 2013 (PGPA Act)*. In our opinion, these Annual Performance Statements are based on properly maintained records, accurately reflects the performance of the entity, and comply with subsection 39 (2) of the *PGPA Act*.

## Entity's purpose

ANSTO's purpose comprises the following core functions, as provided by the *Australian Nuclear Science and Technology Organisation Act 1987 (ANSTO Act)*:

- Conduct research and development in relation to nuclear science and technology
- Produce and use radioisotopes, isotopic techniques and nuclear radiation for medicine, science, industry, commerce and agriculture
- Encourage and facilitate the application and use of the results from research and development
- Manage radioactive materials and waste arising from various prescribed activities
- Provide goods and services related to core activities
- Provide advice to government and undertake international liaison in nuclear-related matters
- Make available (on a commercial basis where appropriate) facilities, equipment and expertise
- Publish scientific and technical reports, periodicals and papers, and provide public information and advice
- Facilitate education and training in nuclear science and technology, including through granting scientific research studentships and fellowships, in cooperation with universities, professional bodies and other education and research institutions.

# Outcome

Improved knowledge, innovative capacity and healthcare through nuclear-based facilities, research, training, products, services and advice to government, industry, the education sector and the Australian population.

# Performance criterion 1 - Leadership team representation

*Putting our people first - Provide a safe, sustainable and inclusive environment that empowers our people and supports a culture of collaboration and engagement.*

**Goal -** Achieving greater gender diversity in ANSTO's workforce, with the goal of reaching equal representation of male and female in our workforce by 2030.

2019-2020 Leadership Teams - representation
Male 40 per cent | Female 40 per cent | Discretional 20 per cent

2024-2025 ANSTO Wide - representation
Male 40 per cent | Female 40 per cent | Discretional 20 per cent

**Results -** ANSTO continues to focus on building diverse leadership teams, and proactively engage with diverse talent pipelines.

Although ANSTO did not achieve its 2019-2020 leadership team representation goal, the Organisation did make significant progress achieving a result of Male 68 per cent | Female 32 per cent representation.

This year, ANSTO took measures to introduce more gender balance into the traditionally male dominated trade environment. While the apprenticeship program has been targeting 50/50 hires for the last few years, this progress was not sufficient to impact the balance in the overall team. Accelerating the pipeline of talent was necessary to create a more robust and equitable working environment, therefore in 2020, ANSTO welcomed a 100 per cent female apprenticeship cohort.

The pilot cohort of the ANSTO My Mentor program launched in 2020, were 100 per cent female, a special measure implemented to strengthen the diversity of the talent pipeline into leadership roles.

Over the course of the recruitment process, ANSTO uses targets to ensure selection panels meet a diverse range of candidates were Male 40 per cent | Female 40 per cent | Discretional 20 per cent prior to making their final appointment. In the 2019-2020 financial year, 45 per cent of all new hires to the Organisation were women. At ANSTO, we understand that diverse teams produce better outcomes – and we value the merit that a diverse perspective can bring to our team.

See more information under Diversity and inclusion pages 113-119.

ANSTO has a diverse range of women working at every level and area of the Organisation. L-R Scientists, Helen Maynard-Casely, Madhura Manohar and Anna Paradowska; Graduate, Shakila Fernando; Scientists Katie Sizeland and Atun Zawadzki; Head of Research, Suzanne Hollins; Chief Information and Digital Officer, Marianne Morton; Deputy Board Chair, Penny Dobson; Scientist, Zhaoming Zhang; Engineer, Hayat Chamtie; Scientist, Vanessa Peterson; Lead, Strategic integration, Kristen Patchett; Scientist, Patricia Gadd and General Manager, Communications and Stakeholder Engagement, Cassandra Casey. Photo courtesy Careers with STEM/Lauren Tromp

# Performance criterion 2 – Safe work environment

*Putting our people first - Provide a safe, sustainable and inclusive environment that empowers our people and supports a culture of collaboration and engagement.*

**Goal -** ANSTO will continue to strengthen its commitment to providing a safe work environment for its staff. One way to measure this is through the Lost Time Injury Frequency Rate (injuries that require five or more days off work). Our annual goal is no lost time due to injury.

**Result -** In 2019-2020 there were 13 Lost Shift Injuries and no Lost Time Injuries.

Lost Shift Injury Frequency Rate (LSIFR) and Lost Time Injury Frequency Rate (LTIFR) are a safety performance measure at ANSTO that are used to separate serious injuries (LTI) from less serious injuries (LSI).

These measures relate to injuries that required time taken off work and do not reflect the impact the injury has had on the worker.

The early intervention program managed by the ANSTO Health and Wellbeing Centre aims to minimise the time taken off for work related injuries and allows workers to return to work as early as possible. The average time taken off for each of the Lost Shift injuries was two days.

See more information at Lost shift and lost time injuries on pages 147-148.

# Performance criterion 3 – Delivery of research outcomes

*World leading research and technology outcomes - Be part of a global network of researchers, delivering innovative solutions to complex problems, through strategic partnerships.*

**Goal -** Delivery of research outcomes that have scientific and industry impact, with a focus on health, the environment and the nuclear fuel cycle

**Results -** Assessed by a minimum of eight research case studies outlined below.

## Human health research

ANSTO uses its infrastructure, capabilities and expertise to build knowledge and optimise the beneficial impacts of nuclear science on human health; ANSTO produces current and future radioisotopes for use in nuclear medicine; and enables research into prevention and improving the approaches to detection, diagnosis and treatment of disease.

**Case study 1 - A diagnostic tool and treatment in one, offers new hope for Australian cancer patients**

ANSTO has specialist expertise and the infrastructure to produce radioactive substances that can be used for diagnosis and treatment.

A radioactive variation of the element scandium, scandium-47, that has the potential for both diagnosis and treatment of disease was produced for the first time in Australia in ANSTO's OPAL multi-purpose reactor.

Scandium-47 has properties similar to lutetium-177, which is already being used in clinical trials as a treatment for prostate and neuroendocrine cancers; but unlike lutetium-177, it has the potential to be a true theranostic.

The term 'theranostic' describes the use of paired radioactive agents, one for diagnosis, and another chemically similar one to provide therapeutic treatment of a tumour or site of infection.

The decay emissions of scandium-47 are applicable to both targeted cancer therapy and higher quality single-photon emission computed tomography (SPECT) imaging than can be achieved using lutetium-177. In addition, the positron emission tomography (PET) imaging radioisotopes scandium-43 and scandium-44 can be produced using a cyclotron.

The team which included ANSTO's Leena Hogan, Dr Paul Pellegrini and Attila Stopic, with support from Mike Izard and Dr Ivan Greguric, is now shifting its focus to scale up production of scandium-47 and to develop methods for producing other therapeutic radioisotopes.

Read the full article at https://www.ansto.gov.au/news/potential-true-theranostic-agent-for-cancer-produced

**Case study 2 - Personalised cancer therapy**

ANSTO researchers are teaming up with the University of Sydney to develop innovative, personalised treatments for cancer.

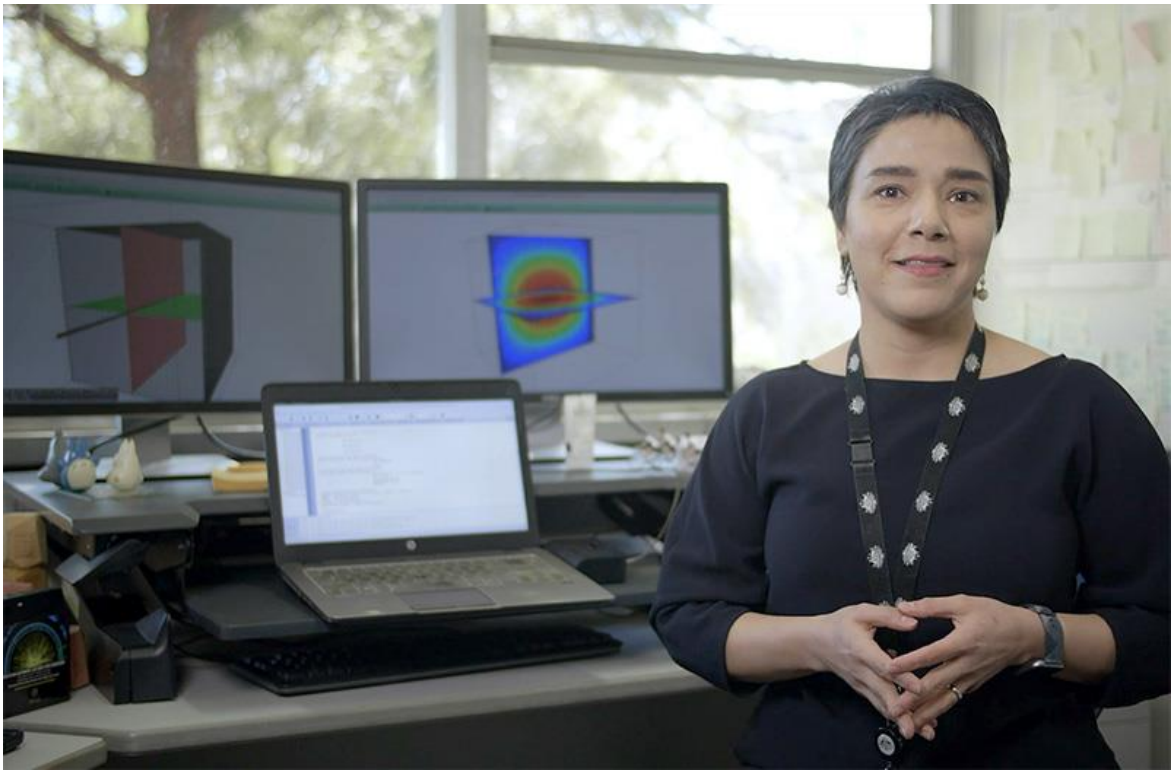
The group, which was awarded $80,000 in seed funding from the University of Sydney's Drug Discovery Initiative, will focus on developing and using molecules of tumour-targeting agents linked to metal chelators that are suitable for containing radioisotopes in theranostic applications.

The research will develop injectable diagnostic agents based on triphenylphosphonium (TPP) salts that accumulate in tumour cells, emitting radiation for detection using PET or SPECT medical imaging techniques. The approach enables diagnosis and treatment planning for therapies including neutron capture enhanced particle therapy (NCEPT), a transformative radiotherapy technique proposed and under development at ANSTO.

The work at ANSTO will be conducted by Dr Mitra Safavi-Naeini, Dr Benjamain Fraser, Dr Nigel Lengkeek, Dr Ryan Middleton, Nicholas Howell and Naomi Wyatt.

The approach will allow flexibility in both the diagnostic and therapeutic radioisotopes incorporated into the TPP agent. The team can then tailor a specific agent towards the desired treatment outcome. Diagnostic agents will be developed with PET radioisotopes such as gallium-68 and copper-64. For therapeutics, they will focus on gadolinium-157, lutetium-177 or copper-67 analogues.

Read the full article at https://www.ansto.gov.au/news/personalised-cancer-therapy



Dr Mitra Safavi-Naeini

## Environmental research

ANSTO conducts and enables inter-disciplinary research using nuclear and isotopic techniques to address some of Australia's and the world's most challenging environmental problems, focusing on water resource sustainability, climate change, and the impact of contaminants.

**Case study 3 - Research clarifies origins of methane in our atmosphere**

ANSTO has contributed to research on atmospheric methane emissions, showing that a massive release of this potent greenhouse gas from fossil methane reservoirs is unlikely as global temperatures rise.

A companion study also revealed important new evidence that methane emissions from human mining and use of fossil sources have been greatly underestimated—as these emissions had been inaccurately attributed to natural fossil emissions from geological sources in the Earth. In the related industrial era methane study, the team found that human fossil methane emissions had been underestimated by between 25 and 40 per cent.

The fossil methane research led by University of Rochester in the United States and published in *Science,* found that emissions of natural fossil methane sources have been overestimated in the period of Earth's last deglaciation 8,000-15,000 years ago.

During that time the Earth went from a colder to a warmer state. Using samples of past atmosphere preserved as bubbles in ice, researchers concluded that very little methane from natural stores in the Earth, such as undersea methane hydrates, thermos-karst lakes and permafrost, actually reached the atmosphere as the planet warmed.

The researchers believe this may be due to natural buffers, such as oxidation by ocean microbes as the methane bubbles rise to the surface when methane hydrates destabilises.

Co-authored by ANSTO's Dr Andrew Smith, the high-profile collaboration was made possible by ANSTO's capability to measure radiocarbon in ultra-small samples of carbon.

ANSTO is one of few laboratories in the world that can undertake these demanding measurements, using a technique pioneered by Andrew Smith and colleagues at the Centre for Accelerator Science.

ANSTO measured the amounts of radiocarbon extracted from methane trapped in gas bubbles in the ice and also participated in some fieldwork. One tonne of ancient ice yields one sample of about 20 micrograms of carbon, and many samples were taken over six seasons of field work. Ice was melted onsite and the precious air returned to the laboratories for methane extraction, graphitisation and, ultimately, accelerator mass spectrometry.

Human fossil methane is emitted when humans extract and use fossil fuels including gas, oil and coal. Methane is a significant greenhouse gas, contributing about 25 per cent of global warming since the industrial era began.

The findings which were published in the prestigious journal *Nature*, provide strong support for the identification of human fossil sources as the primary source of fossil methane emissions in the atmosphere, a question that has been under debate in the scientific community.

Because fossil methane has been locked up in the Earth for so long, the radioactive isotope of carbon, radiocarbon or carbon-14, has decayed away. This makes it easier to identify fossil methane sources from biological methane sources which include wetlands, termites, animals and fires and have a contemporary carbon-14 signature. There are additional natural and human methane sources as well, each of which has a characteristic isotopic 'fingerprint'.

ANSTO is one of the few laboratories in the world capable of making these measurements, which requires identifying and counting individual atoms in miniscule samples.

Read the full natural fossil methane article at https://www.ansto.gov.au/news/potential-good-news-for-a-warming-world

Read the full human fossil fuel article at https://www.ansto.gov.au/news/potential-good-news-for-a-warming-world

**Case study 4 - ANSTO research techniques add important insights for local and global studies**

ANSTO experts have contributed to two international research projects that are helping to better understand and sustainably use groundwater, which is the largest available freshwater resource on Earth and is the largest source of global drinking water.

ANSTO groundwater expert Dr Karina Meredith contributed to a study, led by the Connected Waters Initiative Research Centre at the University of NSW (UNSW) and published in *Nature Communications*, that showed urbanisation and climate change threaten the quality of groundwater sourced drinking water and may result in an increase in groundwater contamination and household water costs in some areas.

The study showed that greater quantities of organic matter have been measured in samples from across the globe, including Australia.

A group of international investigators, compiled the largest global data set of organic matter in groundwater to date, involving thousands of groundwater samples from 32 countries.

Dissolved organic carbon (DOC) is a naturally occurring component of groundwater, but the higher its concentration, the more difficult and expensive it is to make groundwater drinkable.

The study concluded that climate change and the conversion of natural and agricultural areas to urban areas will increase the quantity of organic matter in groundwater, decrease water quality and increase water treatment costs, compounding existing constraints on groundwater resources.

ANSTO's capabilities in using naturally occurring isotopes to date groundwater accurately played a key role in the collaboration.

Dr Karina Meredith at left and Dr Eliza Bryan in the field sampling groundwater at a coastal NSW site

The second study led by ANSTO groundwater experts provided much-needed, quality-assured information about the origins, interactions and vulnerabilities of key groundwater resources in the Maputo District of Mozambique.

In a paper published in *Quaternary International*, a large team led by ANSTO hydrogeochemist Dr Dioni Cendón Sevilla, reported that intense rainfall during the wet seasons was the source of groundwater recharge and not water flowing from distant mountain ranges.

The team determined that groundwater recharge is likely to take place over decadal time scales. This knowledge enables local managers to determine how much groundwater they can sustainably take.

An understanding of shallow groundwater resources is also vital in the Australian setting and ANSTO tools and expertise can be applied for a wider understanding of similar regions in Australia.

Read the full UNSW led study article at https://www.ansto.gov.au/news/international-collaboration-identifies-potential-threat-to-water-quality

Read the full Mozambique research article at https://www.ansto.gov.au/news/sharing-groundwater-expertise

Left to right, Salif Kone from Mali, ANSTO's Dioni Cendon Sevilla and Jean-Mweze of the Democratic Republic of the Congo collecting groundwater samples

## Nuclear fuel cycle research

ANSTO is the home of Australia's nuclear expertise. As the operator of Australia's only nuclear reactor, we address key scientific questions in the nuclear fuel cycle for both the current generation of nuclear reactors and future systems.

**Case study 5 - New knowledge on performance of alloys in extreme environments**

ANSTO has provided insights into the performance of structural alloys for use in the high-temperature environment of molten salt systems as part of a research collaboration between the UNSW and the Shanghai Institute of Applied Physics (SINAP).

Molten salt-based energy-generation and energy-storage systems are being explored as next-generation low-emission systems because of the superior physical properties and the safety advantages of molten salts.

The study published in *Corrosion Science*, led by ANSTO's Dr Ondrej Muránsky and UNSW student Alexander Danon identified the microstructural characteristics of a nickel-molybdenum-chromium alloy (GH3535) that accounted for its corrosion resistance in a metal used both as a structural material and for weld joints.

Understanding the corrosion performance of structural materials and their weld joints is of technological importance in the design of molten salt-based energy generation and energy storage systems.

The study found that the microstructure of the alloy influences its corrosion behaviour in molten salt and that lattice distortion at high-angle grain boundaries promoted enhanced corrosion in the parent metal more than in weld joints.

Read the full article at https://www.ansto.gov.au/news/microstructure-influences-corrosion-advanced-alloy-for-molten-salt-systems

## Additional key research - Industry

Delivering solutions to industry to ensure that Australia's economy remains strong and competing successfully in international markets is a key priority for ANSTO.

**Case study 6 - Leading edge radiation imaging solution**

One of the more challenging aspects of dealing with radiation is that it cannot be seen and workers can unknowingly be exposed to its effects. To keep workers safe, it is critical to identify and locate sources of radiation accurately and quickly.

A new imaging technology developed by ANSTO for industry, makes the invisible visible, by identifying and imaging the exact location of radiation sources.

The technology has applications in nuclear operations, national security and defence, safeguards, radiation services and health physics, as well as for first responders to radiological incidents.

This new radiation imaging solution will improve operational decision making for anyone working in radioactive environments and help to keep workers safe.

With spectroscopic gamma-ray imaging across the full energy range and a large 360° by 90° field of view, this technology provides the most advanced radiation imaging capability.

By using compressed sensing techniques, an image can be produced with significantly less samples than traditional imaging methods, delivering faster results.

Physicist and researcher, Dr David Boardman, has led the team behind the development of the technology and following nearly a decade of research and development and five years of operational deployments, this novel solution will be ready for commercial release in late 2020.

**Case study 7 - Minerals expertise advances sustainable lithium ion battery production**

Lithium ion batteries are used to power electronic devices, vehicles and domestic households all over the world. While lithium itself is not rare, it is widely dispersed in nature and therefore difficult to recover. Currently, more than half of the world's lithium comes from mines in Western Australia.

Even the most advanced mining operations typically only recover 50 to 70 per cent of lithium from spodumene ore. This means that a large proportion of lithium often goes to waste, increasing mining costs and reducing the sustainability of these operations.

ANSTO, in partnership with Lithium Australia, has developed a processing technology that enables the recovery of lithium in the waste from spodumene mining operations. The technology is called LiENa® and Lithium Australia have now been granted a patent from IP Australia for it.

The Minerals team is continuing to work with Lithium Australia in the development of both the LiENa® process and in their work towards establishing domestic battery recycling capability to create a sustainable lithium battery industry in Australia.

Read the full article at https://www.ansto.gov.au/news/minerals-expertise-advances-sustainable-lithium-ion-battery-production

### Case study 8 - Insight into emulsions

ANSTO's neutron scattering capabilities have helped to contribute to characterise the structure of an oil-in-water emulsion commonly used in foods such as milk, cream, salad dressings and sauces as part of an international team led by New Zealand food scientists at the Riddet Institute.

As oil and water do not mix and emulsions are inherently unstable, emulsifiers are used to prevent their components from separating.

These emulsions have enormous potential in the development of functional foods. They could aid in increased delivery and enhanced uptake of dietary nutrients to help fight malnutrition, as the shelf life of the products that contain these emulsions is also far greater than that of other products.

In foods, the use of molecules such as proteins or food-grade surfactants is the most common way to stablise an emulsion; however, particles can also be used. The primary emulsion droplets effectively behave as particles themselves that can be used to stabilise even larger micron-sized droplets.

In the research published in *Langmuir*, the team, including ANSTO's Professor Elliot Gilbert, used particles produced from whey proteins from milk to coat the emulsion droplets.

Neutron scattering was used to determine the packing arrangement of the particles at the interface of the primary emulsion droplets which form a fractal network.

Qilu University of Technology (China) and the University of Queensland also collaborated on the study.

Read the full article at https://www.ansto.gov.au/news/food-science-insight-into-emulsions


The research was published in Langmuir

**Case study 9 - Insights into microstructure of materials under loading conditions**

A team of international researchers led by ANSTO have compared two novel techniques that can be used to assess the degree of accumulated damage in alloys by measuring defects stored in the microstructure.

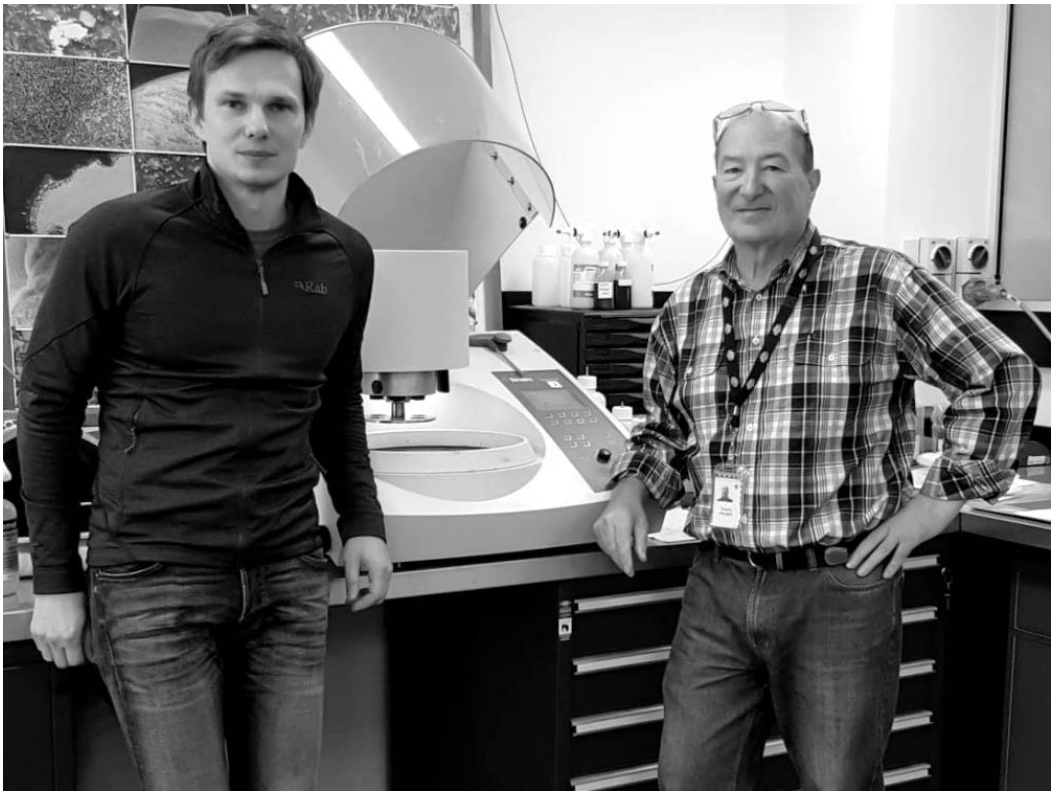
It is of technological importance to understand the accumulation of deformation in response to stresses in components under various operating in-service conditions in order to estimate their service lifetime.

ANSTO's Dr Ondrej Muránsky used subatomic particle diffraction-based techniques to obtain complementary information about the crystal lattice defects (dislocations) stored by the material as a result of applied load.

In the study published in *Acta Materialia*, Muránsky and his collaborators from Queen's University (Canada), University of California (USA), and Argonne National Laboratory (USA) compared Electron Back-Scatter Diffraction (ESBD) and High Resolution Synchrotron Diffraction (HRSD) techniques, and developed the software code for a theoretical estimation of damage at the mesoscopic grain level.

The two techniques complemented each other and can assist in assessing the remaining life of a component in operating in service conditions. However, it was found that the EBSD technique is more sensitive to a small amount of damage, while the HRSD technique is more accurate when measuring a higher amount of accumulated plastic damage.

Read the full article at https://www.ansto.gov.au/news/insights-on-service-life-of-industrial-components



Lead author Dr Ondrej Muransky, left, and Tim Palmer, who prepared samples for the experiments

## Additional key research - Cultural heritage

Over the last decades, nuclear techniques using neutrons, photons, and ions, have been established as a novel and generally non-invasive investigative approach to characterise cultural-heritage materials.

**Case study 10 - A novel approach to dating Aboriginal rock art from the Kimberly is enabled by ANSTO's radiocarbon dating capabilities**

Rock art is always problematic for dating because the pigment used usually does not contain carbon, the surfaces are exposed to intense weathering and nothing is known about the techniques used thousands of years ago.

University of Melbourne researchers in collaboration with ANSTO and the Traditional Owners of Balangarra and Dambimangari Lands in the Kimberley developed a new approach to determine the boundary age estimates of challenging Aboriginal rock art by using radiocarbon found in the remnants of the mud wasp nests on top of or underlying the artwork.

This indirect method of dating could be useful in providing age estimates for other evidence of past human activity including grinding hollows, grooves, carvings as well as paintings.

Mud wasp nests which are commonly found in rock shelters in the remote Kimberley region, also occur ubiquitously across northern Australia, and remnants can survive for tens of thousands of years.

Mud wasp nests were collected from over 108 rock art sites with the permission and assistance of the Traditional Owners of Balangarra and Dambimangari Lands in the Kimberley.

The dates reported in the research paper by lead author Damien Finch and co-authored by ANSTO's Dr Vladimir Levchenko published in *Science Advances* provide, for the first time, an estimate for the time period when paintings in the Gwion Gwion style proliferated, mostly between 10 to 12,000 years ago.

To date, it is believed to be the most comprehensive dating of the Gwion Gwion style, which is commonly characterised by elongated human figures wearing adornments.

Read the full article at https://www.ansto.gov.au/news/dating-aboriginal-rock-art-using-mud-wasp-nests

# Performance criterion 4 – Strategic management of landmark and national infrastructure

*Strategic management of landmark and national infrastructure - To serve users, enable world-class research and create economic impact and benefit.*

| Item | Goal | *Results* |
|---|---|---|
| OPAL days at power | 287 days | 298 days |
| Australian Synchrotron % of availability | 95 per cent | 84 per cent* |
| Neutron beam instruments % of availability | 85 per cent | 82 per cent* |
| Accelerators % of availability | 65 per cent | 56 per cent* |

* In 2019-2020 the percentage availability was less than planned due to the impact of COVID-19 that restricted user travel to ANSTO campuses and resulted in the shutdown of our research infrastructure platforms, except to enable COVID-19 related research for approximately three months.

## OPAL

At the heart of ANSTO's research capabilities is the state-of-the-art OPAL reactor which commenced operation in 2007 and is one of the world's most effective multi-purpose reactors.

OPAL is used for scientific research, the production of medical radioisotopes, and the irradiation of silicon for use in microelectronics and other specialised irradiations for research and industry.

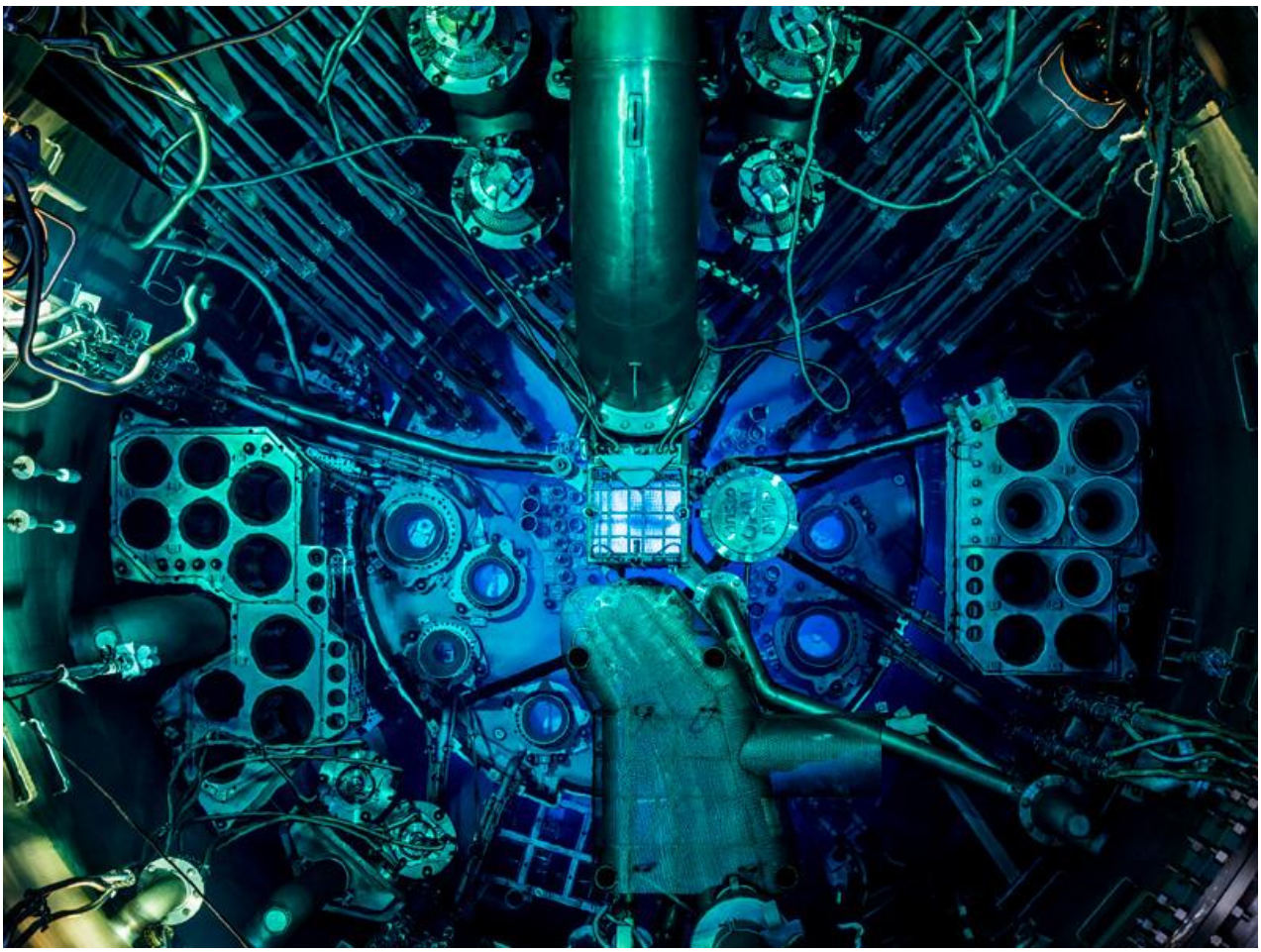
OPAL continued to consolidate its reputation as one of the world's most reliable and available multi-purpose reactors. In the 2019-2020 financial year, the OPAL reactor operated for 298 days with a reliability of 99 per cent. Reliability is measured by how well the OPAL reactor performed against the planned operating and shut down schedule. This schedule is published on ANSTO's website at the beginning of each financial year. See the current schedule: https://www.ansto.gov.au/research/facilities/opal-multi-purpose-reactor/opal-operating-cycles

Sustained safe operations have been achieved through the expertise of OPAL staff and robust asset management. ANSTO's capital investment in OPAL has enhanced safety and reliability, with optimised realisation of asset value through the renewal key infrastructure. OPAL upgrades have enabled the remote condition monitoring of critical plant, minimising radiation exposure for staff and supporting the continuity of supply of medical radioisotopes. A focus on increasing the capacity and capability of the reactor has resulted in a greater level of irradiated products and services being provided to our stakeholders and users. This has enabled ANSTO to supply more than half of the world demand for Neutron Transmutation Doping

(NTD) irradiated silicon, which is used to power high-end, renewable technology such as high-speed trains, wind turbine systems and electric and hybrid vehicles.

High reliability OPAL operations have supported strong levels of utilisation. OPAL has continued to be used for the irradiation of new radioisotope products including novel theranostic products that combine diagnosis and treatment. The OPAL utilisation team is increasing the capacity for irradiation of these products through optimised target configuration within existing facilities. ANSTO's collaboration with researchers to produce the irradiated products supports the global development of targeted treatments that minimise damage to healthy tissue and are better tolerated by patients.

ANSTO has set a target of 285 days of safe operation in 2020-2021, which incorporates a planned extended maintenance shutdown period to ensure the ongoing safety, high efficiency and reliability of the reactor into the future.



OPAL multi-purpose reactor pool

## Australian Synchrotron

ANSTO's Australian Synchrotron is Australia's largest particle accelerator facility that produces powerful beams of light that are used by 10 different beamlines to examine the molecular and atomic details of a wide range of materials. The advanced techniques are applied to research in many important areas including health and medical, food, environment, biotechnology, nanotechnology, energy, mining, agriculture, advanced materials and cultural heritage.

With the $95 million BRIGHT funding already secured with the support of 30 funding partners, ANSTO is constructing an additional eight beamlines at the facility, nearly doubling its research capacity. The new beamlines will be progressively opened to the research community over the next few years and will provide opportunities for researchers to access unique and highly specialised capabilities and techniques. This will open up exciting new facilities for use in diverse areas such as the development of high-grade medical implants and investigating the impacts of food preservatives, to minerals processing and protein analysis for drug design and validation.

During this period, the Australian Synchrotron hosted in excess of 1300 merit access users, supporting in excess of 750 user projects with almost every research intensive university and government institution based in Australia and New Zealand accessing the Synchrotron to conduct research. For example, the Grain Research Development Corporation and university partners began research with ANSTO relating to soil science, plant physiology and growth, as well as the distribution, availability and enhancement of micro-nutritional content in plants and grains. This work will improve the quality and accessibility of our nation's food supply.

The high calibre of collaborations over this period has generated approximately 590 peer-reviewed scientific journal articles, with over 30 per cent appearing in the world's top scientific journals, including *Nature* and *Science*. Research to understand the molecular basis and treatment of malaria and technology that may soon help paralysed patients walk again were both acknowledged by the Australian Museum's annual science awards the Eureka Prizes, while the Australia Synchrotron's involvement in research related to COVID-19 contributed to a better understanding of the nature of the virus and receiving extensive media coverage.

## Neutron beam instruments

ACNS is home to 15 neutron-beam instruments, where scientists apply neutron scattering techniques to solve complex research and industrial problems such as the development of renewable, clean energy technologies or new battery materials. Studying is also conducted on the structural integrity of materials such as airplane turbines and vehicle engine blocks that will be used in vehicles in the near future which is partially funded through the National Collaborative Research Infrastructure Strategy (NCRIS).

During the period, ACNS hosted in excess of 430 users, supporting in excess of 335 user projects. The ACNS's technical and scientific research support staff play an important role in the training and development of postgraduate students, post-doctoral fellows and early career researchers. In 2019-2020 over 150 postgraduate students participated in experiments at the ACNS as part of their studies.

The ACNS has a demonstrated track record of engagement with the research community, which has been integral to the development of the science case for each of the neutron beam instruments and as users of the infrastructure. The ACNS and its staff have been partners of choice for a number of successful Australian Research Council Project grants including new ACNS capabilities that will be secured via two Australian Research Council (ARC) Linkage Infrastructure, Equipment and Facilities.


The ACNS neutron guide hall

## Accelerators

CAS, which is partially funded through NCRIS, provides users with access to a suite of tools in one location that can be used for isotopic dating, air pollution studies, climate science, the modification and characterisation of materials, radiation damage studies, forensic science, nuclear detector characterisation and microbiological and life sciences studies.

CAS consists of four megavolt-range 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) - with a suite of sample processing laboratories.

During 2019-2020, CAS supported over 200 users in over 100 user projects from Australian and international universities, government agencies and industry, including leading national and international institutions such as The Imperial College (London), The University of Rochester (New York), Cambridge University, British Geological Survey, CSIRO, the Australian National University (ANU) and the University of Melbourne.

Over many years, CAS staff have developed specialist expertise in radiocarbon dating of micro-samples, that is, samples where only a few micrograms of carbon are available. This expertise has proven vital to two collaborations which have published important findings this year.

When bushfires struck NSW with unprecedented ferocity in the 2019-2020 bushfire season, sampling sites operated by CAS gave insights into air quality around the Sydney basin and Hunter Valley. Analysis showed that not only was the amount of bushfire smoke exceeding safe limits on many occasions, but also that significant amounts of soil were being transported by winds from the fire zones into regions well beyond those fire zones. See more on ANSTO work on page 28.

# Performance criterion 5 – Advice to Government and international relations

*Nuclear and related expertise and advice - To provide expert advice, education, and services to support Australian policy and to strengthen Australia's nuclear science knowledge base.*

**Goal -** Effectively facilitate ANSTO's role with Government and internationally as Australia's centre of excellence on nuclear science and technology by:

- Providing reliable and trusted advice to Ministers, Parliament, and Government departments and agencies.
- Engaging with key international nuclear organisations and policy discussions.

**Results -** Assessed by a minimum of four research case studies

## Case study 1 - Understanding the 2019-2020 bushfires

Utilising its capabilities in air quality monitoring and understanding climate, ANSTO contributed to the national discussions on the health and environmental impacts of the 2019-2020 bushfire season. ANSTO made submissions to:

1. The Federal Senate Standing Committee's Government Inquiry into the lessons to be learned in relation to the preparation and planning for, response to and recovery efforts from the 2019-2020 bushfire season.

2. The New South Wales Legislative Council inquiry into the health impacts of exposure to poor levels of air quality resulting from bushfires and drought. ANSTO also provided evidence as part of an expert panel hearing.

ANSTO also provided information to the Royal Commission into National Natural Disaster Arrangements and responded to a number of requests from DISER, as well as the Office of the Chief Scientist, in relation to ANSTO's potential contributions to future preparations for bushfires. ANSTO's CEO, Dr Paterson, also participated in several roundtables on Bushfire Science, chaired by the Minister for Industry, Science and Technology, the Hon Karen Andrews, contributing to the development of a scientific response to address this national challenge.

## Case study 2 - Science of nuclear power to inform policy discourse and the Generation IV International Forum (GIF)

ANSTO has made significant contributions to major national discussions and policy forums regarding nuclear science and technology and its applications. During the reporting period, ANSTO provided three written submissions to Federal and state nuclear power inquiries. These submissions were to:

(i) The Federal House of Representatives Standing Committee on the Environment and Energy's inquiry into the prerequisites for nuclear energy in Australia. View submission at https://bit.ly/3mXfzsa

(ii) The New South Wales Legislative Council Standing Committee on State Development's inquiry to consider the *Uranium Mining and Nuclear Facilities (Prohibitions) Repeal Bill 2019*. View submission at https://bit.ly/3685XEN

(iii) The Victorian Government Legislative Council's inquiry to examine the merits in lifting the state's ban on nuclear power. View submission at https://bit.ly/366o6ms

ANSTO appeared at the public hearings for the Federal and New South Wales inquiries. ANSTO also appeared at a hearing of the Federal House of Representatives Standing Committee on Industry, Innovation, Science and Resources' roundtable on the nuclear industry in Australia and facilitated site visits to its Lucas Heights campus for Committee members and staff associated with the inquiries.

This work has been critical in informing Government on the economic, environmental and social implications of nuclear energy technologies.

ANSTO's continued representation of Australia in the GIF enables the Organisation to provide timely and comprehensive submissions and advice to government on nuclear technologies, including international developments. ANSTO remains an active and enthusiastic member of the GIF through its participation in GIF Policy and Expert Group meetings and its contributions towards the development of the Very High Temperature Reactor and Molten Salt Reactor systems.

## Case study 3 - Expert technical support and advice to the National Radioactive Waste Management Facility (NRWMF) Project

In early 2020, the Government identified Napandee in Kimba, South Australia, as the preferred site for the NRWMF following extensive consultation and site assessment activities. Later in the year, ANSTO provided a submission to the Senate Standing Committees on Economics' inquiry on the *National Radioactive Waste Management Amendment (Site Specification, Community Fund and Other Measures) Bill 2020*, which highlighted the need for the establishment of a NRWMF in Australia. Representatives from ANSTO also participated in a public hearing for this inquiry in June 2020.

ANSTO continued to provide extensive technical expertise, services and advice to the Federal Government regarding the establishment of the NRWMF. ANSTO's expertise and services have included the development of the facility concept design and preliminary safety case; assistance with planning for the management of facility safety, security, and safeguards; and the provision of policy advice, as well as information related to costs, waste conditioning processes and transport arrangements. ANSTO's expertise stems from more than 60 years of safe and responsible radioactive waste management.

ANSTO has also facilitated departmental access to international experts and assisted in the broader community's understanding of radioactive waste management practices.

## Case study 4 - Engagement in national science and technology discussions

ANSTO has maintained ongoing engagement with the Minister for Industry, Science and Technology, the Department of Industry, Science, Energy and Resources (DISER) - formerly the Department of Industry, Innovation and Science - and other relevant ministers and their Departments over the reporting period.

Over the reporting period, ANSTO continued to act as the secretariat for both the Nuclear Agencies Consultative Committee (NACC) and Research Agencies Meeting (RAM) - two separate forums that enable discussion and collaboration among government departments, agencies and research institutes.

The NACC serves as a forum for senior representatives from various agencies of government who are involved in, or have an interest in, nuclear matters to exchange information, coordinate activities and discuss policy development and international engagement. Ten government departments and agencies regularly participated in NACC meetings during the reporting period.

The RAM aims to enhance science and research collaboration and policy at both the domestic and international levels. RAM brings together approximately 50 representatives from more than 20 government departments, agencies and research institutes each quarter for important science policy discussions.

In addition to these forums, ANSTO continued to work with DISER on a daily basis, keeping it abreast of ANSTO's operations, achievements and activities. Further, ANSTO responded to numerous requests for expert or technical advice regarding nuclear science and technology, and provided input into the development and revision of science and research policy.

## Case study 5 - International Atomic Energy Agency (IAEA)

ANSTO plays a leadership role within the IAEA. During the reporting period this continued and ANSTO's role involves coordinating the Scientific Visits and Fellowships program, participating in Coordinated Research Projects, and representing Australia at numerous technical meetings on topics across nuclear science and technology. ANSTO staff play prominent roles in IAEA expert groups, including chairing the International Expert Group on Nuclear Liability (INLEX), the Standing Advisory Group on Nuclear Applications (SAGNA), and the International Decommissioning Network (IDN).

ANSTO's strong participation in IAEA activities is not only consistent with our mandated role to undertake international cooperation under the *ANSTO Act,* but is also fundamental to maintaining Australia's permanent seat on the IAEA Board of Governors. This position gives Australia a strong voice on important policy and programmatic issues at the IAEA, and is maintained by continual demonstration that we are the most advanced country in nuclear science and technology in our regional group (South East Asia and the Pacific).

ANSTO also provides expert advice and support to other Australian Government agencies tasked with pursuing Australia's nuclear-related foreign policy objectives through the IAEA. Working in close collaboration with the Department of Foreign Affairs and Trade and other agencies, ANSTO provides much of the technical expertise that informs Australia's whole-of-government approach to IAEA technical

cooperation, nuclear technology and applications, and nuclear safety, security and safeguards. ANSTO is represented at the Australian Permanent Mission to the IAEA in Vienna, and is a highly active participant in both technical and policy discussions within the IAEA and amongst its Member States.

## Case study 6 - Regional Cooperative Agreement (RCA)

The Regional Cooperative Agreement (RCA) is an intergovernmental agreement of 22 IAEA Member States in East and South Asia and the Pacific, under which people from developing member countries are educated and trained in the safe and peaceful uses of nuclear science and technology for a range of applications in health, environment, industry and agriculture. RCA projects deal with topics such as food safety and authentication, non-destructive testing and examination methodologies in industries, environmental and climate science, and cancer and non-communicable diseases management.

An ANSTO officer is the Australian National Representative to the RCA, directing Australia's involvement in the program. This includes facilitating Australia's participation in all of the 16 projects active during the reporting period. Four of these projects are led by Australia, and include:

(i) the assessment of the vulnerability of coastal landscapes and ecosystems on sea-level rise and climate change;

(ii) the role of soil and water quality in minimising land degradation and enhancing crop productivity;

(iii) the enhancement of medical physics services in the region through education, training and standards development; and

(iv) enhancing wetland management and sustainable conversation planning.

In its role as National Representative, ANSTO was successful in progressing two project proposals to the detailed design stage for the 2022-2023 project cycle. We were also successful in getting an Australian expert appointed to the influential RCA Program Advisory Committee (PAC).

In December 2019, 28 teachers and experts from 16 developing countries attended a two-week IAEA teacher training course at ANSTO as part of ANSTO's work as an expert advisor on education and engagement to the IAEA.

## Case study 7- Forum for Nuclear Cooperation in Asia (FNCA)

The Forum for Nuclear Cooperation in Asia (FNCA) is another multilateral forum of importance to Australia and the Asia-Pacific region. The FNCA facilitates technical cooperation using nuclear science and technology amongst the 12 member countries. Australia is represented by ANSTO in three of the eight projects – radiation safety and radioactive waste management, research reactor utilisation, and climate change science. This last project is led by ANSTO.

This year, the ANSTO team in the Research Reactor Utilisation (RRU) project was awarded the FNCA Excellent Research Team Award, recognising the team's contribution to the FNCA project, the prominence of its output and its socioeconomic contribution in the preceding year.

## Case study 8 - Chronic Kidney Disease of Unknown origin (CKDu) in Sri Lanka

ANSTO's investigation of Chronic Kidney Disease of Unknown origin (CKDu), a globally prevalent, non-communicable disease has continued during the reporting period. In late 2019, ANSTO signed a new MOU with the Sri Lankan Government, affirming commitment to the collaboration for a further three years. ANSTO continues to leverage the funding support provided by the Department of Foreign Affairs and Trade to progress understanding of CKDu.

Of particular note, two water-sampling rounds were completed in the north-central province, including one that was led by collaborators from the University of Peradeniya. These samples, in addition to an earlier sample collection undertaken in 2018, are the subject of three, high-impact scientific publications, and focus on topics including microbes, carbon and nitrogen cycling, and water-rock interactions. ANSTO's key finding indicates microbial contamination of drinking water; a new finding which has the potential to reframe discussions and hypotheses about the role of drinking water in development of CKDu.

A capacity-building program aimed at developing a methodology to extend understanding of the histopathology of the Sri Lankan kidney was completed in late 2019 during the visit of a senior researcher from the University of Colombo. This program has helped to establish a baseline methodology for identifying targetable CKDu development stages.

ANSTO has increased the global network of collaborators on this project with the intention to help address this disease in other locations around the world.

# Performance criterion 6 – Business and innovation

*Business and innovation - Deliver nuclear or related products and services to our customers, and partner with others to develop impactful products and services for a sustainable future.*

**Goal -** 3,391,917 radiopharmaceutical potential doses

**Result -** 900,921 radiopharmaceutical potential doses

ANSTO did not reach its target in 2019-2020 principally due to reduced production runs in the ANM facility due to COVID-19. The pandemic also adversely impacted ANSTO's export of radiopharmaceuticals; this is predicted to be a finite issue with exports expected to increase in the 2020-2021 financial year.

By closely working with our customers, the domestic supply was largely maintained despite the supply chain challenges associated with COVID-19.

Traditionally, ANSTO has based the target patient doses per year on sustained organic growth of the nuclear medicine market. This method does not reflect changes to market dynamics, nor the strategies adopted by ANSTO to best meet the needs of our customers. To provide greater transparency of target patient doses, ANSTO has refined the method of calculation for 2020-2021 which align with the organisation's integrated business planning processes. This new methodology utilises ANSTO's operating forecast, which incorporates ANSTO strategies to meet changes in our markets.

For more than 60 years, ANSTO has manufactured a range of nuclear medicines called radiopharmaceuticals, which are used as both diagnostic and therapeutic agents in clinical settings, as well as in medical research

# Performance criterion 7 – Quality compliance performance

*Business and innovation - Deliver nuclear or related products and services to our customers, and partner with others to develop impactful products and services for a sustainable future.*

**Goal -** Our quality compliance performance is measured by our Quality and Business Systems team and reported quarterly through an executive committee. One such measurement is our ongoing Quality Management certification. This will be measured by maintaining our ISO 9000 Quality Management System certification.

**Result -** Two surveillance audits were undertaken during the period and the certification was maintained.

ANSTO Quality Management System (QMS) is a certified system with documented processes, plans and established responsibilities for achieving quality objectives. The system aligns with the ANSTO Corporate Plan and Quality Policy. It provides a framework for strategic planning and continuous improvement as well as ensuring customer satisfaction and compliance with legislative, regulatory and organisational requirements. The high-level structure of the QMS provides a flexible platform for integrating quality with the Oliver Wight Integrated Business Planning and other ISO management systems, such as ISO 14001 and ISO 45001.

The certification has been successfully maintained at all ANSTO's sites.

# ANSTO Precinct

ANSTO's precinct in southern Sydney is all about putting science to work - leveraging Australia's most significant science assets to support and drive solutions for industry.

nandin, located on ANSTO's Lucas Heights campus, has become a magnet for start-ups and small to medium sized enterprises (SMEs), with nine new members joining during the reporting period. There are now 16 members within nandin focusing on developing new solutions for health and respiratory medicine, safety systems and emergency services, air quality infrastructure design and fabrication, cybersecurity, defence and aerospace, automated asset tracking and management and more. These start-ups and SMEs are benefiting from co-location with ANSTO.

Thanks to a $12.5 million grant from the NSW Government work is underway to establish a fit for purpose centre, the nandin Innovation Centre on ANSTO's Lucas Heights campus, co-locating the nandin startup community with students from the Graduate Institute. ANSTO has also signed a partnership agreement with Design Factory Melbourne (Swinburne University, Australia) to enable nandin to become a node of the Design Factory Global Network.

nandin is the first realisation of much broader plans for the ANSTO Innovation Precinct, which will foster close engagement between Australian scientists and both local and international businesses, placing southern Sydney at the heart of innovation in Australia.

The broader ANSTO Innovation Precinct is now recognised as a collaboration area in the Greater Sydney Commission's South District Plan. The innovation and research precinct requires a partnership between government to realise its full potential as an economic catalyst in the District. In May 2020 the Greater Sydney Commission launched the ANSTO Collaboration Area Place Strategy as a result of collaboration between ANSTO and the Sutherland Shire Council, NSW Government departments and agencies, and other stakeholders. The core pillars of the Area Place Strategy are to:

- improve transport connections and accessibility to and from ANSTO
- enhance ANSTO's economic and employment role
- provide essential infrastructure to support the innovation precinct
- embrace the ecological and indigenous values inherent in the site.

nandin has become a magnet for start-ups and small to medium sized enterprises

# Engaging with ANSTO

The key objective of ANSTO's Communications and Stakeholder Engagement programs is to inform and engage Australians with the work of ANSTO and the benefits of nuclear science and technology. We also seek to support education outcomes and inspire young Australians through showcasing what a career in STEM can offer.

Since 2018, ANSTO has used virtual reality to successfully introduced key aspects of nuclear science to a general audience. During National Science Week in 2018 we provided unprecedented access, via virtual reality, to the inside of Australia's only nuclear reactor. This enabled the viewer to meet the people who work inside the reactor every day and to provide a graphic experience of what is happening at the scale of the atom inside the OPAL reactor pool. This app ranked amongst the top 70 education apps for science at the time of launch.

Building upon this success, ANSTO introduced the first augmented reality app for the periodic table during National Science Week 2019. This tool introduces the periodic table of elements to students in an innovative way, helping teachers to explain concepts and attract the interest of students who may not previously have been interested in science. Available free to schools across the country, the app enables students to point their device at ANSTO's 2D periodic table posters and instantly see new and engaging information about some of the most popular elements; including the arrangement of the atom and information on how the element is used in everyday life. During the reporting period, the ANSTO XR app attracted 19,635 downloads. Download the app at https://www.ansto.gov.au/education/apps

Also during the reporting period, ANSTO introduced a virtual reality experience of what happens inside Australia's largest particle accelerator, the Australian Synchrotron. This was released to the general public and timed to support the Australian Synchrotron Open Day in October 2019 and has attracted a strong response from our audiences.

Despite the COVID-19 pandemic leading to necessary adjustments across all of our communications and engagement programs, in the second half of this year, we experienced a growth in audience reach and engagement in the work ANSTO is doing and in nuclear science and technology generally. This is evident in a 13.1 per cent increase in website engagements; an increase of 4.2 per cent on Facebook and 3.5 per cent on Twitter audiences and a 50 per cent increase in activity through traditional media. There was strong media interest in ANSTO's role to support the development of a vaccine for COVID-19.

ANSTO has responded to the changing needs of students and teachers. In place of our in-person tour programs, we have increased the number of students engaging through video conferencing. During the reporting period, just over 2000 students from 80 schools nationally participated in video conferences to support their studies in science.

Prior to the restrictions of COVID-19, ANSTO had welcomed 9000 visitors across 490 tours at Lucas Heights between July 2019 and February 2020. We also welcomed 3000 visitors to the Australian Synchrotron in

Clayton across approximately 200 tours. An additional 3000 members of the general public also attended the Australian Synchrotron Open Day in October 2019.

A key part of our role is to support and inspire Australia's science teachers. During the reporting period, 220 secondary teachers physically attended events in NSW, Victoria, Tasmania, Queensland, South Australia and Western Australia and over 70 primary teachers attended online professional development programs.

In addition to these training opportunities, the ANSTO Big Ideas Forum competition has grown in popularity. It's an annual event that invites students to put forward a 'big idea' to solve a problem and come to ANSTO with their science teacher to experience what it's like to collaborate and work with some of Australia's leading researchers and learn about how they could bring their big idea to life. In 2019, 18 students and nine teachers from each state of Australia were given the four-day experience of working at ANSTO's Lucas Heights campus. Learn more about the Big Ideas Forum at https://www.ansto.gov.au/news/big-ideas-forum

ANSTO's communication and science education approach is recognised internationally and in December 2019, 28 teachers and experts from 16 developing countries attended a two-week IAEA teacher training course at ANSTO as part of ANSTO's work as an expert advisor on education and engagement to the IAEA.

To replace our regular school holiday program of activities that were cancelled due to COVID-19, ANSTO launched an online STEAM (Science, Technology, Engineering, Arts and Mathematics) Club in March 2020. Aimed at primary and early secondary school students from across Australia, it provided weekly challenges, encouraging students to experiment and create using everyday items found around the home with 1900 students across Australia registered. As we continue to live with COVID-19, ANSTO will further develop our online resources to support engagement with students, teachers and the wider community. Learn more about ANSTO's STEAM Club https://www.ansto.gov.au/education/resources/ansto-steam-club

ANSTO launched an online STEAM Club in March 2020. It engaged over 1,900 primary and early secondary school students from across Australia in weekly challenges, encouraging them to experiment and create using everyday items found around the home

# Products and services

## Health Products

Health Products is a commercial division of ANSTO, responsible for the manufacture, production and distribution of radiopharmaceuticals, radio chemicals, cold kits and accessories for use in patient healthcare and research across Australia and globally.

ANSTO's Health Products division enables the supply of approximately 12,500 potential patient doses of technetium-99m (Tc-99m), the daughter isotope of molybdenum-99 (Mo-99), to Australian patients per week. Tc-99m is used to support the diagnosis of a range of serious illnesses, including heart disease, cancer and skeletal injuries. ANSTO's Health Products division also supplies a number of other radioisotopes used in both diagnosis and treatment of disease.

The 2019-2020 Federal Budget included $56.4 million to support ANSTO's operations, particularly the production of nuclear medicine. This included funding that has supported ANSTO to continue improving operations within its nuclear medicine production and distribution facility, also known as Building 23.

Despite the significant adjustments to our workforce planning due to COVID-19, ANSTO has been successful in maintaining nuclear medicine supply for Australians. The pandemic highlights the value of domestic nuclear medicine manufacturing capabilities for continuity of supply for Australian patients and ANSTO has worked closely with the nuclear medicine community to achieve this.

However, the COVID-19 pandemic provided some unique challenges. This is largely due to the short life of nuclear medicine, potential reduced availability of staff, cuts in flights used in the distribution of product around Australia and the importation of niche nuclear medicine products from overseas.

ANSTO worked intensely with its partners, freight and logistics companies and international manufacturers to ensure continuity of supply of nuclear medicine to Australian patients.

As logistical challenges around supply grew, ANSTO took the carefully considered decision to postpone its preventative maintenance shutdown of Building 23, originally scheduled for April 2020, until November 2020. This decision has enabled continuity of supply during a very critical period of change for the Australian health landscape that was responding to the demands of the pandemic.

As ANSTO, its customers and patients begin to emerge from the restrictions of COVID-19, there will be an added need to adjust to evolving patterns of demand and supply of nuclear medicine. ANSTO is committed to working with the nuclear medicine community so that time critical adjustments can be made to meet the needs of Australian patients.

ANSTO wishes to thank the significant contributions made by both the Nuclear Medicine Working Group and its Advisory Board; their participation in discussion, guidance and assistance has been invaluable over the last 12 months.

ANSTO's nuclear medicines benefit thousands of Australians every week, supporting the accurate diagnosis of heart disease, skeletal conditions and cancer

### ANSTO Nuclear Medicine (ANM)

ANSTO Nuclear Medicine (ANM) is a newly commissioned export-scale Molybdenum 99 (Mo-99) Manufacturing Facility, owned by ANSTO's subsidiary ANM Pty Ltd, at ANSTO's Lucas Heights campus.

### Mo-99 Manufacturing Facility

In early March 2020, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) granted permission for the Mo-99 Manufacturing Facility to increase to more than two manufacturing runs per week.

Despite the capacity to increase production, due to COVID-19 restrictions production has remained limited to accommodate new staffing arrangements to support the social distancing of our workforce. Our focus has been to maintain reliable manufacturing to ensure we continue to meet the demand from Australian patients. The Mo-99 Manufacturing Facility will increase the number of runs per week and export volumes when COVID-19 restrictions are eased and international logistics are reinstated.

With the newly commissioned Mo-99 Manufacturing Facility and the highly reliable and modern OPAL multi-purpose reactor, Australia now stands ready to emerge from COVID-19 as a global leader in the advanced manufacturing of this important radioisotope for nuclear medicine supply globally and ensuring a reliable supply of potentially lifesaving nuclear medicines for generations to come.

# Silicon Irradiation

After further processing by power electronics manufacturers, NTD silicon is used in high-end electronic switching devices. These devices are used in a range of high-power semiconductor applications such as power grid infrastructure, industrial automation, wind turbine systems, high-speed trains and the automotive industry. The long-term outlook for NTD silicon remains strong and the impact from COVID-19 to date has been minimal.

Silicon Irradiation increased its global market share to 58.2 per cent in the 2019 calendar year, compared to 50 per cent in the 2018 calendar year. Revenue from silicon irradiation, also known as neutron transmutation doping (NTD) in 2019-2020 was over 12 per cent higher than the previous year.

ANSTO's Silicon Irradiation business increased its global market share to 58.2 per cent in the 2019 calendar year

# Minerals

ANSTO's Minerals business provides practical solutions and innovative technologies to the mining and minerals industry through the provision of consultancy and process development services. In addition, it undertakes industry-funded research to develop and improve processes for the treatment of ores containing uranium, rare earths and other critical metals.

Minerals also provides consulting services to mining and minerals processing operations managing naturally occurring radioactive materials (NORM), applying its extensive knowledge to the efficient management and mitigation of risks that may be associated with NORM.

Minerals has established a strong reputation with its clients for high-quality technical development, utilising its excellent pilot plant facilities to allow the scale up of a range of metallurgical unit operations. These benefits accrue from both the technical expertise applied as well as the strong focus on delivering improved energy efficiency and overall economics of processing. Minerals also has the only rare earth solvent extraction pilot plant outside of China capable of producing individual rare earth products of greater than 99.9 per cent purity.

Minerals continues to diversify its consultancy work, undertaking a number of technology trade-off studies and providing input to pre-feasibility and feasibility studies covering a wide range of metals including zirconium, uranium, rare earths, vanadium, niobium, copper and lithium.

# Radiation Services

Comprising the Radiation Consultancy, Radiation Safety Training and Instrument Calibration groups, ANSTO's Radiation Services business unit is the leading provider of radiation protection services and advice in Australia.

There has been a commercial downturn in many sections of the radiation protection industry, but with a strong reputation and extensive practical experience across a broad range of radiation protection issues in industry, Radiation Services continues to maintain strong revenue and profitability.

Much of the consulting focus has been on establishing longer-term contracts with key clients including the larger scale characterisation and remediation of legacy buildings and sites, and the management of high activity sources, utilising a range of ANSTO's resources. In the training area, the development of industry specific training has been very well received.

# Managing our waste

Radioactive waste is a by-product of the past and current activities of ANSTO. Over the past 67 years, ANSTO, and previously the Australian Atomic Energy Commission (AAEC), has safely and reliably managed these waste holdings at its Lucas Heights campus in Sydney.

Work is underway to prepare radioactive waste for longer-term storage at the National Radioactive Waste Management Facility (NRWMF) when this becomes available.

Key projects during the reporting period include the development of a new medium to long-term plan for managing the Little Forest Legacy Site. The defueled and shutdown High Flux Australian Reactor (HIFAR) continues to be monitored and maintained in anticipation of future planned decommissioning activities.

Construction of the first-of-a-kind SYMO - Synroc waste treatment facility is on track to treat liquid waste by-products from the manufacture of nuclear medicine.

Integrated Waste Management Facility extension

# Next generation accelerator technologies

ANSTO is Australia's custodian of both reactor-based and accelerator-based nuclear technologies.

ANSTO operates the largest accelerator in Australia, the Australian Synchrotron at our Clayton campus, four linear accelerators at the Centre for Accelerator Science at Lucas Heights and the National Research Cyclotron at Camperdown.

Accelerators will play an increasing role in nuclear medicine production and cancer treatment with particles.

ANSTO is engaged in the National Particle Treatment and Research Centre Steering Committee, providing expertise on accelerators and the broader research applications in the fields of space, materials testing or nuclear physics.

To advance the development of novel radiopharmaceuticals that will be produced by accelerator applications, ANSTO has teamed up with researchers from Monash University to build on a proposal to establish a Precision Radiopharmaceuticals Facility at our Clayton campus housing either a high energy cyclotron or a linear accelerator.

In addition, now in its 12th year of operation, the Australian Synchrotron is planning for future upgrades of the accelerator system with a 10-15 year horizon. Studies are being carried out to determine the best and most cost-effective solution to upgrade the existing accelerator structure.

# Embracing the digital economy

The digital economy transcends the physical, geographical and resourcing constraints of traditional markets and consequently several challenges arise that must be met. This includes the capability and capacity to work remotely, collaborate internally and externally and maintain the ANSTO values including Safety, Security and Sustainability.

ANSTO has risen to these challenges through the implementation of expanded infrastructure to provide enhanced remote working capability. We have increased capacity and network connectivity enabling remote monitoring of experiments and use of the scientific landmark infrastructure. This, along with our completed installation of enhanced multi-campus storage infrastructure, enables the safety and sustainability of scientific and corporate data into the future.

Leveraging the foundation provided by the enhanced internal infrastructure, ANSTO introduced an enterprise analytics platform to provide a powerful visual interface that facilitates continuous flows of information for rapid decision making, further facilitating collaboration, rapid analysis and a streamlined customer experience. This platform has been used to map the global supply chain of key ANSTO products, predict workforce diversity and provide up-to-date reporting on financial, operational and research performance.

ANSTO has progressed its cyber security program via the development of the ANSTO-wide cyber security strategy. Under the strategy, a graded approach to cyber security risk management is implemented across all of ANSTO's computer-based assets. This assessment follows international and national guidance, informed by the Australian National Design Basis Threat issued by the Australian Safeguards and Non-proliferation Office (ASNO) and continuous intelligence and guidance provided by the Australian Cyber Security Centre (ACSC). Under this strategy, ANSTO has increased cyber security resourcing and has begun implementing a range of new cyber security controls.

ANSTO's cyber security team is working with owners and managers of operational technology (OT) assets across the Organisation to improve the asset management and cyber security control of these assets. ANSTO has a wide range of OT asset management and cyber security maturity across the Organisation, and the cyber security team is driving improvements to this maturity across all assets and teams by partnering with asset owners and managers.

ANSTO has commenced ongoing cyber security awareness campaigns to improve capability across the Organisation. Specific awareness and training activities are run with teams exposed to higher levels of threat activity and staff with privileged access to computer-based assets.

# Partnerships and collaborations

ANSTO maintains strategic partnerships and collaborations with a selection of Australia's and the world's leading nuclear agencies, research organisations and universities.

Highlights for 2019-2020 include the following new international partnership agreements:

- A MOU signed with Argentine nuclear services company, CNEA. This agreement formalises and continues the long association between the organisation on research reactor operation, maintenance, and safety
- A cooperation agreement executed between ANSTO and the Institute of Nuclear Physics Polish Academy of Sciences (IFJ-PAN), to provide a framework around the translation of ANSTO's Neutron Capture Enhanced Particle Therapy (NCEPT) technology in Europe
- A MOU signed with the Shanghai Advanced Research Institute (SARI), which includes the Shanghai Synchrotron Radiation Facility and the new Shanghai X-ray Free Electron Laser Project
- A MOU with Tohoku University, which is constructing a new 4$^{th}$ generation synchrotron lightsource in Japan.

In addition a number of existing partnership agreements were renewed including: Japan's National Institute for Materials Science (NIMS) and the RIKEN SPring-8 centre; the Republic of Korea's Atomic Energy Research Institute (KAERI); a 4$^{th}$ Implementing Agreement with the ITER international fusion project; ANSTO's CKDu program in Sri Lanka; and the ANSTO/AINSE/French Embassy SAAFE early career researcher scholarship program.

For more information on ANSTO's existing partnerships and collaborations visit https://www.ansto.gov.au/about/how-we-work/partnerships

# Our Organisation

## Members of the Board

**The Hon Dr Annabelle Bennett AC SC**

**Board Chair**

Remuneration & Nomination Committee and the Commercial Committee Chair

BSc (Hons), PhD, LLB, D Univ (hon Causa), D Laws (hon Causa)

Chancellor of Bond University and practicing consultant Senior Counsel, mediator and arbitrator. See full bio at https://www.ansto.gov.au/people/hon-dr-annabelle-bennett-ac-sc

Appointed: 21 March 2019

Term concludes: 20 March 2024

**Penelope (Penny) J Dobson**

**Deputy Board Chair**

Dip Pharm, MPS, MBA, GAICD

Global pharmaceutical executive and business person. See full bio at https://www.ansto.gov.au/people/ms-penelope-j-dobson

Appointed: 24 April 2014

Appointed Deputy Chair: 14 March 2018

Appointed Acting Chair: 1 September 2018 – 20 March 2019

Reappointed: 24 April 2019

Term concludes: 23 April 2024

**Dr Adrian (Adi) Paterson**

BSc, PhD

Chief Executive Officer and materials engineer. See full bio at https://www.ansto.gov.au/people/dr-adrian-adi-paterson

Appointed: 1 March 2009

Reappointed effective: 1 March 2017

Resignation announced: 9 September 2020

**Emeritus Professor Stephen Buckman AM**

BSc (Hons), PhD, FAPS, FAIP, FinstP

Academic and researcher at ANU. See full bio at https://www.ansto.gov.au/people/emeritus-professor-stephen-buckman-am

Appointed: 23 July 2015

Reappointed: 23 July 2020

Term concludes: 22 July 2023

**Dr Gordon de Brouwer PSM**

BComm (First Class Hons), MComm, PhD

Senior leader in the Australian Government. See full bio at https://www.ansto.gov.au/people/gordon-john-de-brouwer-psm

Appointed: 4 April 2019

Term concludes: 3 April 2024

**Professor Brigid Heywood**

BSc (Hons), PhD

Vice-Chancellor of the University of New England. See full bio at https://www.ansto.gov.au/people/professor-brigid-heywood

Appointed: 28 June 2016

Term concludes: 27 June 2021

**Esther (Carol) Holley**

Risk & Audit Committee Chair

BA, FCA, FAICD

Non-executive Director and Chair of various Risk and Audit Committees. See full bio at https://www.ansto.gov.au/people/ms-carol-holley

Appointed: 25 February 2016

Term concludes: 24 February 2021

**Professor Andrew Scott AM**

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

Nuclear medicine physician, scientist, and academic. See full bio at https://www.ansto.gov.au/people/professor-andrew-scott-am

Appointed: 26 September 2007

Reappointed: 29 September 2011

Reappointed: 29 September 2016

Term concludes: 28 September 2021

**Andrea Sutton**

BEng Chemical (Hons), GradDipEcon

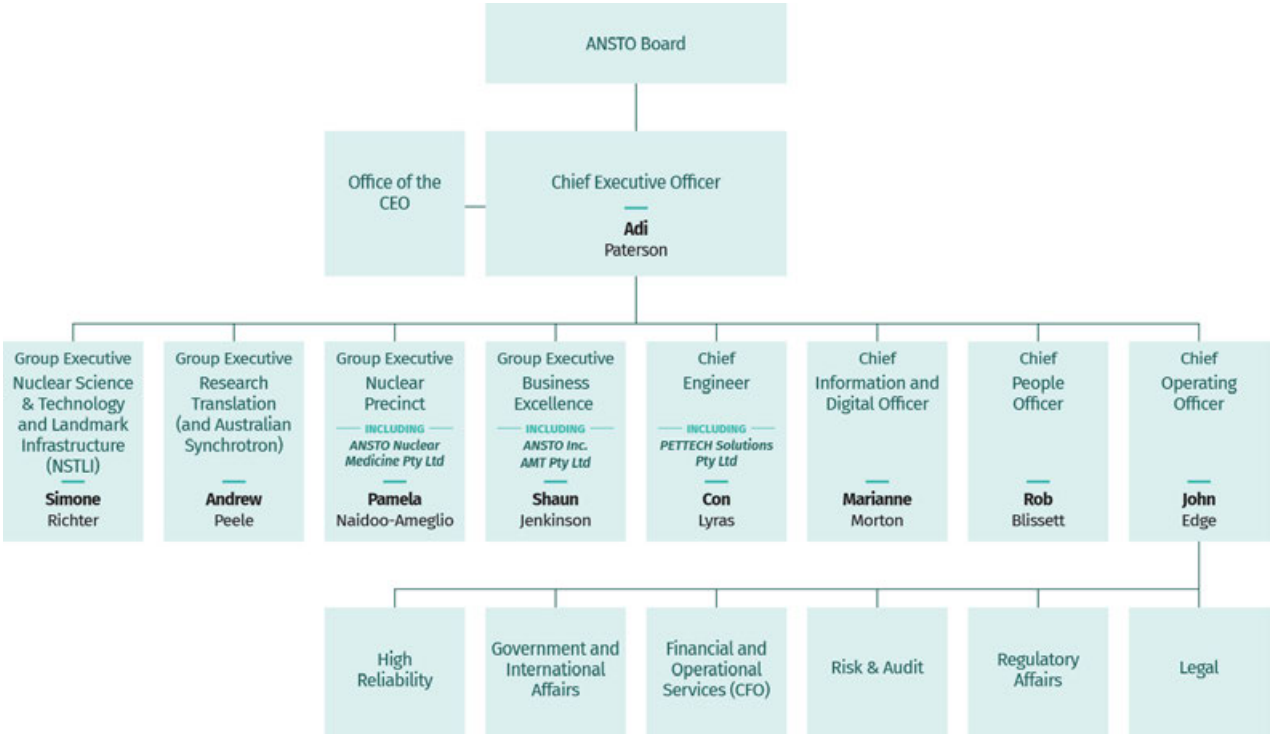
Senior executive in the mining industry. See full bio at https://www.ansto.gov.au/people/ms-andrea-sutton

Appointed: 30 April 2020

Term concludes: 29 April 2025

# Organisational structure

During the reporting period, an organisational restructure was undertaken to respond to the evolving needs and priorities of the organisation. Most significantly, a Chief Operating Officer was appointed, with responsibility for safety and other responsibilities as outlined below, and a Nuclear Precinct established at the Lucas Heights campus. The Nuclear Precinct, under the leadership of Ms Pamela Naidoo-Ameglio, consolidates the operational functions of ANSTO Nuclear Medicine Pty Limited, Health Products, Reactor Operations and Waste Management.



## Subsidiaries and companies

ANSTO has the following subsidiaries and company (where ANSTO possesses a material interest)

| ANSTO subsidiaries | Jurisdiction of operation | Information/Status |
|---|---|---|
| PETTECH Solutions Pty Ltd | NSW | PETTECH Solutions Pty Ltd is a small nuclear medicine diagnostic company and wholly owned ANSTO subsidiary. Its business operations were sold to Cyclotek NSW under a collaborative venture which will strengthen the PET imaging market and increase the research and development capability for new nuclear medicine diagnostics in New South Wales. |
| ANSTO Nuclear Medicine Pty Ltd | NSW | ANSTO Nuclear Medicine Pty Ltd is the operating producer of one of the world's most important nuclear medicines, Mo-99. The subsidiary will also participate and invest in nuclear medicine and related activities, including applied research and development aligned and complementary to its core facilities and competencies. |
| ANSTO Inc. | Delaware, USA | Inactive |
| **ANSTO companies** | | |
| Applied Molecular Therapies Pty Ltd | Vic | Contract development and manufacturer of radiopharmaceutical products |

# Senior Leadership Team

**Adi Paterson**

Chief Executive Officer

Resignation announced: 9 September 2020

See bio at https://www.ansto.gov.au/people/dr-adrian-adi-paterson

**Simone Richter**

Group Executive Nuclear Science & Technology, and Landmark Infrastructure (NSTLI)

See bio at https://www.ansto.gov.au/people/simone-richter

**Andrew Peele**

Group Executive Research Translation and Australian Synchrotron

See bio at https://www.ansto.gov.au/people/prof-andrew-peele

**Pamela Naidoo-Ameglio**

Group Executive Nuclear Precinct

See bio at https://www.ansto.gov.au/people/pamela-naidoo-ameglio

**Shaun Jenkinson**

Group Executive Business Excellence

See bio at https://www.ansto.gov.au/people/shaun-jenkinson

**Con Lyras**

Chief Engineer

See bio at https://www.ansto.gov.au/people/con-lyras

**Marianne Morton**

Chief Information and Digital Officer

See bio at https://www.ansto.gov.au/people/marianne-morton

**Rob Blissett**

Chief People Officer

See bio at https://www.ansto.gov.au/people/robert-blissett

**John Edge**

Chief Operating Officer

See bio at https://www.ansto.gov.au/people/john-edge

# Corporate governance

## ANSTO statement on corporate governance

During the 2019-2020 financial year, the Board worked closely with Management on continuing to improve ANSTO's corporate governance, accountability and risk management practices to ensure that ANSTO is able to deliver essential research, nuclear medicines and other products and services safely and sustainably for the benefit of all Australians.

## Our Corporate Governance Framework

ANSTO is a Corporate Commonwealth entity established under the *Australian Nuclear Science and Technology Organisation Act 1987* (*ANSTO Act*). Its operations and governance arrangements are subject to the provisions of the *Public Governance, Performance and Accountability Act 2013* (*PGPA Act*) and the Rules issued pursuant to that Act.

The Board, as the 'accountable authority', is responsible for the overall direction, performance and governance of the organisation. As part of this function, it reviews, provides feedback and approves the strategic direction and the risk appetite of ANSTO as presented by Management. It also plays an important part in ensuring that there is an appropriate culture within ANSTO that is underpinned by strong organisational values. The Chief Executive Officer (CEO), supported by the other members of the ANSTO Executive, is responsible for managing the organisation and for bringing important matters to the attention of the Board. The Board monitors and assesses performance and holds the Executive accountable for outcomes, in accordance with strategy. Further detail on the respective roles of the Board and the Executive can be found in the Board Charter, which is reviewed yearly. The Board Charter is available on the ANSTO website.

## Ministerial oversight

During the 2019-2020 financial year, the Minister responsible for ANSTO was the Hon Karen Andrews MP, Minister for Industry, Science and Technology.

***Statement of Expectations***

In February 2020, Minister Andrews provided the ANSTO Board with a Statement of Expectations (SOE) in which she requested ANSTO's support in resolving national challenges, and advancing the Government's policy priorities around nuclear medicines, collaboration with Australian industry, management of research infrastructure, the digital economy, and pursuing STEM equity.

In addition, the Minister has set clear expectations for ANSTO to continue to enhance organisational performance, including around sustainable operations and governance, and workplace health and safety.

This document replaced the previous SOE, which was provided in June 2015 by the Hon Ian Macfarlane MP, the then Minister for Industry and Science.

In August 2020, the ANSTO Board responded to the SOE with a Statement of Intent (SOI), which sets out how the ANSTO Board will meet the Minister's expectations. Copies of both the SOE and the SOI can be found on the ANSTO website at https://www.ansto.gov.au/governance#content-charters

***Ministerial directions and notifications***

Under the *ANSTO Act* and the *PGPA Act*, ANSTO's responsible Minister and the Finance Minister may provide the ANSTO Board with Directions with respect to the performance of the functions or the exercise of the powers of the Board or the organisation. No such Ministerial Directions were received in 2019-2020.

During 2019-2020, ANSTO continued to adopt a proactive approach to keeping the Minister informed of its activities, including as required under section 19 of the *PGPA Act*. During 2019-2020, ANSTO provided 48 briefs on ANSTO's operations and activities to the Minister. ANSTO also advised the Minister of significant events, including nuclear medicine supply and radioactive waste management.

During 2019-2020, ANSTO also advised the Minister of one matter under section 72 of the *PGPA Act* regarding ANSTO or its subsidiaries: In August 2019, ANSTO advised the Minister that, on 12 June 2019, it had deregistered, ANSTO subsidiary, the Australian Synchrotron Holding Company (ASHCo) Pty Ltd. This constituted the final step in the Australian Synchrotron's integration into ANSTO. The Minister tabled a statement to that effect in both houses of Parliament.

***Government engagement***

As a publically funded research agency, ANSTO has ongoing engagement with the Department of Industry, Science, Energy and Resources (DISER) across all levels. ANSTO staff also had regular meetings across the Commonwealth Government as required to discuss ANSTO's activities, including advice to inform policy development and implementation in ANSTO's areas of expertise

During the last financial year, ANSTO made 14 submissions to parliamentary and departmental inquiries, and ANSTO staff provided information at four parliamentary inquiry hearings. The inquiry topics included radioactive waste management, uranium mining, nuclear energy, and the environmental impact of the summer 2019-20 bushfire season.

# ANSTO Board

The ANSTO Board is comprised of eight part-time, non-executive members drawn from the broader community and a full-time Chief Executive Officer. All non-executive members are appointed by the Governor-General. Under the *ANSTO Act 1987*, the CEO is appointed by the ANSTO Board. As a significant appointment, Cabinet endorsement is required.

Board members have a broad range of skills, knowledge and experience that cover ANSTO's diverse range of responsibilities. This is necessary in order for the Board to provide the guidance and stewardship needed to ensure ANSTO's sustainability and to determine its strategic direction. The Board's Remuneration and Nomination Committee reviews the Board skills matrix at least annually; the skills matrix is used as the basis for making recommendations to Government concerning the appointment/reappointment of Board members.

The remuneration and allowances payable to members of the Board, including the CEO, are determined by the Commonwealth Remuneration Tribunal.

***Disclosure of interests and related entity transactions***

Board members declare material interests in accordance with the *ANSTO Act* and *PGPA Act* as appropriate.

The Board has processes in place to manage conflicts of interest, including a requirement that, unless determined otherwise by the other Board members, members absent themselves from discussions and voting where a member has declared a material professional or personal interest, or where a potential or actual conflict of interest or duty arises. For the 2019-2020 financial year, the Board is satisfied that it has discharged its duties and obligations regarding conflicts of interest in accordance with all relevant requirements.

ANSTO follows the Commonwealth Procurement Rules and has a system of delegated powers and authorisations for all procurement transactions to ensure that transactions are appropriately considered. The ANSTO Board, as its accountable authority, approves the operational and capital expenditure budgets of ANSTO. Where operating expenses of $5 million or more arise outside of the operational budget, these transactions are separately approved by the Board. The Board also approves expenditure on capital projects of $5 million or more. For transactions under $5 million, delegations are provided to Management. This process applies regardless of the counterparty.

During the reporting period, there were 52 transactions to Government entities or companies for goods and services above $10,000, which came to a total combined value of $15 million.

***Board access to information***

Board members have access to all information required to fulfil their role. Although information is primarily provided through the Board papers and presentations at Board meetings, the Board is provided with opportunities to gather information through other means. Board members have direct access to the CEO, other members of the Executive, and, as required, other managers and Subject Matter Experts. They also receive periodic CEO updates and regular media reports.

Site tours are arranged, when practicable, to coincide with Board meetings to offer further opportunities for information gathering and to support engagement between the Board and the wider ANSTO staff. Board members also participate in individual site visits and meet both formally and informally with different divisions and groups of staff. Site tours during the reporting period included the Australian Synchrotron and the Synroc demonstration plant. COVID-19 led to the temporary suspension of site tours and visits. However, subject to current restrictions and advice, site visits ceased in March but have restarted again in a COVID-19 safe manner.

Newly appointed Board members are inducted in the organisation's operations and activities, and their duties and responsibilities as a member of the Board of a corporate Commonwealth entity. During COVID-19, Board member inductions have been conducted remotely.

To improve oversight and to increase the flow of information from ANSTO Nuclear Medicine Pty Limited to ANSTO, the ANSTO Board Chair and the ANSTO Risk and Audit Committee Chair, along with the CEO and Group CFO, meet with the ANM Chair and the ANM Risk & Audit Committee Chair quarterly. They discuss opportunities, risks, finances and other material matters. These meetings commenced in June 2020.

Board members are able to seek independent professional advice in accordance with their duties, responsibilities and obligations as members of the Board.

***Board meetings***

The Board holds six formally scheduled meetings a year, with additional meetings held as required. Of the formally scheduled meetings, four are usually held at the Lucas Heights Campus, one is held at the Clayton Campus and one is held in Canberra.

At the invitation of the Chair, members of the Executive and subject matter experts attend Board meetings as required to report on matters relevant to their individual areas of responsibility and expertise. The Secretary of the Department of Industry, Science, Energy and Resources, or a delegate, also attends regularly scheduled Board meetings at the invitation of the Chair as an observer.

ANSTO has a Company Secretary who assists with the running of the Board and advises on governance matters. The Company Secretary attends all Board meetings, except those meetings or parts of meetings where that attendance is precluded by the *ANSTO Act*, and is accountable directly to the Board, through the Chair, on all matters to do with the proper functioning of the Board.

Eight Board meetings were held during the 2019-2020 financial year. The details of the number of Board meetings attended by each member during the 2019-2020 financial year are outlined in **Table 1**.

**TABLE 1: ANSTO BOARD**

| Member | Eligible to attend | Attended |
|---|---|---|
| The Hon Dr Annabelle Bennett AC SC (Chair) | 8 | 8 |
| Ms Penelope J Dobson (Deputy Chair) | 8 | 8 |
| Dr Adrian (Adi) Paterson (CEO) | 8 | 6 |
| Emeritus Professor Stephen Buckman, AM | 8 | 7 |
| Dr Gordon de Brouwer, PSM | 8 | 8 |
| Professor Brigid Heywood | 8 | 8 |
| Ms Carol Holley | 8 | 8 |
| Professor Andrew M Scott, AM | 8 | 7 |
| Ms Andrea Sutton[1] | 1 | 1 |

[1]Ms Sutton was appointed on 30 April 2020

# Board committees

The Board is assisted by three standing committees:

- The Risk and Audit Committee (RAC) , which provides independent oversight, advice and assurance to the Board on the appropriateness of ANSTO's systems of risk oversight and management, financial reporting processes, performance reporting arrangements, systems of internal control, and systems to ensure compliance with relevant laws and policies;
- The Remuneration and Nomination Committee, which assists the Board in fulfilling its responsibilities with regard to overall remuneration policy and strategy; performance and remuneration of the CEO; the approach to performance and remuneration of the Executive Team; and succession planning and nominations for Board Members and the CEO; and
- The Commercial Committee, which provides independent oversight, review and evaluation of particular commercial activities.

The role, purpose and responsibilities of each of the Committees are set out in the relevant Charter, which are available on the ANSTO website. All Committee Charters are reviewed yearly. An extensive review of the Committee Charters, as part of the Board Charter review, commenced during the 2019-2020 financial year. The Board approved the amended Charters at its meeting in August 2020.

Other committees/working groups are established on an ad hoc basis as required by the Board. For example, during the year, a working group was established to assist the Board in examining nuclear medicine production.

### *Risk and Audit Committee*

All Committee members, including the RAC Chair, are appointed by the Board. During the 2019-2020 financial year, the RAC consisted of at least three non-executive Board members who had the required qualifications, knowledge, skills or experience to assist the RAC in performing its functions, including an understanding of systems of risk oversight and management and systems of internal control. At least one member had accounting or related financial management experience and/or qualifications, and a comprehensive understanding of accounting and auditing standards. The Chair of the Board, the CEO, and the Group Chief Financial Officer cannot be members of the RAC.

Membership of the RAC is reviewed periodically against a skills matrix in order to ensure that there is a suitable mix of qualifications, knowledge, skills and experience on the Committee. During the 2019-2020 financial year, the Board determined that two external representatives, one with strong financial and one with nuclear and risk management experience, should be appointed to the RAC. That appointment process has commenced. The two external representatives will be inducted in the organisation's operations and activities, and their duties and responsibilities as a member of the RAC of a corporate Commonwealth entity.

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, Deputy Chief Financial Officer, Head of Internal Audit and the General Counsel) attend meetings of the RAC as advisors and observers, by invitation of the RAC Chair. The Company Secretary is the secretary to the RAC and attends all RAC meetings.

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

The Risk and Audit Committee met on six occasions during the 2019-2020 financial year. Details of the number of RAC meetings attended by each member during the year are provided in **Table 2**.

**TABLE 2: RISK AND AUDIT COMMITTEE**

| Member | Eligible to attend | Attended |
|---|---|---|
| Ms Carol Holley (Chair) | 6 | 6 |
| Emeritus Professor Stephen Buckman, AM | 6 | 6 |
| Dr Gordon de Brouwer, PSM[1] | 5 | 5 |
| Ms Penelope J Dobson | 6 | 6 |
| Professor Brigid Heywood | 6 | 5 |
| Professor Andrew M Scott, AM | 6 | 5 |

[1] Dr de Brouwer was appointed to the Committee on 27 August 2019.

***Remuneration and Nominations Committee***

The Remuneration and Nominations Committee consists of the Board Chair, the CEO and one or more non-executive Board members appointed by the Board. The Board Chair is the Chair of the Committee. The Chief People Officer attends Committee meetings by invitation, as do other relevant persons by invitation of the Committee Chair. The Company Secretary is the secretary to the Committee and attends all Committee meetings, except those meetings or parts of meetings where that attendance is precluded by the *ANSTO Act*.

The committee met on three occasions during the 2019-2020 financial year. Details of the number of Remuneration and Nominations Committee meetings attended by each member during the 2019-2020 financial year are provided in **Table 3**.

**TABLE 3: REMUNERATION AND NOMINATION COMMITTEE**

| Member | Eligible to attend | Attended |
|---|---|---|
| The Hon Dr Annabelle Bennett AC SC (Chair) | 4 | 4 |
| Dr Adrian (Adi) Paterson | 4 | 3 |
| Emeritus Professor Stephen Buckman, AM | 4 | 4 |
| Ms Penelope J Dobson | 4 | 4 |

***Commercial Committee***

The Commercial Committee consists of at least three non-executive members of the Board. External parties may be appointed to the Committee but may not outnumber the non-executive Board members on the Committee. There were no external parties on the Committee during the 2019-2020 financial year. The Chair of the Board is the Chair of the Committee unless the Chair delegates this role to another non-executive member. Members of the Executive and other relevant parties attend Committee meetings by invitation of the Committee Chair. The Company Secretary is the secretary to the Committee and attends all Committee meetings.

The Committee does not have formally scheduled meetings but meets as and when required to consider matters referred to the Committee. During the 2019-2020 financial year, commercial matters were considered by the full Board which was supported by a working group. The Committee did not meet during the 2019-2020 financial year.

# Board performance

In order to ensure its ongoing effectiveness and performance, the Board along with its Committees and its individual members are evaluated regularly. The Board frequently discusses its operation, including the structuring of agendas and development of Board papers, and its performance during Board meetings. Further, during the 2019-2020 financial year, the Board decided to engage an external evaluator to conduct

an independent review of the Board. That review has commenced, and the findings will be presented to the Board for consideration at the December 2020 Board meeting.

# Internal control

The ANSTO Board oversees ANSTO's system of internal control. This system has been designed to provide 'reasonable assurance' that ANSTO's objectives will be achieved, and encompasses the control environment, risk assessment, control activities, information and communication, and monitoring activities.

# Risk management

Management is accountable to the ANSTO Board for designing, implementing and continuously improving the ANSTO Enterprise Risk Management (ERM) framework. The ERM framework is aligned with relevant best practice and has been designed to support the achievement of business goals and objectives, support decision-making, standardise risk management processes and guide desired risk behaviours.

ANSTO recognises that risk management is essential not only to preserve, but also to create, value. This means that there is a need to engage with risk or exploit opportunity while also managing uncertainty on an ongoing basis. ANSTO further recognises that effective risk management requires appropriate risk behaviours. As a result, ANSTO has initiated a review of its risk culture in order to identify any gaps or areas of weakness.

The ANSTO Board determines the nature and extent of the risk it is willing to accept in achieving the organisation's strategic objectives, consistent with ANSTO's risk appetite and the effective, efficient, ethical and economical use and management of public resources. The ANSTO Board takes a particular interest in those risks that may impact the safety of ANSTO staff and its operations and/or negatively impact the sustainability and reputation of the organisation.

The RAC receives regular reports and briefings on ANSTO's top risks and significant risks associated with operations and major capital programs.

# Fraud control

ANSTO has specific obligations under Section 10 of the PGPA Rule to take all reasonable measures to prevent, detect and deal with fraud.

The ANSTO Fraud Control Plan (2019–-2021) reflects the 'better practice' principles and practices articulated within the Commonwealth Fraud Control Framework. During the year, the risk function assessed the completeness and effective operation of controls over specific areas of fraud risk across the organisation. Control measures designed to mitigate the risk of fraud are present and are judged to be sufficient to provide 'reasonable assurance' that the risk of fraud will be mitigated to an acceptable level. Recommendations were made to improve controls where gaps were detected.

In addition, ANSTO operates a public interest disclosure scheme in accordance with the *Public Interest Disclosure Act 2013*. Complementary to this scheme, ANSTO has a confidential, independent and externally hosted reporting service (FairCall), which provides another avenue for staff and contractors to report any concerns about unacceptable, unethical or illegal activities in the workplace.

# Business ethics

Business ethics plays a key role in the proper governance of an organisation. A new Code of Conduct that is aligned to ANSTO's values was approved during the 2019-2020 financial year. It provides ANSTO employees with a framework for ethical decision-making and articulates the standards of behaviour, values and actions expected of all individuals who work for ANSTO.

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

# Business resilience

The continuity of ANSTO's operations is critical and is a key focus area of the Board, the CEO and Executives.

Many of the services delivered by ANSTO are critical to the economic and social well-being and health of the Australian community.

ANSTO has a Business Resilience Framework and Learning and Improvement Strategy that aligns with national standards and international best practice. This holistic and integrated approach focuses on building resilience and reliability across ANSTO's critical functions and infrastructure, including the OPAL multi-purpose reactor.

As a result of the COVID-19 pandemic, ANSTO has assessed the criticality of the physical campuses in the delivery of products and services. The use of Landmark Infrastructure is essential across these functions, specifically for the production of nuclear medicine. Administration and support generally can proceed remotely, with limited impact, for an extended period of time.

# Legal and regulatory compliance

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

Pursuant to section 19 (1) (e) of the *PGPA Act*, ANSTO had no instances of significant non-compliance with finance law in 2019–2020.

# Internal audit

The ANSTO Internal Audit function provides the ANSTO Board and CEO with independent and objective assurance and advisory services. The scope of Internal Audit's activities encompasses all financial and non-financial functions, systems, programs, projects, activities and processes across the ANSTO Group.

The Head of Internal Audit prepares risk-based strategic and annual work plans in consultation with the RAC, executive management and the ANAO. The annual Internal Audit Plan is reviewed by the RAC and approved by the ANSTO Board.

The outcome of internal audit reviews are presented to the RAC. Follow-up reviews are conducted to ensure that all internal audit recommendations are properly carried 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 to the Chair of the Board.

The Head of Internal Audit reports for administrative purposes to the Chief Operating Officer.

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.

# External audit

The Commonwealth Auditor-General, through the ANAO, is the external auditor for ANSTO and its Australian-based subsidiaries. The auditors of ANSTO's USA-based subsidiary, ANSTO Inc., are WIPFLi LLP. For the 2019–20 financial year, the ANAO contracted KPMG to assist with the external audits of ANSTO and its Australian-based subsidiaries. During the year, KPMG hosted ANSTO's 'whistleblower' reporting service (FairCall).

# 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 financial year.

There were no specific reports issued by the Commonwealth Auditor-General, other than reports issued in relation to audit of the financial statements of ANSTO and its Australian based subsidiaries.

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

# Amendments to the Australian Nuclear Science and Technology Organisation Act 1987

There were no amendments to the *ANSTO Act 1987* during the 2019-2020 financial year.

# 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, amongst other conduct.

There have been no exceptions to these provisions and no claims were made against ANSTO in respect of such directors' and officers' or professional 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

ANSTO is provided with insurance coverage for ionising radiation liability from Comcover for up to $50 million. The Comcover policy includes liability arising out of ANSTO's responsibility for: managing, storing and conditioning ionising radiation emitting material and waste; transporting nuclear waste and materials for disposal both within Australia and overseas; and transporting radioactive materials including radioisotopes.

For any liability which is not covered by Comcover, ANSTO has been provided with a Deed of Indemnity by the Commonwealth which commits the Commonwealth to providing an indemnity to cover any loss or liability incurred by ANSTO and ANSTO Nuclear Medicine Pty Ltd, their respective employees and contractors, which arise from a claim for injury to a person or damage to property caused by ionising radiation. The current Deed expires in April 2026.

# 2019-2020 financial statements

Australian National Audit Office

## INDEPENDENT AUDITOR'S REPORT

### To the Minister for Industry, Science and Technology

### Opinion

In my opinion, the financial statements of the Australian Nuclear Science and Technology Organisation and its subsidiaries (together the 'Consolidated Entity') for the year ended 30 June 2020:

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

(b) present fairly the financial position of the Consolidated Entity as at 30 June 2020 and its financial performance and cash flows for the year then ended.

The financial statements of the Consolidated Entity, which I have audited, comprise the following statements as at 30 June 2020 and for the year then ended:

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

### Basis for opinion

I conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. My responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Statements* section of my report. I am independent of the Consolidated Entity in accordance with the relevant ethical requirements for financial statement audits conducted by the Auditor-General and his delegates. These include the relevant independence requirements of the Accounting Professional and Ethical Standards Board's APES 110 *Code of Ethics for Professional Accountants* (the Code) to the extent that they are not in conflict with the *Auditor-General Act 1997*. I have also fulfilled my other responsibilities in accordance with the Code. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

### Emphasis of matter

I draw attention to the Decommissioning provision discount rate - prior period error as set out in the Overview to the Financial Statements, which describes the error identified in the discount rate used in the calculation of the amounts reported for the decommissioning provision as at 30 June 2019 and 2018, and the impacted comparatives disclosed in this financial report. My opinion is not modified in respect of this matter.

GPO Box 707 CANBERRA ACT 2601
38 Sydney Avenue FORREST ACT 2603
Phone (02) 6203 7300 Fax (02) 6203 7777

## Other information

The Accountable Authority is responsible for the other information. The other information comprises the information included in the annual report for the year ended 30 June 2020 but does not include the financial statements and my auditor's report thereon.

My opinion on the financial statements does not cover the other information and accordingly I do not express any form of assurance conclusion thereon.

In connection with my audit of the financial statements, my responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or my knowledge obtained in the audit, or otherwise appears to be materially misstated.

If, based on the work I have performed, I conclude that there is a material misstatement of this other information, I am required to report that fact. I have nothing to report in this regard.

## Accountable Authority's responsibility for the financial statements

As the Accountable Authority of the Consolidated Entity, the directors are responsible under the *Public Governance, Performance and Accountability Act 2013* (the Act) for the preparation and fair presentation of annual financial statements that comply with Australian Accounting Standards – Reduced Disclosure Requirements and the rules made under the Act. The directors are also responsible for such internal control as the directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the directors are responsible for assessing the ability of the Consolidated Entity to continue as a going concern, taking into account whether the entity's operations will cease as a result of an administrative restructure or for any other reason. The directors are also responsible for disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the assessment indicates that it is not appropriate.

## Auditor's responsibilities for the audit of the financial Statements

My objective is to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the Australian National Audit Office Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

As part of an audit in accordance with the Australian National Audit Office Auditing Standards, I exercise professional judgement and maintain professional scepticism throughout the audit. I also:

- identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control;
- obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Consolidated Entity's internal control;
- evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Accountable Authority;
- conclude on the appropriateness of the Accountable Authority's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Consolidated Entity's ability to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify my opinion.

My conclusions are based on the audit evidence obtained up to the date of my auditor's report. However, future events or conditions may cause the Consolidated Entity to cease to continue as a going concern;

- evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation; and
- obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Consolidated Entity to express an opinion on the financial report. I am responsible for the direction, supervision and performance of the Consolidated Entity audit. I remain solely responsible for my audit opinion.

I communicate with the Accountable Authority regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.

Australian National Audit Office

Scott Sharp

Executive Director

Delegate of the Auditor-General

Canberra

13 October 2020

Australian Government

ANSTO
Science. Ingenuity. Sustainability.

# Statement by Accountable Authority, Chief Executive and Chief Financial Officer

In our opinion, the attached financial statements for the year ended 30 June 2020 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.

| | | |
|---|---|---|
| Annabelle Bennett<br>Accountable Authority - Chair | Shaun Jenkinson<br>Acting Chief Executive Officer | Steve Jennaway<br>Group Chief Financial Officer |
| 13 October 2020 | 13 October 2020 | 13 October 2020 |

# Consolidated Statement of Comprehensive Income

**For the year ended 30 June 2020**

| | Note | Budget 2020 $'000 | Actual 2020 $'000 | Restated[1] 2019 $'000 | Previously reported 2019 $'000 |
|---|---|---|---|---|---|
| **NET COST OF SERVICES** | | | | | |
| **Expenses** | | | | | |
| Employee | 1.1A | 158,240 | 160,737 | 155,919 | 155,919 |
| Supplier | 1.1B | 140,018 | 98,649 | 103,872 | 103,872 |
| Depreciation/amortisation | 2.2A | 85,189 | 81,593 | 77,545 | 77,545 |
| Impairment losses | 2.2A | - | 32,719 | 147,314 | 147,314 |
| Decommissioning provision losses | 2.3C | - | - | 301,608 | 129,908 |
| Nuclear waste management expenses | 2.3C | - | 2,997 | - | - |
| Write-down of stock and fixed assets | 1.1C | - | 12 | 739 | 739 |
| Grant expenses | | 2,767 | 2,853 | 4,331 | 4,331 |
| Finance costs | 1.1D | 21,680 | 14,061 | 24,230 | 19,609 |
| Foreign currency exchange losses | | - | 244 | 5,188 | 5,188 |
| **Total expenses** | | **407,894** | **393,865** | **820,746** | **644,425** |
| **Own-source revenue** | | | | | |
| Sales of goods and rendering of services | 1.2A | 101,925 | 65,902 | 102,676 | 102,676 |
| Interest | 5.2 | 2,500 | 2,188 | 3,221 | 3,221 |
| Grant income | | 30,441 | 18,895 | 16,005 | 16,005 |
| **Total own-source revenue** | | **134,866** | **86,985** | **121,902** | **121,902** |
| **Other income** | | | | | |
| Decommissioning provision gains | 2.3C | - | 146,114 | - | - |
| Foreign currency exchange gains | | - | 3,085 | 498 | 498 |
| Gains from asset sales | | - | 222 | 313 | 313 |
| Other revenues | | - | - | 6 | 6 |
| **Total other income** | | **-** | **149,421** | **817** | **817** |
| **Total own-source income** | | **134,866** | **236,406** | **122,719** | **122,719** |
| **Net cost of services** | | (273,028) | (157,459) | (698,027) | (521,706) |
| Revenue from Government | 3.1 | 235,018 | 281,909 | 214,072 | 214,072 |
| **Surplus/(deficit) for the year before income tax** | | **(38,010)** | **124,450** | **(483,955)** | **(307,634)** |
| Income tax expense | 1.1E | - | (235) | (134) | (134) |
| **Surplus/(deficit) for the year after income tax** | | **(38,010)** | **124,215** | **(484,089)** | **(307,768)** |
| **Other comprehensive income** | | | | | |
| **Items that will not be subsequently reclassified to net cost of services** | | | | | |
| Changes in asset revaluation reserve | 2.4A | - | (2,655) | (53,808) | (53,808) |
| **Items that may be subsequently reclassified to net cost of services** | | | | | |
| Exchange differences on translation of foreign operations | 2.4A | - | - | 2 | 2 |
| **Total other comprehensive expense for the year** | | **-** | **(2,655)** | **(53,806)** | **(53,806)** |
| **Total comprehensive surplus/(deficit) for the year** | | **(38,010)** | **121,560** | **(537,895)** | **(361,574)** |

1. Refer to the Overview.

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

# Consolidated Statement of Financial Position

**As at 30 June 2020**

| | Note | Budget 2020 $'000 | Actual 2020 $'000 | Restated[1] 2019 $'000 | Previously reported 2019 $'000 | Restated[1] 2018 $'000 |
|---|---|---|---|---|---|---|
| **Assets** | | | | | | |
| **Financial assets** | | | | | | |
| Cash and cash equivalents | 2.1A | 10,531 | 12,568 | 19,178 | 19,178 | 7,916 |
| Trade and other receivables | 2.1B | 39,584 | 11,860 | 22,783 | 22,783 | 16,120 |
| Investments | 2.1C | 99,220 | 214,918 | 102,099 | 102,099 | 130,282 |
| **Total financial assets** | | **149,335** | **239,346** | **144,060** | **144,060** | **154,318** |
| **Non-financial assets** | | | | | | |
| Property, plant and equipment | 2.2A | 1,182,742 | 1,121,376 | 1,138,589 | 1,138,589 | 1,233,742 |
| Intangible assets | 2.2A/B | 76,248 | 54,756 | 68,101 | 68,101 | 70,449 |
| Inventories | 2.2C | 35,821 | 41,800 | 30,456 | 30,456 | 30,549 |
| Deferred tax asset | 1.1E | 1,197 | 283 | 518 | 518 | 652 |
| Prepayments | | 8,766 | 16,116 | 15,383 | 15,383 | 11,775 |
| **Total non-financial assets** | | **1,304,774** | **1,234,331** | **1,253,047** | **1,253,047** | **1,347,167** |
| **Total assets** | | **1,454,109** | **1,473,677** | **1,397,107** | **1,397,107** | **1,501,485** |
| **Liabilities** | | | | | | |
| **Payables** | | | | | | |
| Suppliers | | 11,038 | 11,430 | 10,377 | 10,377 | 17,886 |
| Employees | 4.1 | 6,500 | 6,452 | 5,366 | 5,366 | 4,415 |
| Other payables | 2.3A | 6,947 | 7,831 | 8,570 | 8,570 | 10,878 |
| **Total payables** | | **24,485** | **25,713** | **24,313** | **24,313** | **33,179** |
| **Interest bearing liabilities** | | | | | | |
| Operating leases | 2.3D | - | 3,750 | - | - | - |
| **Total interest bearing liabilities** | | **-** | **3,750** | **-** | **-** | **-** |
| **Revenue in advance** | 2.3B | **-** | **36,129** | **33,364** | **33,364** | **20,686** |
| **Provisions** | | | | | | |
| Employees | 4.2 | 48,607 | 50,293 | 45,932 | 45,932 | 44,192 |
| Decommissioning | 2.3C | 617,648 | 745,438 | 882,002 | 613,256 | 479,549 |
| Intellectual property payment | 2.3C | 34,852 | 37,703 | 40,312 | 40,312 | 43,188 |
| Other provisions | 2.3C | 505 | 1,218 | 505 | 505 | 578 |
| **Total provisions** | | **701,612** | **834,652** | **968,751** | **700,005** | **567,507** |
| **Total liabilities** | | **726,097** | **900,244** | **1,026,428** | **757,682** | **621,372** |
| **Net assets** | | **728,012** | **573,433** | **370,679** | **639,425** | **880,113** |
| **Equity** | | | | | | |
| Contributed equity | | 898,475 | 900,869 | 819,675 | 819,675 | 791,214 |
| Reserves | 2.4A | 399,098 | 396,469 | 399,124 | 399,124 | 452,930 |
| Accumulated deficit | 2.4B | (569,561) | (723,905) | (848,120) | (579,374) | (364,031) |
| **Total equity** | | **728,012** | **573,433** | **370,679** | **639,425** | **880,113** |

1. Refer to the Overview.

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

# Consolidated Statement of Changes in Equity

**For the year ended 30 June 2020**

| | Accumulated deficit | | Asset revaluation reserve | | Other reserves | | Contributed equity | | Restated Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | Budget | Actual | Budget | Actual | Budget | Actual | Budget | Actual | Budget |
| | $'000 | $'000 | $'000 | $'000 | $'000 | $'000 | $'000 | $'000 | $'000 | $'000 |
| **Balance at 30 June 2018** | **(271,606)** | | **442,932** | | **9,998** | | **791,214** | | **972,538** | |
| Restatement[1] - opening | (92,425) | | - | | - | | - | | (92,425) | |
| **Restated balance at 30 June 2018** | **(364,031)** | | **442,932** | | **9,998** | | **791,214** | | **880,113** | |
| Deficit for the year | (307,768) | | - | | - | | - | | (307,768) | |
| Restatement[1] - 2019 | (176,321) | | - | | - | | - | | (176,321) | |
| **Restated deficit for the year** | **(484,089)** | | **-** | | **-** | | **-** | | **(484,089)** | |
| **Other comprehensive income** | | | | | | | | | | |
| Revaluation decrement | - | | (53,808) | | 2 | | - | | (53,806) | |
| **Restated total comprehensive deficit for the year** | **(484,089)** | | **(53,808)** | | **2** | | **-** | | **(537,895)** | |
| **Transactions with owners** | | | | | | | | | | |
| Government equity injection | - | | - | | - | | 28,461 | | 28,461 | |
| **Restated balance at 30 June 2019** | **(848,120)** | **(531,551)** | **389,124** | **389,087** | **10,000** | **10,011** | **819,675** | **819,675** | **370,679** | **687,222** |
| Surplus/(deficit) for the year | 124,215 | (38,010) | - | - | - | - | - | - | 124,215 | (38,010) |
| **Other comprehensive income** | | | | | | | | | | |
| Revaluation increment | - | - | (2,655) | - | - | - | - | - | (2,655) | - |
| **Total comprehensive surplus/(deficit) for the year on continuing operations** | 124,215 | (38,010) | (2,655) | - | - | - | - | - | 121,560 | **(38,010)** |
| **Transactions with owners** | | | | | | | | | | |
| Government equity injection | - | - | - | - | - | - | 81,194 | 78,800 | 81,194 | 78,800 |
| **Balance at 30 June 2020** | **(723,905)** | **(569,561)** | **386,469** | **389,087** | **10,000** | **10,011** | **900,869** | **898,475** | **573,433** | **728,012** |

1. Refer to the Overview.

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

# Consolidated Statement of Cash Flows

**For the year ended 30 June 2020**

| | Note | Budget 2020 $'000 | Actual 2020 $'000 | Restated[1] 2019 $'000 | Previously reported 2019 $'000 |
|---|---|---|---|---|---|
| **Cash flows from operating activities** | | | | | |
| Sales of goods and rendering of services | | 101,203 | 76,760 | 104,307 | 104,307 |
| Grants received | | 16,932 | 19,144 | 24,108 | 24,108 |
| Interest received | | 2,500 | 2,225 | 3,420 | 3,420 |
| Receipts from Government | | 235,018 | 281,909 | 214,072 | 214,072 |
| Payments to employees | | (158,240) | (155,291) | (153,513) | (153,513) |
| Payments to suppliers | | (140,763) | (109,838) | (127,972) | (132,816) |
| Payments for decommissioning | 2.3C | (8,767) | (7,376) | (24,936) | - |
| Bank charges | | - | (25) | (37) | (37) |
| **Net cash from operating activities** | | **47,883** | **107,508** | **39,449** | **59,541** |
| **Cash flows from investing activities** | | | | | |
| Proceeds from sale of property, plant, equipment and intangibles | | - | 313 | 504 | 504 |
| Proceeds from investment sales/maturities | | 194,988 | 298,720 | 225,909 | 225,909 |
| Purchase of property, plant, equipment and intangibles | 2.2A | (125,284) | (82,664) | (85,336) | (64,572) |
| Purchase of investments | | (195,931) | (411,540) | (197,725) | (197,725) |
| Principal payments on lease liabilities | 2.3D | - | (141) | - | - |
| **Net cash used in investing activities** | | **(126,227)** | **(195,312)** | **(56,648)** | **(35,884)** |
| **Cash flows from financing activities** | | | | | |
| Government equity injection | | 78,800 | 81,194 | 28,461 | 28,461 |
| **Net cash from financing activities** | | **78,800** | **81,194** | **28,461** | **28,461** |
| **Net (decrease)/increase in cash and cash equivalents** | | 456 | (6,610) | 11,262 | 52,118 |
| Effect of exchange changes on the balance of cash and cash equivalents held in foreign currencies | | - | - | - | - |
| Cash and cash equivalents at the beginning of the reporting year | | 10,075 | 19,178 | 7,916 | 7,916 |
| **Cash and cash equivalents at the end of the reporting year** | 2.1A | **10,531** | **12,568** | **19,178** | **60,034** |

FY19 closing cash has been restated to $19,178,000 from $60,034,000 as a result of payments to suppliers decreasing to $127,972,000 from $132,816,000, payments for decommissioning increasing to $24,936,000 from $nil and purchase of property, plant, equipment and intangibles increasing to $85,336,000 from $64,572,000. The restatement arose as a result of final FY19 accounting adjustments not being reflected in the Statement of Cash Flows.

1. Refer to the Overview.

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

# Overview

## Objectives of Australian Nuclear Science and Technology Organisation

Australian Nuclear Science and Technology Organisation (ANSTO) is a not-for-profit Australian Government Corporate Commonwealth Entity. ANSTO's strategic objectives, as set out in its current Corporate Plan, are:

- Putting people first: Equipping and empowering our people to respond to the growing nuclear science and technology needs of Australia and the world;
- World class science and technology outcomes: Creating innovative solutions to complex problems and providing new insights into our world;
- Strategic management of landmark and national infrastructure: Realising opportunities, serving users and creating value;
- Nuclear expertise and advice: Providing expert, science and technology based advice and services to support Australia's nuclear policy; and
- Nuclear business and innovation: Providing services and products to our customers that benefit the broader community.

In the 2019-20 Portfolio Budget Statement ANSTO has only one outcome as reflected below:

Outcome 1: Improved knowledge, innovative capacity and healthcare through nuclear based facilities, research, training, products, 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, income and expenses controlled or incurred by ANSTO in its own right. 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 1.1E and 6.2.

## 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); and
b) in accordance with:
   i. *Public Governance, Performance and Accountability (Financial Reporting) Rule 2015* (FRR) (as amended) for reporting periods ending on or after 1 July 2017; and
   ii. Australian Accounting Standards and Interpretations – Reduced Disclosure Requirements 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. Where necessary the comparative information for the preceding financial year has been reclassified to achieve consistency in disclosure with current financial year amounts.

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

The financial statements were authorised for issue by the Board of Directors on 13 October 2020.

# Overview (continued)

## 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 does not enter into speculative forward exchange contracts.

## Principles of consolidation

The consolidated financial statements incorporate the financial statements of ANSTO and the 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; and
- 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 is 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. 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.

## Significant accounting judgements and estimates

In the process of applying the accounting policies listed in this note, management has made a number of judgements and applied estimates and assumptions to future events. Information regarding judgements and estimates which are material to the financial statements are found in the following notes:

- Notes 2.2A and 5.3: Property, plant and equipment fair value measurement and useful lives;
- Note 2.3C: Decommissioning provision phasing of work and discounted cash flow assumptions; and
- Note 2.2B: 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.

# Overview (continued)

## Decommissioning provision discount rate - prior period error

In the calculation of the decommissioning provision as at 30 June 2019, and previous years, cash flows were discounted using the rate of 5% from the Standard Parameters made available by the Department of Finance. This has been identified as an error in accordance with AASB 108 *Accounting Policies, Changes in Accounting Estimates and Errors*. The discount rate which most closely aligned with the time pattern of the provision should have been used. A recalculation of the decommissioning provision using a sliding yield (1%-5%) based on the timing of projected cash flows resulted in the decommissioning provision as at 30 June 2019 being understated by $268,746,000, of which $176,321,000 related to FY19 and $92,425,000 related to the period prior to FY19.

As this occurred in prior periods the following restatements have been made to the comparatives:

| | Increase/ (Decrease) | Restatement 2019 $'000 | Restatement 2018 $'000 | Note |
|---|---|---|---|---|
| **Consolidated Statement of Comprehensive Income** | | | | |
| Decommissioning provision losses | Increase | 171,700 | | 2.3C |
| Finance costs | Increase | 4,621 | | 1.1D |
| Total expenses | Increase | 176,321 | | |
| Net cost of services | Increase | 176,321 | | |
| Deficit for the year before income tax | Increase | 176,321 | | |
| Deficit for the year after income tax | Increase | 176,321 | | |
| Total comprehensive deficit for the year | Increase | 176,321 | | |
| **Consolidated Statement of Financial Position** | | | | |
| Decommissioning provision | Increase | 268,746 | 92,425 | 2.3C |
| Total provisions | Increase | 268,746 | 92,425 | |
| Total liabilities | Increase | 268,746 | 92,425 | |
| Net assets | Decrease | (268,746) | (92,425) | |
| Accumulated deficit | Increase | 268,746 | 92,425 | 2.4B |
| Total equity | Decrease | (268,746) | (92,425) | |
| **Consolidated Statement of Changes in Equity** | | | | |
| Accumulated deficit 30 June 2018 | Increase | 92,425 | | 2.4B |
| Total equity balance 30 June 2018 | Decrease | (92,425) | | |
| Deficit for the year | Increase | 176,321 | | 2.4B |
| Total comprehensive deficit for the year | Increase | 176,321 | | |
| Accumulated deficit 30 June 2019 | Increase | 268,746 | | |
| Total equity balance 30 June 2019 | Decrease | (268,746) | | |
| **Consolidated Statement of Cash Flows – no changes** | | | | |

A further unrelated restatement has been made in the Consolidated Statement of Cash Flows. Refer to the Consolidated Statement of Cash Flows for further explanation.

The impact of the prior period errors on the parent entity are shown in Note 6.2.

# Overview (continued)

## Impact of COVID-19

The COVID-19 pandemic has developed in 2020. Measures taken by various governments to contain the virus have affected economic activity, particularly through social distancing and the closing of borders. ANSTO have taken a number of measures to monitor and mitigate the effect of COVID-19, such as safety and health measures for our people (such as social distancing and working from home) and securing the supply of materials that are essential to our production process.

At this stage, the impact on ANSTO and its results has not been significant and based on experience to date this is expected to remain the case. The impact of the measures taken by government and ANSTO as a result of COVID-19 have resulted in a net decrease in ANSTO's liquidity in FY20 of $10.9 million. The current estimate of the impact in FY21 is $11.7 million. The liquidity impacts are primarily driven from the loss of revenue due to both closure of borders and changes in shift patterns to protect staff and secure production.

## Adoption of new Australian Accounting Standard requirements

In the current year, ANSTO adopted all new and revised Australian Accounting Standards issued by the Australian Accounting Standards Board that are mandatorily effective for accounting periods that ended on 30 June 2020.

ANSTO has initially applied AASB 15 *Revenue from Contracts with Customers*, AASB 2016-8 *Amendments to Australian Accounting Standards – Australian Implementation Guidance for Not-for-Profit Entities*, AASB 1058 *Income of Not-For-Profit Entities* and AASB 16 *Leases* from 1 July 2019 except when accounting for the ANSTO subsidiaries, ANSTO Nuclear Medicine Pty Ltd (ANM) and PETTECH Solutions Pty Ltd, who have adopted AASB 15 from 1 July 2018 in accordance with the standard. There has been no material effect on ANSTO's financial statements for the year ended 30 June 2020.

AASB 15 establishes a comprehensive framework for determining whether, how much and when revenue is recognised. It replaced AASB 118 *Revenue*, AASB 111 *Construction Contracts* and related interpretations. The core principle of AASB 15 is that an entity recognises revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services.

AASB 1058 is relevant in circumstances where AASB 15 does not apply. AASB 1058 replaces most of the not-for-profit provisions of AASB 1004 *Contributions* and applies to transactions where the consideration to acquire an asset is significantly less than fair value principally to enable the entity to further its objectives, and where volunteer services are received.

ANSTO has adopted AASB 15 and AASB 1058 using the modified retrospective approach, under which the cumulative effect of initial application, where applicable, is recognised in retained earnings at the date of initial application. Accordingly, the information presented for 2019 has not been restated i.e. it is presented, as previously reported, under AASB 118, AASB 111 and related interpretations. Additionally, the disclosure requirements in AASB 15 and AASB 1058 have not generally been applied to comparative information.

# Overview (continued)

## Adoption of new Australian Accounting Standard requirements (continued)

Under the new income recognition model ANSTO shall first determine whether an enforceable agreement exists and whether the promises to transfer goods or services to the customer are 'sufficiently specific'. If an enforceable agreement exists and the promises are 'sufficiently specific' (to a transaction or part of a transaction), ANSTO applies the general AASB 15 principles to determine the appropriate revenue recognition. If these criteria are not met, ANSTO shall consider whether AASB 1058 applies.

In terms of AASB 1058, ANSTO is required to recognise volunteer services at fair value if those services would have been purchased if not provided voluntarily, and the fair value of those services can be measured reliably.

In the comparative period, revenue was measured at the fair value of the consideration received or receivable. Revenue from the sale of goods was recognised when the significant risks and rewards of ownership had been transferred to the customer, recovery of the consideration was probable, the associated costs and possible return of goods could be estimated reliably, there was no continuing management involvement with the goods and the amount of revenue could be measured reliably. Revenue from rendering of services was recognised in proportion to the stage of completion of the work performed at the reporting date. On application of AASB 15 there has been no financial impact to the recognition of ANSTO's revenue streams or the opening balance of retained earnings.

AASB 16 replaced AASB 117 *Leases*, Interpretation 4 *Determining whether an Arrangement contains a Lease*, Interpretation 115 *Operating Leases—Incentives and* Interpretation 127 *Evaluating the Substance of Transactions Involving the Legal Form of a Lease*.

AASB 16 provides a single lessee accounting model, requiring the recognition of assets and liabilities for all leases, together with options to exclude leases where the lease term is 12 months or less, or where the underlying asset is less than $5,000. AASB 16 substantially carries forward the lessor accounting in AASB 117, with the distinction between operating leases and finance leases being retained.

ANSTO has adopted AASB 16 using the modified retrospective approach, under which the cumulative effect of initial application, where applicable, is recognised in retained earnings at 1 July 2019. Accordingly, the comparative information presented for 2019 is not restated, that is, it is presented as previously reported under AASB 117 and related interpretations.

ANSTO elected to apply the practical expedient to not reassess whether a contract is, or contains, a lease at the date of initial application. Contracts entered into before the transition date that were not identified as leases under AASB 117 were not reassessed. The definition of a lease under AASB 16 was applied only to contracts entered into or changed on or after 1 July 2019.

As a result of implementing AASB 16 one building operating lease with a Right of Use value of $3.853 million has been capitalised in the consolidated financial statements, the lease currently lasts until 2045. Details of the Right of Use assets between group entities are contained in Note 6.2.

# Overview (continued)

## Adoption of new Australian Accounting Standard requirements (continued)

AASB 16 provides for certain optional practical expedients, including those related to the initial adoption of the standard. ANSTO applied the following practical expedients when applying AASB 16 to leases previously classified as operating leases under AASB 117:

- Apply a single discount rate to a portfolio of leases with reasonably similar characteristics;
- Exclude initial direct costs from the measurement of right-of-use assets at the date of initial application for leases where the right-of-use asset was determined as if AASB 16 had been applied since the commencement date;
- Reliance on previous assessments on whether leases are onerous as opposed to preparing an impairment review under AASB 136 *Impairment of assets* as at the date of initial application; and
- Applied the exemption not to recognise right-of-use assets and liabilities for leases with less than 12 months of lease term remaining as of the date of initial application.

As a lessee, ANSTO previously classified leases as operating or finance leases based on its assessment of whether the lease transferred substantially all of the risks and rewards of ownership. Under AASB 16, ANSTO recognises right-of-use assets and lease liabilities for most leases. However, ANSTO has elected not to recognise right-of-use assets and lease liabilities for some leases of low value assets based on the value of the underlying asset when new or for short-term leases with a lease term of 12 months or less.

On adoption of AASB 16, ANSTO recognised right-of-use assets and lease liabilities in relation to leases of buildings which had previously been classified as operating leases.

The lease liabilities were measured at the present value of the remaining lease payments, discounted using ANSTO's incremental borrowing rate as at 1 July 2019. ANSTO's incremental borrowing rate is the rate at which a similar borrowing could be obtained from an independent creditor under comparable terms and conditions. The weighted-average rate applied was 1.007%.

At the date of authorisation of the financial statements, there were no Standards and Interpretations in issue but not yet effective.

# 1. Financial Performance

This section details the financial performance of ANSTO.

## 1.1 Expenses

### 1.1A Employee

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| Wages and salaries | 122,683 | 117,970 |
| Superannuation | 22,305 | 21,589 |
| Leave and other entitlements | 15,604 | 15,040 |
| Separation and redundancies | 145 | 1,320 |
| **Total employee expenses** | **160,737** | **155,919** |

**Accounting Policy**

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.

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 at the estimated salary rates that will be applied when leave is taken, 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'.

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 benefit 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.

**Superannuation**

ANSTO's staff are members of the Commonwealth Superannuation Scheme (CSS) and the Public Sector Superannuation Scheme (PSS) or the PSS accumulation plan (PSSap), or other superannuation funds held outside of the Australian Government 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.

# 1. Financial Performance (continued)

## 1.1A Employee (continued)

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 a defined contribution scheme.

The staff of the subsidiaries are members of various defined contribution schemes and receive the Superannuation Contribution Charge.

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

## 1.1B Suppliers

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| Goods from external entities | 52,537 | 21,348 |
| Services from related entities | 12,011 | 17,761 |
| Workers compensation premiums - related entities | 1,208 | 725 |
| Services from external entities | 32,893 | 64,038 |
| **Total supplier expenses** | **98,649** | **103,872** |

## 1.1C Write-down of assets

| | | |
|---|---|---|
| **Non-financial assets:** | | |
| Materials - write off obsolete stock | - | 49 |
| Property, plant and equipment write-down | 12 | 690 |
| **Total write-down of assets expenses** | **12** | **739** |

## 1.1D Finance costs

| | | |
|---|---|---|
| Interest expense on lease liabilities | 38 | - |
| Unwinding of discount on decommissioning | 14,023 | 24,230 |
| **Total finance costs** | **14,061** | **24,230** |

# 1. Financial Performance (continued)

## 1.1E Income tax expense

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| Prima facie income tax benefit on results of taxable subsidiaries | 9,739 | 44,428 |
| Over provision in respect of prior years | (226) | (29) |
| Deferred tax asset write off | (8,795) | (44,596) |
| Impact of origination and reversal of temporary differences | - | (133) |
| Effect of non-deductible items | (953) | 196 |
| **Total income tax expense** | **(235)** | **(134)** |

ANSTO is exempt from income tax. Unbooked deferred tax assets in relation to un-recouped tax losses including timing difference in ANSTO Inc., is $574,727 (2019: $718,299) and ANM is $54,523,570 (2019: $45,159,363). The total deferred tax assets recognised as at 30 June 2020 in relation to controlled entities are: $283,178 (2019: $518,188), from PETTECH Solutions Pty Ltd at $283,178 (2019: $518,188), ANM at $nil (2019: $nil) and ANSTO Inc. at $nil (2019: $nil).

**Accounting Policy**
ANSTO is exempt from all forms of Australian taxation except fringe benefits tax (FBT) and the goods and services tax (GST). ANSTO is not exempt from any foreign taxation laws relative to its overseas operations.

Revenues, expenses, assets and liabilities 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.

ANSTO Inc. is a USA company and is subject to US tax laws. No deferred tax asset has been recognised at 30 June 2020 (2019: $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.

No deferred tax asset has been recognised at 30 June 2020 (2019: $nil) in relation to ANM as the directors do not believe it is probable that sufficient profits will be generated to utilise the tax losses in a reasonable time frame.

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.

The PETTECH Solutions Pty Ltd directors believe it is probable that sufficient profits will be generated to utilise the tax losses available.

# 1. Financial Performance (continued)

## 1.1E Income tax benefit (continued)

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 in the foreseeable future 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.

# 1. Financial Performance (continued)

# 1.2 Revenue

## 1.2A Sales of goods and rendering of services

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| **Sales of goods** | | |
| Radioisotope sales | 37,867 | 64,235 |
| **Total sales of goods** | **37,867** | **64,235** |
| **Rendering of services** | | |
| Service & contract research | 12,203 | 23,953 |
| Silicon irradiation | 8,720 | 7,771 |
| CSIRO site support | 1,004 | 753 |
| Training courses | 243 | 306 |
| Land management | 5,865 | 5,658 |
| **Total rendering of services** | **28,035** | **38,441** |
| **Total sales of goods and rendering of services** | **65,902** | **102,676** |

**Accounting Policy**

**Sales of goods and rendering of services**

ANSTO recognises revenue for the transfer of promised goods and services to customers in an amount that reflects the consideration expected for the exchange of those goods and services.

The following is a description of the principal activities, and their respective revenue recognition treatment, from which ANSTO generates its revenue:

- Revenue from radioisotope sales is recognised once the products are dispatched from ANSTO's premises;
- Revenue for service & contract research is recognised upon completion of the service and research to be provided;
- Silicon irradiation revenue is recognised once the product has undergone the irradiation process;
- Revenue from land management is recognised in the period the tenancy relates too; and
- Revenue from training courses is recognised in the period the training course held.

In all revenue streams for contracts with customers there are no contractual performance obligations that trigger revenue recognition. This removes the judgemental aspect of the timing and amount of revenue to be recognised. As a result the implementation of AASB 15 has had no financial impact 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.

# 1. Financial Performance (continued)

## 1.2A Sales of goods and rendering of services (continued)

**Accounting Policy (continued)**

**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 revenue in advance.

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.

**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.

# 2. Financial Position

This section details the financial position of ANSTO.

## 2.1 Financial assets

### 2.1A Cash and cash equivalents

**Accounting policy**

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

- Cash on hand; and
- 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.

### 2.1B Trade and other receivables

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| **Goods and services** | | |
| Related entities | 818 | 716 |
| External entities | 7,104 | 16,600 |
| **Trade receivables** | **7,922** | **17,316** |
| Less impairment allowance | - | - |
| **Net receivables for goods and services** | **7,922** | **17,316** |
| | | |
| **Other receivables** | | |
| Interest accrued | 558 | 595 |
| GST receivable from the Australian Tax Office | 1,225 | 856 |
| Accrued Revenue | 1,572 | 3,489 |
| Other | 583 | 527 |
| **Total other receivables** | **3,938** | **5,467** |
| **Total net trade and other receivables** | **11,860** | **22,783** |

Trade and other receivables are expected to be received within 12 months.

| | | |
|---|---|---|
| Net receivables are aged as follows: | | |
| | | |
| **Overdue but not impaired**: | | |
| Less than 31 days | 10,152 | 21,348 |
| 31 to 60 days | 95 | 383 |
| 61 to 90 days | 515 | 461 |
| More than 90 days | 1,098 | 591 |
| **Total net trade and other receivables** | **11,860** | **22,783** |

**Accounting policy**

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.

# 2. Financial Position (continued)

## 2.1C Investments

| | Note | 2020 | 2019 |
|---|---|---|---|
| | | $'000 | $'000 |
| Term deposits – held to maturity | | 214,215 | 101,886 |
| Joint ventures | 2.1D | - | - |
| Other | 2.1E | 703 | 213 |
| **Total investments** | | **214,918** | **102,099** |

## 2.1D Investment in joint ventures

| Name | Place of incorporation | % | 2020 $ | 2019 $ |
|---|---|---|---|---|
| Southern Radioisotopes Alliance Inc. | USA | 100 | 625 | 625 |
| Applied Molecular Therapies Pty Ltd | Australia | 45 | - | - |
| **Total investment in joint venture** | | | **625** | **625** |

Southern Radioisotopes Alliance Inc. investment is USD 600 (2019: USD 600). This company has yet to commence trading.

The investment in Applied Molecular Therapies Pty Ltd is 900 shares (2019: 900). The company is in the establishment phase.

## 2.1E Investment – other

| Name | Place of incorporation | % | $ | $ |
|---|---|---|---|---|
| Clarity Pharmaceuticals Pty Ltd | Australia | 2.4 | 703,306 | 213,241 |
| **Total investment – other** | | | **703,306** | **213,241** |

Clarity Pharmaceuticals Pty Ltd. was incorporated in New South Wales, Australia on 17 September 2010. The current shareholding is 180,023 shares (2019: 147,325).

# 2. Financial Position (continued)

## 2.2 Non-financial assets

### 2.2A Property, plant and equipment and intangible assets

Movement summary 2019-20 for all consolidated assets irrespective of valuation basis.

| | Land $'000 | Buildings $'000 | Plant and equipment $'000 | Intellectual property $'000 | Software $'000 | Other intangibles $'000 | Assets under construction $'000 | Buildings Right of Use $'000 | Total $'000 |
|---|---|---|---|---|---|---|---|---|---|
| Gross value as at 30 June 2019 | 115,688 | 250,421 | 1,067,626 | 51,210 | 27,579 | 5,686 | 185,570 | - | 1,703,780 |
| Additions | - | - | - | - | - | - | 82,664 | 3,853 | 86,517 |
| Transfers/reclassifications | - | 4,653 | 73,389 | - | 1,915 | 3,070 | (83,027) | - | - |
| Assets written-off | - | - | (17) | - | - | - | - | - | (17) |
| Disposals | - | - | (278) | - | - | - | - | - | (278) |
| **Gross value as at 30 June 2020** | **115,688** | **255,074** | **1,140,720** | **51,210** | **29,494** | **8,756** | **185,207** | **3,853** | **1,790,002** |
| Accumulated depreciation/amortisation and impairment losses 1 July 2019 | - | 133,122 | 306,793 | 20,916 | 5,289 | 2,109 | 28,861 | - | 497,090 |
| Depreciation/amortisation | - | 12,647 | 63,276 | - | 3,312 | 2,207 | - | 151 | 81,593 |
| Impairment loss | - | - | 12 | 5,594 | - | - | 27,113 | - | 32,719 |
| Assets written-off | - | - | (5) | - | - | - | - | - | (5) |
| Released on disposal | - | - | (182) | - | - | - | - | - | (182) |
| Revaluations and impairments recognised in other comprehensive income | - | - | 2,655 | - | - | - | - | - | 2,655 |
| **Accumulated depreciation/amortisation and impairment losses 30 June 2020** | **-** | **145,769** | **372,549** | **26,510** | **8,601** | **4,316** | **55,974** | **151** | **613,870** |
| **Net book value as at 30 June 2020** | **115,688** | **109,305** | **768,171** | **24,700** | **20,893** | **4,440** | **129,233** | **3,702** | **1,176,132** |
| **Property, plant and equipment** | **115,688** | **109,305** | **768,171** | **-** | **-** | **-** | **124,510** | **3,702** | **1,121,376** |
| **Intangibles** | **-** | **-** | **-** | **24,700** | **20,893** | **4,440** | **4,723** | **-** | **54,756** |

No intangible assets are expected to be disposed of within the next 12 months.

# 2. Financial Position (continued)

## 2.2A Property, plant and equipment and intangible assets (continued)

**Accounting Policy**

**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 $5,000 (2019: $5,000) are expensed in the year of acquisition (other than where they form part a group of similar items which 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 increase 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 to the extent that there is a sufficient balance in the asset revaluation reserve, any residual decrease will be recognised in profit or loss. Any decrease in cost will be reflected as an adjustment to the provision for decommissioning and asset revaluation reserve except to the extent that the decrease reverses a revaluation decrease previously recognised as an expense, in which case the decrease in the provision is recognised in profit or loss.

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

**Lease right-of-use (ROU) assets**

Leased ROU assets are capitalised at the commencement date of the lease and comprise of the initial lease liability amount, initial direct costs incurred when entering into the lease less any lease incentives received. These assets are accounted for by Commonwealth lessees as separate asset classes to corresponding assets owned outright.

Following initial application, an impairment review is undertaken for any right of use lease asset that shows indicators of impairment and an impairment loss is recognised against any right of use lease asset that is impaired.

**Revaluations**

Following initial recognition at cost, buildings, infrastructure, plant and equipment and major facilities (excluding right-of-use (ROU) assets) 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. Independent valuers are generally used to conduct these scheduled revaluations. Revaluation increases or decreases arise from differences between an asset's carrying value and fair value.

Qualified parties, independent of ANSTO carried out the 30 June 2017 valuations. The independent valuations undertaken effective 30 June 2017 were performed by PP&E Valuations Pty Ltd in relation to the assets at ANSTO's Clayton site and Australian Valuation Solutions for the assets at ANSTO's Lucas Heights and Camperdown sites.

# 2. Financial Position (continued)

## 2.2A Property, plant and equipment and intangible assets (continued)

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.

**Depreciation**
Items of buildings, infrastructure, plant and equipment and major facilities, but excluding freehold land and ROU assets, are depreciated over their estimated useful lives to ANSTO using the straight-line method. The depreciation rates for ROU assets are based on the commencement date to the earlier of the end of the useful life of the ROU asset or the end of the lease term.

The depreciation rates (useful lives), residual values and methods are reviewed during each reporting date and necessary adjustments are recognised in the current, or current and future reporting periods, as appropriate. ROU assets are amortised based on the life of the lease.

Depreciation and amortisation rates applying to each class of depreciable asset (excluding ROU assets) are based on the following useful lives:

| | **2020** | 2019 |
|---|---|---|
| Buildings on freehold land | **5 to 45 years** | 5 to 40 years |
| Plant and equipment | **2 to 45 years** | 2 to 30 years |
| Infrastructure | **20 years** | 20 years |
| Landmark, national and major research facilities | **5 to 45 years** | 5 to 40 years |

**Impairment**
All assets (excluding ROU assets) were assessed for indications of impairment at 30 June 2020. 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.

**Derecognition**
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.

# 2. Financial Position (continued)

## 2.2B 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 $5,000 (2019: $5,000) 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 internal capitalised costs involved in the implementation of purchased software.

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

ANSTO originally recognised the IP right conveyed, at fair value, as an intangible asset with an indefinite life and a financial liability for the future payments required in relation to the asset. This IP is recognised as its initial fair value less impairment of $24,700,000 (2019: $30,294,000).

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

Amortisation rates applying to intangibles are as follows:

| | **2020** | 2019 |
|---|---|---|
| Purchased software | **2 to 10 years** | 2 to 10 years |
| Licences | **3 years** | 3 years |
| Intellectual property | **Indefinite life** | Indefinite life |

**Impairment**
All intangible assets were assessed for impairment at 30 June 2020. 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 2020 there were 173 patents (2019: 196) registered to ANSTO and no associated costs are recognised as an asset (2019: $nil).

# 2. Financial Position (continued)

## 2.2C Inventories

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| **Raw materials and stores – not held for resale** | | |
| Stores – at cost | 27,866 | 23,957 |
| Cobalt-60 sources – at net realisable value | 86 | 86 |
| Reactor fuel and heavy water – at average purchase price | 8,876 | 2,700 |
| | 36,828 | 26,743 |
| Work in progress - at cost | 3,350 | 2,222 |
| Finished goods - at cost | 1,622 | 1,491 |
| **Total inventories** | **41,800** | **30,456** |
| | | |
| **Inventories expected to be realised within** | | |
| No more than 12 months | 33,996 | 27,672 |
| More than 12 months | 7,804 | 2,784 |
| **Total inventories** | **41,800** | **30,456** |

In 2020, inventories of $13,022,029 (2019: $12,838,529) were recognised as an expense during the year and included in 'cost of sales'.

**Accounting Policy**

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;
- 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.

## 2.2D Commitments

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| Infrastructure, plant and equipment | 50,014 | 50,234 |
| Fuel element purchase | 13,961 | 8,455 |
| Mo-99 plate purchase | 23,048 | 13,128 |
| **Total commitments** | **87,023** | **71,817** |
| | | |
| One year or less | 66,963 | 58,055 |
| From one to five years | 20,060 | 13,762 |
| **Total commitments** | **87,023** | **71,817** |

**Accounting Policy**

Commitments are expenditure contracted for at the reporting date, but not recognised as liabilities.

# 2. Financial Position (continued)

## 2.3 Liabilities

### 2.3A Other payables

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| Final monies on construction contract | - | 20 |
| Other payables | 7,831 | 8,550 |
| **Total other payables** | **7,831** | **8,570** |
| | | |
| **Other payables expected to be settled within** | | |
| No more than 12 months | 7,831 | 8,570 |
| **Total other payables** | **7,831** | **8,570** |

**Accounting Policy**

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 interest basis.

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).

### 2.3B Revenue in advance

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| Grant monies received in advance | 33,892 | 30,789 |
| Revenue received in advance - goods and services | 2,237 | 2,575 |
| **Total revenue in advance** | **36,129** | **33,364** |
| | | |
| **Other payables expected to be settled within** | | |
| No more than 12 months | 27,505 | 12,863 |
| More than 12 months | 8,624 | 20,501 |
| **Total revenue in advance** | **36,129** | **33,364** |

**Accounting Policy**

Revenue is recognised in the profit or loss until the customer obtains control of the goods or services. Grants and funding are recognised when ANSTO obtains control over the contribution. Until such time, the funds received are recognised as revenue in advance.

# 2. Financial Position (continued)

## 2.3C Provisions (other than employees)

| | | 2020 | 2019 |
|---|---|---|---|
| | | $'000 | $'000 |
| Decommissioning | (a) | 745,438 | 882,002 |
| Intellectual property payment | (b) | 37,703 | 40,312 |
| Other provisions | | 1,218 | 505 |
| **Total provisions** | | **784,359** | **922,819** |
| | | | |
| **Provisions expected to be settled within** | | | |
| No more than 12 months | | 22,006 | 22,123 |
| More than 12 months | | 762,353 | 900,696 |
| **Total provisions** | | **784,359** | **922,819** |

### Provisions movement reconciliation

| | Decommissioning $'000 | Intellectual property payment $'000 | Other claims $'000 |
|---|---|---|---|
| **Carrying amount 30 June 2018** | **387,124** | **43,188** | **578** |
| Restatement[1] - opening | 92,425 | - | - |
| **Restated balance at 30 June 2018** | **479,549** | **43,188** | **578** |
| Change in accounting estimate - Income statement | 129,908 | - | - |
| Restatement[1] - change in accounting estimate - Income statement | 171,700 | - | - |
| **Restated change in accounting estimate - Income statement** | **301,608** | **-** | **-** |
| Change in accounting estimate - Asset revaluation reserve | 53,808 | - | - |
| Foreign currency movement | - | 4,755 | - |
| Additions to provision | 47,893 | - | - |
| Amounts used | (24,936) | (7,781) | (73) |
| Unwinding discount | 19,459 | 150 | - |
| Restatement - unwinding discount | 4,621 | - | - |
| **Restated carrying amount 30 June 2019** | **882,002** | **40,312** | **505** |
| Nuclear waste management expenses | 2,997 | - | - |
| Additions to provision | - | - | 795 |
| Amounts used | (7,376) | (147) | (82) |
| Change in accounting estimate | (146,114) | - | - |
| Foreign currency movement | - | (2,556) | - |
| Unwinding discount | 13,929 | 94 | - |
| **Carrying amount 30 June 2020** | **745,438** | **37,703** | **1,218** |

1. Refer to the Overview.

# 2. Financial Position (continued)

## 2.3C Provisions (other than employees) (continued)

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

Estimated nominal costs being the estimate of future cash flows required to fund the decommissioning of current facilities, infrastructure and waste (2020: $860.8 million; 2019 $906.4 million):

- An external company, Project Time & Cost LLC (PT&C), was engaged in FY19 to provide a report on the cost of decommissioning facilities at ANSTO's Lucas Heights campus effective 30 June 2019. The estimate provided by PT&C has an expected accuracy range between +50% and -30%. ANSTO has applied the point estimate from the PT&C report of $716.7 million in their calculation of the decommission provision.
- The legacy waste relates to the future costs of managing legacy waste from research and the production of nuclear medicine. The provision also includes the estimated costs of managing the spent fuel from the OPAL multipurpose reactor. The FY19 calculation contains depreciation costs on facilities required to process the waste. As these facilities are yet to be operational the depreciation has been removed from the FY20 calculation and will be only included once the facilities are operating. The costs of the legacy waste and spent fuel are based primarily on ANSTO experience and expertise of managing these items over a number of years.

Phasing of the estimated nominal costs over the expected time period of the decommissioning provision being 58 years (2019: 53 years):

- The cash flows are phased based on when it is expected that the work will be undertaken, which is subject to the use of the asset, the available funding and, where applicable, the licence.
- Decommissioning costs are funded by government. Until FY19 funding was obtained for projects as it was required. From FY20 funding will be received on a pro-rata basis with the longest funding over 58 years for the decommissioning of infrastructure.
- A timing of decommissioning activities has been reassessed in FY20 to reflect the new funding arrangements as well as the use of the asset and where applicable the licence.

Inflating the nominal costs by expected CPI over time (2020: 1.5%, 2019: 2.5%):

Payments to fund decommissioning are made in the future and need to account for expected increases in the underlying cost of the final outflow due to inflationary pressures. The inflation rate assumption applied by ANSTO is set with reference to the Standard Parameters made available by the Department of Finance.

# 2. Financial Position (continued)

## 2.3C Provisions (other than employees) (continued)

Discounting for the effect of the time value of money (2020: ranging from 0.15% to 3.25%, 2019 restated: ranging from 1% to 5%):

- Projected nominal costs are discounted to a present value using risk free rates to reflect the time value of money and are set with reference to the Standard Parameters made available by the Department of Finance. Prior to the restatement, the 2018 and 2019 discount rate used in error was 5%.

Given the high degree of judgement required to estimate future cash flows and the phasing of these cash flows, there is inherent uncertainty in establishing the liability, therefore it is likely that the final outcome will differ from the original liability established. Changes in decommissioning provision year on year are recognised in profit or loss in the reporting year in which the estimates change.

The sensitivity of the decommissioning provision, based on the nominal cost of $860.8 million as at 30 June 2020 (2019: $906.4 million), to changes in the primary drivers are indicated in the table below. Each change has been calculated in isolation and without regard to other driver changes that may occur simultaneously.

| | | Decommissioning Provision Increase/(Decrease) | |
|---|---|---|---|
| **Driver** | **Change** | **2020 $'000** | **2019 $'000** |
| CPI | (1.0)% | (133,482) | (73,259) |
| | (0.5)% | (71,568) | (38,773) |
| | 0.5% | 83,057 | 43,860 |
| | 1.0% | 179,823 | 93,782 |
| Discount rate | (1.0)% | 174,886 | 92,246 |
| | (0.5)% | 82,491 | 42,967 |
| | 0.5% | (70,938) | (37,733) |
| | 1.0% | (131,894) | (71,100) |
| Delaying planned expenditure | 1 year | (12,050) | (14,601) |
| | 3 years | (35,397) | (42,769) |
| | 5 years | (54,565) | (69,612) |

(b) The provision of intellectual property relates to future payments required in relation to the intellectual property asset (Notes 2.2A and 2.2B). The liability is derived from calculating the estimated commission to be paid to NTP based on expected future sales and then discounted back at 5.11% (2019: 4.28%).

# 2. Financial Position (continued)

## 2.3D Operating Leases

| | Note | 2020 |
|---|---|---|
| | | $'000 |
| Additions | 2.2A | 3,853 |
| Lease repayments | | (141) |
| Interest expense on lease liabilities | 1.1D | 38 |
| **Closing balance** | | **3,750** |

| | |
|---|---|
| **Maturity analysis - contractual undiscounted cash flows** | |
| Buildings | |
| Less than one year | 108 |
| One to five years | 588 |
| More than five years | 3,054 |
| **Total undiscounted lease liabilities** | **3,750** |

**Accounting policy**
Refer to Overview section for accounting policy on leases.

# 2. Financial Position (continued)

## 2.4 Reserves

### 2.4A Reserves

| | | 2020 | 2019 |
|---|---|---|---|
| | | $'000 | $'000 |
| **Asset revaluation** | (a) | | |
| Opening balance | | 389,124 | 442,932 |
| Revaluation - realisation | | (2,655) | (53,808) |
| **Asset revaluation reserves** | | **386,469** | **389,124** |
| **Other reserves** | | | |
| **OPAL depreciation** | (b) | **9,061** | **9,061** |
| **Intermediate low level waste (ILLW) return** | (c) | **616** | **616** |
| **Foreign currency reserve** | | | |
| Opening balance | | 323 | 321 |
| Movement | | - | 2 |
| **Closing balance** | (d) | **323** | **323** |
| **Other reserves** | | **10,000** | **10,000** |
| **Total reserves** | | **396,469** | **399,124** |

**(a) Asset revaluation**
This reserve represents the revaluation of property, plant and equipment.

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

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

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

### 2.4B Accumulated deficit

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| Opening balance | (848,120) | (271,606) |
| Restatement[1] - opening | - | (92,425) |
| Restated opening balance | (848,120) | (364,031) |
| Surplus/(deficit) for the year after income tax | 124,215 | (307,768) |
| Restatement[1] - 2019 | - | (176,321) |
| Restated surplus/(deficit) for the year after income tax | 124,215 | (484,089) |
| **Closing balance** | **(723,905)** | **(848,120)** |

1. Refer to the Overview.

# 3. Funding

This section identifies ANSTO's funding structure.

## 3.1 Government funding

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| Revenue from Government | 281,909 | 214,072 |
| Government equity injection | 81,194 | 28,461 |
| **Total government funding** | **363,103** | **242,533** |

**Revenue from government**

Funding received or receivable from the Department of Industry, Science, Energy and Resources (DISER) (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.

# 4. People and relationships

This section describes a range of employment and post-employment benefits provided to our people and our relationships with key people.

## 4.1 Employee payables

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| Accrued salaries and wages | 2,552 | 1,182 |
| Incentives | 3,900 | 4,184 |
| **Total employee payables** | **6,452** | **5,366** |

All employee payables are expected to be settled within 12 months.

## 4.2 Employee provisions

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| Annual leave | 16,421 | 13,628 |
| Long service leave | 33,872 | 32,304 |
| **Total employee provisions** | **50,293** | **45,932** |
| | | |
| **Employee provisions expected to be settled within** | | |
| No more than 12 months | 42,841 | 37,700 |
| More than 12 months | 7,452 | 8,232 |
| **Total employee provisions** | **50,293** | **45,932** |

# 4. People and relationships (continued)

## 4.3 Key management personnel remuneration

Key management personnel (KMP) are those persons having authority and responsibility for planning, directing and controlling the activities of ANSTO, directly or indirectly, including any director (whether executive or otherwise) of ANSTO. ANSTO has determined the KMP to be the ANSTO Portfolio Minister, the Board and the Executive Leadership Team. KMP remuneration is reported in the table below:

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| **Short-term employee benefits:** | | |
| Salary | 3,796 | 3,581 |
| Performance bonuses | 720 | 599 |
| Other | 18 | 11 |
| **Total short-term employee benefits** | **4,534** | **4,191** |
| **Post-employment benefits:** | | |
| Superannuation | 406 | 372 |
| **Total post-employment benefits** | **406** | **372** |
| **Other long-term benefits:** | | |
| Long-service leave | 82 | 60 |
| Other | 64 | 283 |
| **Total other long-term benefits** | **146** | **343** |
| **Termination benefits** | **-** | **216** |
| **Total key management personnel remuneration** | **5,086** | **5,122** |

The total number of KMP included is 16.65 (2019: 15.37). Represented by 7.17 non-executive board members (prorated) (2019: 6.68) and 9.48 full time equivalent (FTE) (2019: 8.69 FTE) members of the ANSTO Executive Leadership Team. The above key management personnel remuneration excludes the remuneration and other benefits of the Portfolio Minister. The Portfolio Minister's remuneration and other benefits are set by the Remuneration Tribunal and are not paid by the entity.

## 4.4 Related party transactions

ANSTO is an Australian Government controlled entity. Related parties to this entity are the Key Management Personnel, the Commonwealth cabinet and other Australian Government entities.

Significant transactions with related parties or entities that they are associated with can include:

- the payments and receipt of grants; and
- purchases of goods and services

Giving consideration to relationships with related parties, their associated entities, and transactions entered into during the reporting period by ANSTO, it has been determined that there are no related party transactions to be separately disclosed.

# 5. Managing Uncertainties

This section analyses how ANSTO manages the financial risks within its operating environment.

## 5.1 Contingent assets and liabilities

Contingent assets and contingent liabilities 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.

**Unquantifiable Contingencies**

At 30 June 2020, 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. However, such claims are 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.

## 5.2 Financial instruments

### a) Categories of financial instruments

| | Note | Carrying amount 2020 | Amortised Cost 2020 | Fair value through profit or loss 2020 | Carrying amount 2019 | Amortised Cost 2019 | Fair value through profit or loss 2019 |
|---|---|---|---|---|---|---|---|
| **Financial assets** | | **$'000** | **$'000** | **$'000** | **$'000** | **$'000** | **$'000** |
| Cash and cash equivalents | | 12,568 | 12,568 | | 19,178 | 19,178 | |
| Trade receivables | 2.1B | 7,922 | 7,922 | - | 17,316 | 17,316 | - |
| Interest accrued | 2.1B | 558 | 558 | - | 595 | 595 | - |
| Accrued revenue | 2.1B | 1,572 | 1,572 | - | 3,489 | 3,489 | - |
| Other | 2.1B | 583 | 583 | - | 527 | 527 | - |
| Investments - held to maturity | 2.1C | 214,215 | - | 214,215 | 101,886 | - | 101,886 |
| Investments - other | 2.1C | 703 | - | 703 | 213 | - | 213 |
| **Total financial assets (recognised)** | | **238,121** | **23,203** | **214,918** | **143,204** | **41,105** | **102,099** |
| **Total financial liabilities** | | | | | | | |
| Suppliers | | 11,430 | 11,430 | - | 10,377 | 10,377 | - |
| Employees | 4.1 | 6,452 | 6,452 | - | 5,366 | 5,366 | - |
| Other payables | 2.3A | 7,831 | 7,831 | - | 8,570 | 8,570 | - |
| Revenue in advance | 2.3B | 36,129 | 36,129 | - | 33,364 | 33,364 | - |
| **Total financial liabilities (recognised)** | | **61,842** | **61,842** | **-** | **57,677** | **57,677** | **-** |

# 5. Managing Uncertainties (continued)

## 5.2 Financial instruments (continued)

### Interest revenue from financial assets

| | 2020 | 2019 |
|---|---|---|
| | $'000 | $'000 |
| **Loans and receivables** | | |
| Cash and cash equivalents | 463 | 486 |
| Investment held to maturity | 1,725 | 2,735 |
| **Net income from financial assets** | **2,188** | **3,221** |

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

### b) Net expenses from financial liabilities

There were no expenses from financial liabilities for 2020 (2019: $nil).

**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 grants received in advance, all of which are short-term in nature, are in accord with their carrying amounts.

**Accounting Policy**
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 or a financial liability 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.

# 5. Managing Uncertainties (continued)

## 5.2 Financial instruments (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. The net fair values of cash, deposits on call and non-interest-bearing monetary financial assets are in accord with their carrying amounts.

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

# 5. Managing Uncertainties (continued)

## 5.2 Financial instruments (continued)

**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 the interest expense recognised on an effective interest basis.

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).

## 5.3 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.

| Non-financial assets | Category | Fair value 2020 $'000 | Fair value 2019 $'000 | Valuation technique[1] | Inputs used[1] |
|---|---|---|---|---|---|
| **Land** | **3** | **115,688** | **115,688** | Market approach | Adjusted market transactions (zoning, access, existing use, size, topography, location) |
| **Buildings** | **2** | **4,579** | **4,579** | Market approach | Adjusted market transactions |
| | **3** | **104,726** | **112,720** | Depreciated replacement cost (DRC) | Replacement cost of a new/consumed economic benefit/ obsolescence of asset |
| **Infrastructure, plant and equipment** | **2** | **3,410** | **3,410** | Market approach | Adjusted market transactions |
| | **3** | **764,761** | **757,423** | Depreciated replacement cost (DRC) | Replacement cost of a new/consumed economic benefit/ obsolescence of asset |

1. The valuation techniques and inputs used in 2020 and 2019 are consistent.
The highest and best use of all non-financial assets is the same as their current use.

# 5. Managing Uncertainties (continued)

## 5.3 Fair value measurement (continued)

**Accounting Policy**

For assets that are recognised in the financial statements at fair value on a recurring basis, the determination is made 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.

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

The Australian Valuation Solutions (AVS) undertook a comprehensive valuation of all non-financial assets located at the Lucas Heights and Camperdown campuses effective 30 June 2017. PP&E Valuations undertook a comprehensive valuation of all non-financial assets located at the Clayton campus effective 30 June 2017. 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.

**Land, Infrastructure, Plant and 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 depreciated replacement cost (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.

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. Fixed 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.

# 6. Other information

## 6.1 Deed of indemnity

A Deed of Indemnity between the Commonwealth Government, ANSTO and ANM, under which the government has formally agreed to indemnify ANSTO and ANSTO Officers, and ANM and ANM Officers, from any loss or liability arising from claims caused by ionising radiation, was signed by the Minister for Industry, Innovation and Science in April 2016. It will remain in place until April 2026.

## 6.2 Information relating to ANSTO (the parent entity)

| | 2020 | Restated 2019 | 2019 | Restated 2018 |
|---|---|---|---|---|
| | $'000 | $'000 | $'000 | $'000 |
| Financial assets | 261,397 | 161,353 | 161,353 | 170,525 |
| Non-financial assets | 1,208,404 | 1,225,683 | 1,225,683 | 1,226,892 |
| **Total assets** | **1,469,801** | **1,387,036** | **1,387,036** | **1,397,417** |
| | | | | |
| Payables | 26,453 | 13,543 | 13,543 | 33,327 |
| Provisions | 751,596 | 916,492 | 655,187 | 565,962 |
| Revenue in advance | 36,128 | 33,363 | 33,363 | 20,686 |
| Operating leases | 3,750 | - | - | - |
| **Total liabilities** | **817,927** | **963,398** | **702,093** | **619,975** |
| **Net assets** | **651,874** | **423,638** | **684,943** | **777,442** |
| | | | | |
| Contributed equity | 900,869 | 819,675 | 819,675 | 791,214 |
| Asset revaluation reserve | 385,577 | 388,232 | 388,232 | 442,077 |
| Other reserves | 9,677 | 9,677 | 9,677 | 9,677 |
| Accumulated deficit | (644,249) | (793,946) | (532,641) | (465,526) |
| **Total equity** | **651,874** | **423,638** | **684,943** | **777,442** |
| **Surplus/(deficit) of the parent entity** | **149,697** | **(328,420)** | **(159,540)** | **(292,827)** |
| **Other comprehensive expense of the parent entity** | **-** | **(53,845)** | **(53,845)** | **(55,842)** |
| **Total comprehensive surplus/(deficit) of the parent entity** | **149,697** | **(382,265)** | **(213,385)** | **(348,669)** |

The lease commitments shown in Note 2.3D only relate to ANSTO.

# 6. Other information (continued)

## 6.2 Information relating to ANSTO (the parent entity) (continued)

| | Interest rate | Maturity date | 2020 | 2019 |
|---|---|---|---|---|
| | | | $ | $ |
| $15 million unsecured loan facility from ANSTO to ANM | CommSec Variable Rate 6.03% (2019: 6.28%) | 31.12.21 (2019: 31.12.20) | 5,573,447 | 8,322,377 |
| **Total unsecured loan from ANSTO to ANM** | | | **5,573,447** | **8,322,377** |
| **Interest on unsecured loan facility** | | | **437,448** | **322,040** |

There are transactions between ANSTO and its subsidiaries for operating leases, purchases and sales of goods and services. These transactions are on normal commercial terms and conditions no more favourable than those available to other parties.

### Investment in subsidiaries

The current carrying value of ANSTO's subsidiaries at 2020 are set out below. Unless otherwise stated, share capital consists solely of ordinary shares that are held directly by ANSTO, and the proportion of ownership interests held equals the voting rights held by the group. The country of incorporation is also their principal place of business.

| Name | Place of incorporation | 2020 % | 2020 $ | 2019 $ |
|---|---|---|---|---|
| PETTECH Solutions Pty Ltd (a) | Australia | 100 | 2,965,588 | 2,965,588 |
| ANSTO Inc. (b) | USA | 100 | - | - |
| ANSTO Nuclear Medicine Pty Ltd (c) | Australia | 99.9 | 13,938,100 | 13,938,100 |
| Australian Synchrotron Holding Company Pty Ltd (d) | Australia | 100 | - | - |
| **Total investment in subsidiaries** | | | **16,903,688** | **16,903,688** |

(a) ANSTO continues to own 100% of PETTECH Solutions Pty Ltd (PETTECH). To 2 January 2019, when its business was sold, its principal activities were manufacturing, sale and distribution of FluoroDeoxyGlucose (FDG) and Fluorine 18 (F18) for use in the Australian market. Subsequent to the sale of the business, PETTECH's primary activity is the ownership of infrastructure for the manufacture of FDG.
During FY20 PETTECH recognised a right of use asset of $0.5 million resulting from a lease with ANSTO. The NBV as at 30 June 2020 was $0.5 million.

(b) ANSTO continues to own 100% of ANSTO Inc. its principal activity is to promote the commercialisation of ANSTO Technology in the USA. For the financial year ended 30 June 2020 the financial statement were audited by Wipfli LLC.

# 6. Other information (continued)

## 6.2 Information relating to ANSTO (the parent entity) (continued)

(c) ANSTO owns 100% of the B class and C class shares on issue of ANM. The B class shares, 101 are not entitled to any dividends but do have operational control. The C class shares, 110,300,000 were issued as consideration for the Mo-99 manufacturing facility. There was one A class share issued to the Minister of Industry, Innovation and Science on behalf of the Commonwealth. The A class share is entitled to dividends. ANM's principal activities are to own and operate the new Molybdenum 99 (Mo-99) and Synroc Waste Treatment facilities.
At 30 June 2020 ANSTO's investment in ANM was impaired by $96.3 million (2019: $96.3 million). ANSTO has undertaken to not call on ANM to pay for the operational readiness capital costs until ANM has sufficient incremental cash flows to pay these costs, as agreed by both parties. This will be no earlier than 12 months from the date of signing the ANM FY20 financial statements.
The Mo-99 manufacturing facility had the production restrictions on its operating licence lifted on 27 March 2020, however, the social distancing arrangement in place to ensure that safe and continued production during COVID-19 restrictions resulted in specific export production not commencing until August 2020.
During FY20 ANM recognised a right of use asset of $9.3 million resulting from a lease with ANSTO. The NBV as at 30 June 2020 was $9.2 million.

(d) Australian Synchrotron Holding Company Pty Ltd (ASHCo) was deregistered on 12 June 2019.

## 6.3 Events after reporting date

The Overview note details the impact of COVID-19 on ANSTO's liquidity to date.

At this stage, the impact on ANSTO and result has not been significant and based on our experience to date it is expected this to remain the case. ANSTO operates in the nuclear medicine and research industries.

We will continue to follow the various government policies and advice and, in parallel, we will do our utmost to continue our operations in the best and safety possible way without jeopardising the health of our people and safeguarding the supply of nuclear medicine into the Australian market.

# 6. Other information (continued)

## 6.4 Budgetary reports and explanations of major variances

The following tables provide a comparison between the 2019–20 Portfolio Budget Statements (PBS) budget and the final financial outcome in the 2019–20 financial statements. The Budget is not audited and does not reflect additional budget estimates provided in the 2019–20 Portfolio Additional Estimates Statements (PAES). However, major changes in budget have been explained as part of the variance analysis where relevant.

The ANSTO PBS does not include ANM, the $168.8 million 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 and are outside of the scope of AASB 1055 *Budgetary Reporting*. ANM is included in the Actual figures in the financial statements as it is controlled by ANSTO.

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

**Explanation of major variances**

| Event impacting financial statements | Affected consolidated statements and line items |
|---|---|
| The ANM project is reported differently in the budget compared to the Actual figures. ANM is a subsidiary of ANSTO, it is consolidated into the financial statements and the costs associated with the construction of the ANM facilities are reflected in Property, Plant and Equipment net of impairment, $51.3M (2019: $28.9M). However, for budget purposes ANM does not form part of the PBS and is reflected as an investment. As at 30 June 2020 the value of the ANM Mo-99 production facility is $18.6M (2019: $18.6M).<br>The nuclear waste management expense and provision relate to ANM's production of Mo-99.<br>ANM operated under a restricted operating licence until March 2020. Production was limited to ensuring domestic demand for Mo-99 was met. ANSTO holds the inventory of target plates used by ANM to produce Mo-99.<br>As a result of a letter of support, ANSTO paid the costs of ANM until ANM was specifically producing for export. This support was in place from 1 September 2019 to 30 June 2020 and resulted in $21.9 million of support. | **Statement of Comprehensive Income:**<br>Supplier expenses<br>Nuclear waste management expense<br>Sale of goods and rendering of services<br>**Statement of Financial Position:**<br>Investments<br>Inventories<br>Property, plant and equipment<br>Nuclear waste management provision<br>**Statement of Cash Flows:**<br>Sales of good and rendering of services<br>Payments to suppliers |
| ANSTO received $49.5M of additional funding in the 2019-20 PAES. $47.1M was received as revenue from Government and $2.4M as an equity injection. $33.7M was to support nuclear medicine production. | **Statement of Comprehensive Income:**<br>Revenue from Government<br>**Statement of Financial Position:**<br>Investments<br>Contributed equity |

# 6. Other information (continued)

| Event impacting financial statements | Affected consolidated statements and line items |
|---|---|
| | **Statement of Cash Flows:**<br>Receipts from Government m<br>investment sales/maturities<br>Purchase of investments |
| ANSTO have taken a number of measures to monitor and mitigate the effect of COVID-19, such as safety and health measures for staff (such as social distancing and working from home) and securing the supply of materials that are essential to our production process. Capital works, such as the Bright project, have also been delayed through the closure of manufacturers of equipment and the closure of borders impacting the installation of equipment.<br>Grants received for the Bright project at the Australian Synchrotron are recognised as revenue when the capital expenditure is incurred. The delay in this expenditure arising from COVID-19 has had a corresponding delay in the recognition of income. | **Statement of Comprehensive Income:**<br>Supplier expenses<br>Sales of goods and rendering of services<br>Grant income<br>**Statement of Financial Position:**<br>Trade and other receivables<br>Investments<br>Property, plant and equipment<br>Suppliers<br>Revenue in advance<br>**Statement of Cash Flows:**<br>Sales of goods and rendering of services<br>Payments to suppliers<br>Purchase of property, plant and equipment |
| ANSTO manages its cash through the use of term deposits. The term of each deposit is dependent on the cash needs of the business and the interest rates prevailing at the time. Changes in either the cash needs or interest rates impacts on the number of times a deposit is 'rolled' in the period. | **Statement of Cash Flows:**<br>Proceeds from investment sales/maturities<br>Purchase of investments |
| Each year at 30 June ANSTO assesses its obligation to decommission facilities and manage waste from its operations. In accordance with the Australian Accounting Standards, the decommissioning provision is assessed for the timing of payments, anticipated costs and discount, exchange and inflation rates. A certainty of funding that has been achieved in FY20 has impacted the schedule of decommissioning works and the timing of payments. The actual inflation and discount rates as at 30 June 2020 were lower than those used to calculate the provision when the 2019-20 PBS was completed in April 2019. | **Statement of Comprehensive Income:**<br>Finance costs<br>Decommissioning provisions gains<br>**Statement of Financial Position:**<br>Provision – Decommissioning |

# Performance against relevant Acts and policies

## Equality opportunity, diversity and inclusion

### Diversity and inclusion

ANSTO strives to embrace and champion diversity within and outside our Organisation and welcomes the contributions of our staff, customers, stakeholders and the public in helping us achieve that goal.

We endeavour to create a culture of inclusion, where our diversity of thought and differing perspectives are a source of organisational agility, resilience and renewal. We provide empowering and effective work-based policies which support the individual needs of our employees, including flexible work practices, health and well-being and family-friendly programs.

**Reconciliation Action Plan**

In February 2020, ANSTO officially launched its innovate Reconciliation Action Plan (RAP), which sets out a roadmap of activities over the next two years for greater engagement with Indigenous employees, students, research collaborators and communities. In addition to a formal launch ceremony, and guided bushwalks to culturally significant sites; ANSTO also hosted a number of local indigenous school students who learned more about how careers in STEM connect and support Indigenous culture, country and communities. View the the Reconciliation Action Plan at https://bit.ly/3689h2J

**Indigenous acknowledgment**

ANSTO acknowledges the traditional owners of the lands of each of our campuses and the unique cultural significance of the area in the past, today and into the future. In recognition of this connection, ANSTO is enhancing activities to connect with the local and broader Australian Indigenous communities.

**Disability**

ANSTO is committed to creating a workplace where different abilities are recognised, valued and celebrated. We care about providing a workplace where people with physical disability or neuro-divergences, carers of people with a disability, and people experiencing and managing mental health issues are supported to thrive.

ANSTO assists people with disabilities by providing workplace modifications or reasonable adjustments to help them perform their job, including:

- changing when, where and how work is performed
- ergonomic or specialist equipment, and
- physical changes to access (accessibility parking permits and spaces).

All new buildings and areas being renovated at ANSTO must comply with the relevant disability legislations, and we have ongoing improvements to the accessibility of our campuses including widening footpaths and equipping meeting rooms (above 100m2) with hearing loops.

In the event that a workplace design has excluded facilities for people with disabilities or the work environment is unsafe for people with disabilities to fulfil their duties, ANSTO reviews whether the work environment can be modified. ANSTO's policies and procedures align with the requirements of the *Equal Employment Opportunity (Commonwealth Authorities) Act 1987* and *Disability Discrimination Act 1992*, intended to ensure employees with disabilities working at ANSTO and applicants for recruitment who have a disability are not discriminated against. ANSTO also has procedures and support in place to handle complaints and grievances which may be raised by employees and visitors.

**Meditation and multi-faith prayer space**

ANSTO's Lucas Heights campus has two dedicated spaces that can be used for mediation and prayer, including a meeting room and silent room. This facility is intended to provide staff with quiet and peaceful rooms. Rooms for private reflection, meditation and prayer are also available to our staff working at ANSTO's Clayton campus.

These spaces accommodate all religious affiliations and denominations, and are part of ANSTO's ongoing commitment to provide facilitates that enable balance between personal, work and faith-based commitments.

**LGBTQI+ support**

Our LGBTQI+ Staff Network's mission is to provide support, networking and advocacy to gender diverse and same-sex attracted people at ANSTO. Our network provides visibility to gender diversity and LGBTQI+ issues, and support and advocacy for those encountering difficulties in the workplace. They provide important input into ANSTO policies and procedures on gender diversity and LGBTQI+ issues.

Individuals in our network work are role models and mentors, and outreach to LGBTQI+ youth in STEM.

**Equipping and empowering our leaders**

Over the last year, all people managers at ANSTO have been engaged in an *Inclusive Leadership* program. The program aims to increase awareness and understanding around the practice of inclusive leadership, providing participants with the capability to effectively communicate and implement Diversity & Inclusion strategies. These skills are fundamental to leadership at ANSTO.

ANSTO also launched the My Mentor Program and targeting women as part of the pilot program. Participants are engaging in a 10-module career development program over six months. In addition to structured mentoring, the program is designed to tackle topics like juggling work and lifestyle and equips mentees with a practical toolkit to accelerate their career to the next level.

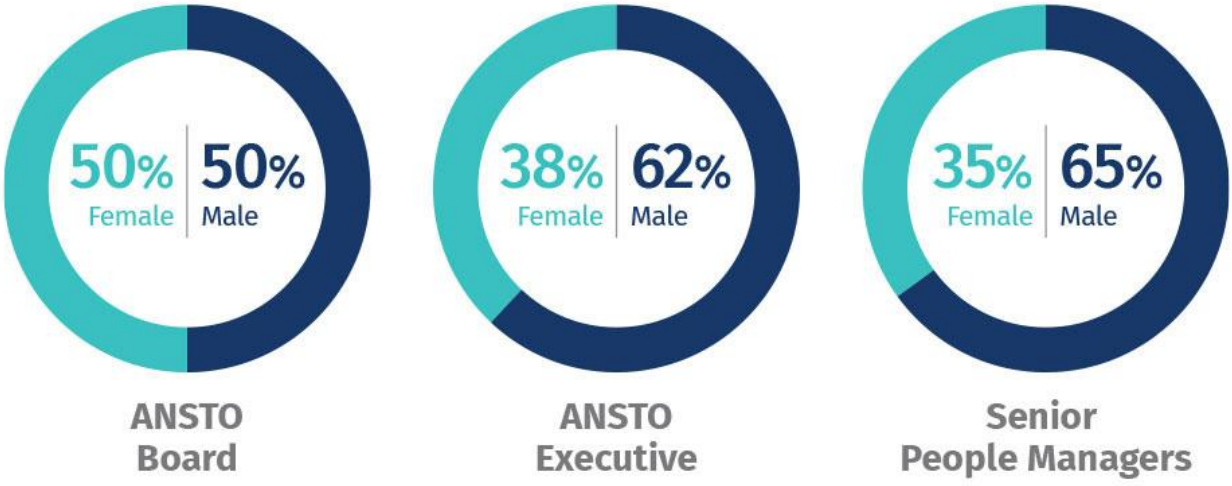
**Thriving through adversity**

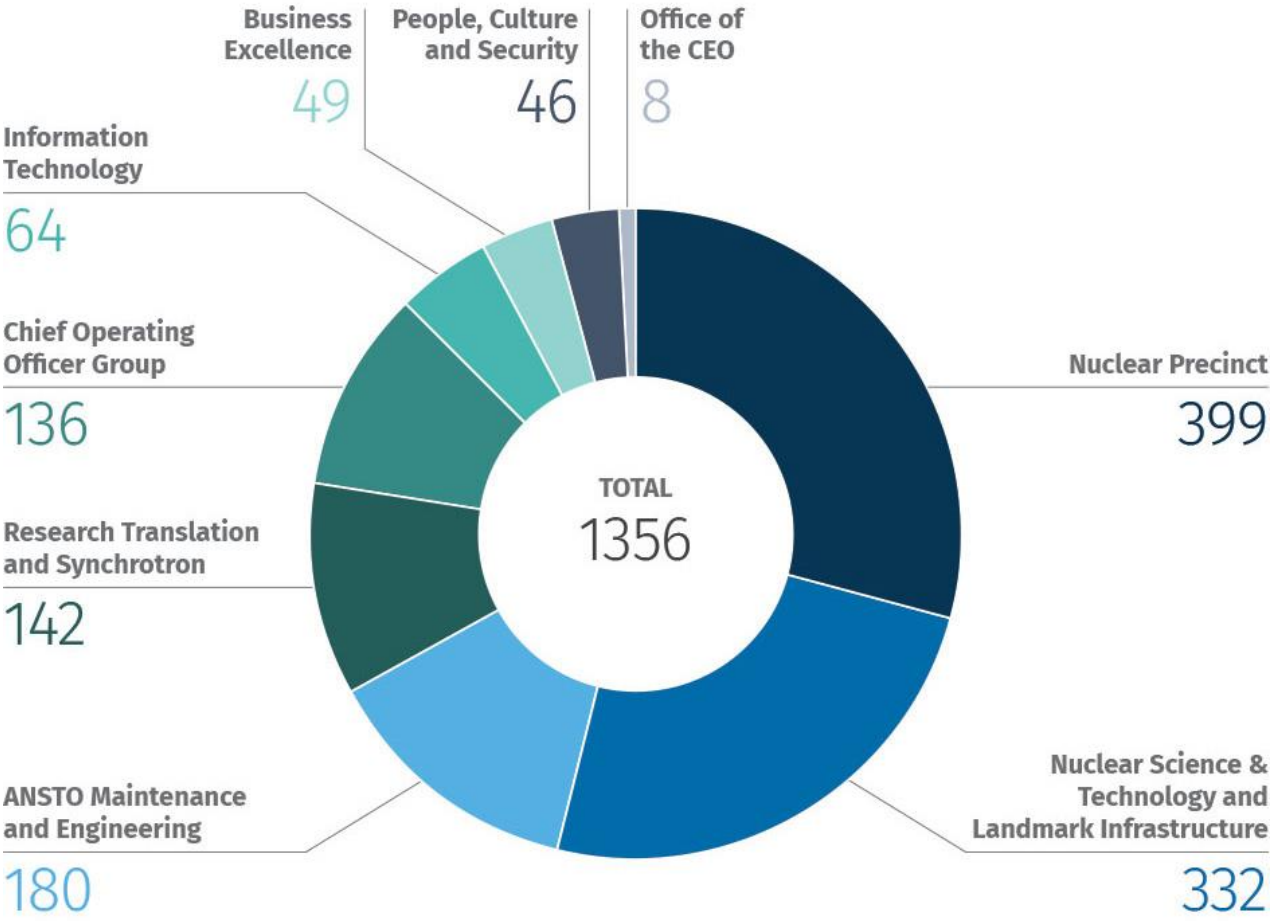
Workplace flexibility is a key way in which ANSTO supports the needs of its diverse staff. In January 2020, over 70 per cent of staff identified that they had made use of ANSTO's flexible work arrangements - up almost 25 per cent from 2017. In the same survey the vast majority of staff felt encouraged to make use of flexible work arrangements, they overwhelmingly recognised the positive impact they had had on with work-life balance.

ANSTO's investment in improving policies, training and technology around workplace flexibility - including working from home support, proved invaluable as the Organisation faced periods of difficulty in 2019 and 2020; with staff unable to access campuses during the December and January bushfires; and most recently to manage the risk of COVID-19. During COVID-19, almost overnight, 70 per cent of ANSTO's workforce switched to working exclusively from home, and considerable safety measures were put in place for those who continued to work on campus, to ensure Australia maintained a consistent supply of lifesaving radiopharmaceuticals. Staff reported that those working from home maintained a significant connection to ANSTO, felt supported by their manager and were engaged in meaningful work.

## EQUALITY OF EMPLOYMENT OPPORTUNITY FOR 2019-2020

| Description | Employees (full-time equivalent) | | % of Total | | % change 2020-2019 | Average Salary | | % change 2020-2019 |
|---|---|---|---|---|---|---|---|---|
| **Financial Year** | **2020** | **2019** | **2020** | **2019** | | **2020** | **2019** | |
| Female | 413.4 | 359.4 | 31.06% | 29.18% | 15.03% | $99,458 | $96,051 | 3.55% |
| Male | 917.75 | 872.3 | 68.94% | 70.82% | 5.21% | $111,968 | $109,293 | 2.45% |
| Total | 1,331.15 | 1,231.70 | 100.00% | 100.00% | 8.07% | $107,964 | $105,261 | 2.57% |
| **Workforce Diversity** | | | | | | | | |
| People with disabilities | 5 | 6 | 0.38% | 0.49% | 0.00% | $101,324 | $107,630 | -5.86% |
| Aboriginal and Torres Strait Islanders | 5 | 6 | 0.38% | 0.49% | 0.00% | $84,594 | $92,054 | -8.10% |
| Non-English-speaking background | 196 | 204 | 14.72% | 16.56% | -3.92% | $113,993 | $111,570 | 2.17% |




This chart represents ANSTO's headcount, or number of individuals that worked within the Organisation, as of 30 June 2020.

### All ongoing employees – Current reporting period (2019-2020)

| | Male | | | Female | | | Total |
|---|---|---|---|---|---|---|---|
| | Full time | Part time | Total Male | Full time | Part time | Total Female | |
| **NSW** | 752 | 11 | 763 | 297 | 63 | 360 | 1123 |
| **Vic** | 95 | 2 | 97 | 25 | 2 | 27 | 124 |
| **Overseas** | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| **Total** | 848 | 13 | 861 | 322 | 65 | 387 | 1248 |

### All non-ongoing employees – Current reporting period (2019-2020)

| | Male | | | Female | | | Total |
|---|---|---|---|---|---|---|---|
| | Full time | Part time | Total Male | Full time | Part time | Total Female | |
| **NSW** | 35 | 2 | 37 | 34 | 0 | 34 | 71 |
| **Vic** | 24 | 0 | 24 | 12 | 1 | 13 | 37 |
| **Overseas** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ***Total*** | 59 | 2 | 61 | 46 | 1 | 47 | 108 |

### All ongoing employees – Previous reporting period (2018-2019)

| | Male | | | Female | | | Total |
|---|---|---|---|---|---|---|---|
| | Full time | Part time | Total Male | Full time | Part time | Total Female | |
| **NSW** | 707 | 13 | 720 | 263 | 69 | 332 | 1052 |
| **Vic** | 92 | 1 | 93 | 19 | 4 | 23 | 116 |
| **Overseas** | 1 | 0 | 1 | 0 | 0 | 0 | 1 |
| ***Total*** | 800 | 14 | 814 | 282 | 73 | 355 | 1169 |

### All non-ongoing employees – Previous reporting period (2018-2019)

| | Male | | | Female | | | Total |
|---|---|---|---|---|---|---|---|
| | Full time | Part time | Total Male | Full time | Part time | Total Female | |
| **NSW** | 50 | 2 | 52 | 23 | 2 | 25 | 77 |
| **Vic** | 11 | 0 | 11 | 3 | 1 | 4 | 15 |
| **Overseas** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ***Total*** | 61 | 2 | 63 | 26 | 3 | 29 | 92 |

# Remuneration Report

**Introduction**

The categories of officials, employees of ANSTO, covered by the disclosures are:

- Key Management Personnel (KMP) - members of the Board and the Executive Leadership team disclosure in Table 1
- Senior executives: employees who are assigned General Manager or equivalent roles and delegations, disclosed in Table 2
- Other highly paid staff: employees with total remuneration $225,000 or greater not disclosed in Table 1 or 2, disclosed in Table 3.

**Remuneration policies and practices**

The remuneration of the ANSTO Board is in accordance with the Remuneration Tribunal (Remuneration and Allowances for Holders of Part-time Public Office) Determination 2019.

The remuneration parameters of the Chief Executive Officer are determined by the Australian Government Remuneration Tribunal. The ANSTO Remuneration and Nominations Committee assist the Board in fulfilling its responsibilities with regard to overall remuneration policy and strategy, performance and remuneration of the CEO.

Members of the Executive Leadership Team are on individual contracts which are based on market rates at the time of employment. The remuneration reflects qualifications, experience and levels of responsibility for each role. They also participate in the ANSTO Executive Incentive Plan. This plan was developed in conjunction with an independent external organisation, Mastertek Pty Ltd in 2014 to establish a reward plan where all Executives focuses on the delivery of the corporate strategy, that have shared goals that encourage true collaboration and cooperation and underpin behavioural component that drive a One ANSTO philosophy. It contains a mixture of short-term and long-term incentives. Achievement of these incentives relies on achievement of group and individual key performance indicators (KPIs). The Remuneration and Nominations Committee oversees the approach to performance and remuneration of the Executive Leadership Team.

Senior Manager and high paid positions are remunerated either in accordance with the ANSTO Enterprise Agreement salary tables or individual contracts. Each role has a Position Description detailing the roles, responsibilities, reporting lines, delegations, qualifications, skills and knowledge required. The role is subject to the Mercer job evaluation system and is benchmarked to ensure the appropriateness of remuneration. The Enterprise Agreement sets out the remuneration and entitlements of employees. All staff excluding the Executive Leadership team are eligible to participate in the Enterprise Agreement bonus system linked to the achievement of their KPIs under the annual performance appraisal process. Some Senior Managers and highly paid officers are eligible to participate in a short term incentive program. Recommendations for incentive payments are made by line managers and ultimate approval is by the divisional Group Executive.

**Remuneration governance arrangements**

The operations of the Remuneration and Nominations Committee for the year are detailed in the Corporate Governance Statement. Internally their operations are supported by the CEO and the Chief People Officer.

**TABLE 1 – KMP**

| | | Short Term Benefits | | | Post Employment Benefits | Other Long Term Benefits | | Termination Benefits | Total Remuneration[1] |
|---|---|---|---|---|---|---|---|---|---|
| **Name** | **Position Title** | **Base Salary $** | **Bonus $** | **Other Benefits $** | **Super Contributions $** | **Long Service Leave $** | **Other Long Term Benefits[2,3] $** | **$** | **$** |
| The Hon Annabelle Bennett, AC SC | Board Chair | 103,646 | - | 1,528 | 19,897 | - | - | - | 125,071 |
| Ms Penny Dobson | Deputy Board Chair and RAC Member | 77,170 | - | 1,380 | 7,288 | - | - | - | 85,839 |
| Ms Carol Holley | Board Member and RAC Chair | 67,902 | - | 2,360 | 6,401 | - | - | - | 76,663 |
| Dr Gordon de Brouwer | Board and RAC Member | 49,304 | - | 3,206 | 9,652 | - | - | - | 62,162 |
| Emeritus Professor Stephen Buckman, AM | Board and RAC Member | 59,706 | - | 4,016 | 9,123 | - | - | - | 72,845 |
| Professor Brigid Heywood | Board and RAC Member | 59,706 | - | 3,143 | 9,123 | - | - | - | 71,972 |
| Professor Andrew Scott, AM | Board and RAC Member | 59,706 | - | 2,622 | 5,628 | - | - | - | 67,956 |
| Ms Andrea Sutton | Board Member from 30 April 2020 | 8,711 | - | - | - | - | - | - | 8,711 |
| Dr Adi Paterson | Chief Executive Officer and Board Member | 509,632 | 110,327 | - | 25,000 | 15,555 | - | - | 660,514 |
| Mr John Edge | Chief Operating Officer from 4 May 2020 | 60,097 | 12,500 | - | 4,740 | 999 | 3,125 | - | 81,461 |

| Name | Position Title | Base Salary $ | Bonus $ | Other Benefits $ | Super Contributions $ | Long Service Leave $ | Other Long Term Benefits[2,3] $ | $ | $ |
|---|---|---|---|---|---|---|---|---|---|
| Mr Steve Jennaway | Group Executive, Business Operations Systems and Group Chief Financial Officer 31 July 2019 to 15 May 2020 - Part-time 80% | 196,089 | 45,330 | - | 17,868 | 3,585 | 11,333 | - | 274,205 |
| Ms Pamela Naidoo-Ameglio | Group Executive, Nuclear Precinct | 304,959 | 62,572 | - | 53,476 | 9,312 | 17,169 | - | 447,489 |
| Mr Michael Beckett | Group Executive, Special Projects, Part-time, 80% until 5 August 2019 | 20,403 | 3,639 | - | 1,675 | 348 | 2,730 | - | 28,795 |
| Mr Robert Blissett | Chief People Officer | 353,787 | 82,574 | - | 31,554 | 13,468 | - | - | 481,383 |
| Mr Shaun Jenkinson | Group Executive, Business Excellence | 365,770 | 88,660 | - | 25,000 | 9,217 | - | - | 488,647 |
| Mr Con Lyras | Group Executive, Asset Maintenance and Engineering and Chief Engineer | 314,504 | 82,474 | - | 21,316 | 624 | 6,840 | - | 425,758 |
| Ms Marianne Morton | Chief Information and Digital Officer | 290,954 | 46,121 | - | 30,680 | 5,852 | 14,250 | - | 387,856 |
| Dr Simone Richter | Group Executive, Nuclear Science & Technology, and Landmark Infrastructure | 292,784 | 63,349 | - | 53,504 | 9,384 | - | - | 419,021 |
| Professor Andrew Peele | Group Executive, Research Translation and the Australian Synchrotron from 11 December 2019 | 159,771 | 58,366 | - | 26,277 | 6,319 | 9,391 | - | 260,124 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Ms Jayne Senior | Group Executive, Customer Advocacy and Value Chain until 15 May 2020 | 253,001 | 43,247 | - | 27,534 | 4,947 | (1,250) | - | 327,480 |
| **ANSTO KMP** | | **3,607,601** | **699,159** | **18,256** | **385,737** | **79,610** | **63,588** | **-** | **4,853,951** |
| Subsidiary KMP disclosures | | 188,243 | 20,674 | - | 20,337 | 2,000 | - | - | 231,254 |
| **TOTAL Consolidated KMP - Financial Statements Note 4.3** | | **3,795,845** | **719,833** | **18,256** | **406,073** | **81,610** | **63,588** | **-** | **5,085,205** |

Notes:

1. Remuneration is reflected on an accruals basis not a cash basis and has not been annualised.
2. Other long term benefits reflect long term incentives.
3. The negative figure in the other long term benefits column represents the movement in the accrual from 2018-2019 to 2019-2020.

## Table 2 – Senior Managers

| | | Short Term Benefits | | | Post Employment Benefits | Other Long Term Benefits | | Termination Benefits | Total Remuneration[1] |
|---|---|---|---|---|---|---|---|---|---|
| Total Remuneration Bands | Number of Senior Executives[2] | Base Salary $ | Bonus $ | Other Benefits $ | Super Contributions $ | Long Service Leave $ | Other Long Term Benefits $ | $ | $ |
| $0-$225,000 | 7 | 121,801 | 6,807 | - | 18,676 | 3,935 | - | - | 151,219 |
| $275,001-$300,000 | 7 | 225,616 | 32,836 | - | 31,901 | 3,858 | - | - | 294,211 |
| $300,001-$325,000 | 2 | 220,656 | 41,105 | - | 39,667 | 9,413 | - | - | 310,841 |
| $325,001-$350,000 | 1 | 247,594 | 40,283 | - | 41,866 | 8,356 | - | - | 338,099 |
| $400,001-$425,000 | 1 | 322,051 | 51,684 | - | 31,457 | 4,880 | - | - | 410,072 |
| | **18** | | | | | | | | |

Notes:

1. Remuneration is reflected on an accruals basis not a cash basis.
2. Remuneration has only been included for the period the employee is a senior manager.

### TABLE 3 - OTHER HIGHLY PAID STAFF

| | | Short Term Benefits | | | Post Employment Benefits | Other Long Term Benefits | | Termination Benefits | Total Remuneration[1] |
|---|---|---|---|---|---|---|---|---|---|
| **Total Remuneration Bands** | **Number of Highly Paid Officers** | **Base Salary $** | **Bonus $** | **Other Benefits $** | **Super Contributions $** | **Long Service Leave $** | **Other Long Term Benefits $** | **$** | **$** |
| $225,001-$250,000 | 16 | 188,468 | 5,487 | - | 32,120 | 7,192 | - | - | 233,267 |
| $250,001-$275,000 | 9 | 209,959 | 10,549 | 37 | 29,225 | 11,820 | - | - | 261,590 |
| $275,001-$300,000 | 4 | 240,760 | 13,127 | 92 | 36,736 | 1,582 | - | - | 292,296 |
| $300,001-$325,000 | 2 | 250,817 | 10,221 | - | 37,891 | 13,761 | - | - | 312,690 |
| $325,001-$350,000 | 1 | 295,805 | - | - | 25,854 | 6,705 | - | - | 328,364 |
| $350,001-$375,000 | 1 | 294,774 | 51,815 | - | 24,700 | 2,765 | - | - | 374,054 |
| | **33** | | | | | | | | |

Notes:

1. Remuneration is reflected on an accruals basis not a cash basis and has not been annualised.

## Employee support, culture and inclusion

Our goal is to create a workplace where employees thrive and feel like they belong, by supporting, empowering and valuing their individual skills.

ANSTO is committed to providing a flexible, supportive and diverse working environment to enable everyone to work towards their planned career goals, and encouraging employees to live a balanced lifestyle that combines work, family and community responsibilities. Eighty per cent of staff state that their work arrangements meet their need for flexibility.

Flexible arrangements can take a number of different forms and can be temporary or permanent depending on the nature of the requirement, the work done by the staff member and what can be reasonably accommodated by the business area.

ANSTO encourages managers and employees to work together – utilising the wide variety of options available to meet the flexible needs of the employee and the business, which include, but are not limited to:

- Flexible working hours
- Flex/Managed Time (time off in lieu)
- Working from home
- Job sharing
- Part time work
- Compressed hours
- Averaging of hours
- Purchased leave
- Unpaid leave
- Transition to retirement
- Individual flexibility arrangement (IFA).

In line with our environmental sustainability measures, ANSTO has invested significantly in technology which supports a seamless work experience from any location, with improvements in technology supporting working from home and virtual meeting capabilities.

## Career management

At ANSTO, we are creating a culture that encourages proactive and deliberate career management; a culture that invests in employee's careers to enable informed career decisions and encourage individual accountability for career growth. Our goal is to actively facilitate a learning journey designed to help our employees develop new capabilities and knowledge that both align with business objectives and provide long-term career growth opportunities.

The Career Management System (CMS) provides a suite of tools and training for employees, managers and leaders to support each stage of the career development model. These tools include self-assessments and diagnostic resources to assist employees and managers with greater self-awareness and understanding of personal strengths. This in turn has resulted in managers and employees working in partnership to explore

creative possibilities, leading to richer conversations related to career planning and development opportunities.

Managers are supported through specific training to build their capability as career coaches to better facilitate the career discovery journey and change processes with their employees.

The CMS provides employees with the opportunity to realise the various career options they could leverage. This is creating better staff engagement and career movements within the Organisation, leading to better engagement and job satisfaction and staff pursuing further education.

## Privacy

ANSTO is committed to protecting personal information in accordance with the *Privacy Act 1988* (Cth) (*Privacy Act*) and the Australian Privacy Principles (APPs). The privacy function sits within the People Culture and Security division and a Privacy Officer and a Privacy Champion have been appointed as required by the Privacy (Australian Government Agencies – Governance) Australian Privacy Principle (APP) Code 2017.

The aim of this function is to enhance existing privacy capabilities within ANSTO, build greater transparency in information handling practices, ensure legislative compliance and foster a culture of respect for privacy and the value of personal information. To achieve this aim, ANSTO has a documented privacy management plan which identifies specific, measurable privacy goals and targets and sets out how ANSTO will meet its compliance obligations under the APPs. ANSTO has appointed both a Privacy Champion and Privacy Officer to ensure our aims are given the required priority and oversight.

ANSTO also conducts privacy impact assessments for all high-risk privacy projects, regularly reviews and updates its privacy practices, procedures and systems to ensure their currency and adequacy for the purposes of compliance with the APPs and monitors compliance with its privacy practices, procedures and systems. ANSTO is actively enhancing internal privacy capabilities including providing appropriate privacy education and training to all staff who have access to personal information.

## Parenting career phase

For staff members who are or become parents, ANSTO is committed to ensuring that our staff are supported during the parenting phase of their careers.

We see this phase as a valuable period of skill development, and are committed to supporting and partnering with employees during this time. Ways that we do this include, but are not limited to:

- Generous maternity/parental paid and unpaid leave
- Flexible working options
- On-site childcare centre at Lucas Heights
- Family room
- Three weeks of sick/carers leave per year
- The Parenting Toolkit to assist managers and employees plan this career phase
- Seamless backfill replacements for staff going on parental/maternity leave

- Support to staff members providing care to others, with flexible work arrangements and leave available to all those balancing work and caring responsibilities.

## Phased retirement

ANSTO recognises the knowledge, skills and expertise held by mature-age employees, and the contribution they make to the Organisation. Managers are working with these employees to ensure effective transfer of knowledge that is critical to the business. We therefore offer a range of phased retirement options, including reducing hours to part time work, mentoring, community involvement and other flexible working arrangements to assist employees' transition into retirement.

## Supporting employees in periods of difficulty

ANSTO is committed to ensuring all employees feel safe and supported in our workplace. We encourage any employee at risk of, or experiencing, domestic and family violence to feel comfortable seeking support from ANSTO and the Employee Assistance Program.

ANSTO:

- provides affected employees with a safe space, support networks and leave entitlements when dealing with domestic or family violence
- promotes flexible work practices at all levels in the Organisation to support employees with family or other caring responsibilities and create an equal opportunity environment
- provides information on support services and options for managers, colleagues and individuals that may be affected by, or at risk of being affected, on how to respond effectively and assist with minimising the impacts of the violence as much as possible.

Our commitment in this area is underpinned by ANSTO's Domestic and Family Violence Policy.

## Healthy minds, healthy bodies and occupational rehabilitation

ANSTO continues to provide a campus physiotherapy service as part of early intervention for injury management and return to work programs, as well as a fully functioning Occupational Health Centre with a registered nurse and fully functioning treatment room (Monday to Friday). The Occupational Health Centre is audited annually through the 9001 and 45001 WHS audit process. ANSTO's performance in the area of occupational rehabilitation continues to be strong as demonstrated with the continued adherence to the Rehabilitation Management System (RMS), *Safety, Rehabilitation and Compensation Act* 1988 and the ongoing commitment to ensuring the timely access to appropriately qualified experts that strive to achieve great outcomes for ANSTO personnel during times of illness or injury. The effectiveness of the RMS continues to be the focus of the ANSTO Senior Leadership and delegates who continue to demonstrate a strong commitment to providing personnel with an effective program that promotes the timely access to best practice evidence-based medical services, that aligns with the principles of natural justice and regard for the individual.

ANSTO has a number of programs and facilities that support mental and physical health including:

- Annual flu vaccines
- Women's and Men's Health Screening Program
- Bowel screening programs
- Lunchtime sporting activities
- Flexible work arrangements
- Running Club
- Toastmasters
- Social Club
- Quit smoking support
- Employee and Manager Support Program with psychologists (Employee Assistance Program service)
- KPMG Fair Call Hotline
- Mindfulness seminars and tools
- Bushcare
- LGBTQI+
- Prayer and Family rooms.

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

## Environmental protection

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

ANSTO's commitment to environmental protection and sustainability principles is defined in its corporate strategic plans, Environmental Policy and organisational core values and is reflected in the logo. 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 continuing to apply the principles of Ecologically Sustainable Development (ESD) and by the prevention, minimisation and control of pollution.

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 at all levels of the Organisation.

Environmental protection is mandated when planning and undertaking major capital works and any proposed activities which may fall under the *EPBC Act* are assessed for referral to the Department of the Environment and Energy. 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 via inductions, the staff intranet, training and communication programs.

## Environmental and quality management systems

To provide assurance that ANSTO is maintaining appropriate environmental protection and management practices we maintain an environmental management system (EMS) that is certified to the International Standard ISO 14001 for all three sites including the ANSTO Nuclear Medicine facility which became operational in 2019.

The EMS is a framework that allows ANSTO to achieve its environmental goals through consistent review, evaluation, and improvement of our environmental performance and operations. This standard requires that:

- The environmental context of the Organisation and its operations is defined;
- The environmental impacts and compliance obligations are identified, with the risks managed and mitigated;
- An effective measurement and review system is in operation; and

- There is organisational commitment to continual improvement.

Our extensive environmental monitoring program also operates within a quality framework that is certified to the ISO 9001 standard for Quality Management Systems.

The ANSTO EMS Strategy is currently being re-evaluated against a new suite of key performance indicators, targets and action plans and a revised EMS strategy is being developed for 2020-2021 onwards which will place further emphasis on understanding ANSTO's environmental footprint while improving the efficiency of our resources consumption, ensuring the minimisation of future pollution risks while delivering sustainable facilities across ANSTO Campuses in Melbourne and Sydney. The Executive Committee *for Workplace Health & Safety and Environment* supports the implementation and provides oversight to the EMS.

## Environmental performance

ANSTO aims to improve the efficiency of its resource consumption while maintaining industry best standards for environmental standards. ANSTO measures and monitors the generation of waste and the consumption of resources such as hydrocarbon fuels, paper, electricity and water. ANSTO reduces its environmental footprint through initiatives such as recycling consumables and applying procurement sustainability principles to minimise our resource consumption. ANSTO monitors and annually reports its carbon footprint through the National Greenhouse and Energy Reporting (NGER) Scheme and participates in the Sustainability Advantage Program run by the NSW Office of Environment and Heritage for which we were awarded a silver partnership award in 2019-2020. A program to assess the biodiversity within ANSTO's Lucas Heights Bushland Perimeter has continued to deliver improvements in the eradication of invasive weed and pest species.

The performance indicators in Table 1 highlights just some of the data that is collected and monitored. Resource use figures incorporate all three campuses. Due to the COVID-19 pandemic which saw remote working conditions come into effect in quarter four and a resultant drop in staff present on site, the resource usage data for 2019-2020 is reflecting different trends than in previous years. The electricity data shows that over the past four years ANSTO's total electricity consumption has been increasing incrementally, however following COVID-19 events, energy consumption in 2019-2020 dropped by 4.2 per cent overall. ANSTO continues to look for electricity savings as per the previous sustainability program introduced in 2017. However, expanded infrastructure on site, return to work conditions and hotter than normal summers are expected to impact electrical consumption in future years. Examples of where ANSTO invests in renewable energy includes pathway and streetlights using standalone integrated solar photovoltaic battery storage systems and solar hot water and electricity. Currently all purchased electricity is from non-renewable sources.

**TABLE 1. ENVIRONMENTAL PERFORMANCE INDICATORS FOR ANSTO SITES**

| Resource Usage | Units | 2015-2016 | 2016-2017 | 2017-2018 | 2018-2019 | 2019-2020 | Change on previous year |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Electricity | GWh | 67.2 | 66.6 | 67.2 | 68.5 | 65.6 | -4.2% |
| Water | $m^3$ | 315,694 | 320,369 | 318,438 | 323,898 | 364,169 | +12.4% |
| Passenger vehicle petrol and diesel | L/100km | 8.98 | 8.65 | 8.26 | 8.20 | 8.79 | +7.2% |
| **Waste Water Discharged to Sewer** (1) | | | | | | | |
| Lucas Heights | $m^3$ | 89,235 | 103,024 | 75,916 | 76,711 | 87,676 | + 14.3% |
| Camperdown | $m^3$ | 6.2 | 9.3 | 14.9 | 7.7 | 21.3 | +176% |
| **Landfill and Recycled Waste** (2) | | | | | | | |
| Waste sent to landfill | tonnes | 226 | 237 | 259 | 308.7 | 274.0 | -11.2% |
| Recycled cardboard + paper | tonnes | 22.3 | 85.5 | 114 | 130.5 | 121.9 | -6.6% |
| Recycled co-mingled containers | tonnes | 5.9 | 16.7 | 18.2 | 20.5 | 14.3 | -30.2% |
| Other recycled streams (3) | tonnes | 19.8 | 12.9 | 24.8 | 31.5 | 10.9 | -65.4% |
| **Landfill diversion rate** | **%** | **17.5** | **33.2** | **37.7** | **37.1** | **33.2** | **-10.5%** |

Notes:

1. Authorised discharges of trade waste water to the Sydney Water sewer (not applicable to Clayton site).
2. Data for the Lucas Heights site only (includes tenants); end-point disposal information is not currently available for recycling at the Camperdown and Clayton sites.
3. Other recycling streams include batteries, ferrous and non-ferrous metal, gardening and E-waste.

In 2019-2020 the Lucas Heights campus received 1084 mm of rainfall, which is higher than the thirty year average. However, temperatures over the summer period were higher than average and as a result, a significant level of irrigation was required across the campus. This was partly offset by utilising the rainwater capture system and communications to staff highlighting the ongoing need to use water efficiently.

ANSTO's landfill diversion rate was lower by 10.5 per cent compared to the total waste being diverted from landfill in previous years. The 11.2 per cent decrease in the total amount of waste going to landfill is attributed to lower staffing levels during the last quarter and less construction activity occurring on site compared to previous years. ANSTO continues to recycle ferrous metals, garden waste, concrete, batteries, toner cartridges, mobile phones and redundant computer and other electrical equipment. Many business units within ANSTO have set up recycling stations for alternative reuse/recyclable waste streams such as soft plastics, coffee grounds and compostable food scraps. Waste segregation and recycling will continue to be a focus for new environmental strategies.

During 2019-2020 the amount of paper consumed decreased by 6.6 per cent. This positive outcome in reducing resource use is partly due to COVID-19 events seeing a reduced staff presence on site, as well as a positive transition to electronic formats with less paper being consumed. The recycled paper content of print stock has increased to over 20 per cent. There was an increase of 14.3 per cent to the amount of wastewater discharged via the sewer system, due to ingress of stormwater during multiple high rainfall events in February.

## Environmental monitoring program

ANSTO conducts an extensive effluent and 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 website. Many of the monitoring results are independently verified.

Due to working restrictions as a result of the COVID-19 pandemic, it was necessary to apply a risk-based approach to delivery of the planned environmental monitoring program. The scope of sampling activities was subsequently reduced for the April-June quarter, allowing critical resources to be applied to emission monitoring for ANSTO's essential operations, including the OPAL reactor and radiopharmaceutical production facilities. This approach was accepted by the nuclear regulator, ARPANSA, and three quarters of the scheduled monitoring program was delivered in 2019-2020.

Results of the environmental monitoring conducted in 2019-2020 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, wildlife or the environment.

**Good water quality**

Storm water runoff from the Lucas Heights site does not contribute to any public drinking water supply, however ANSTO regularly monitors radioactivity levels in stormwater leaving the site, as well as sampling the nearby Woronora River. Results show that concentrations of tritium in local waterways have decreased

significantly since the HIFAR reactor closed in 2007, and are well below the level considered safe for drinking water by the World Health Organisation. 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 level of 0.5 Bq/L for alpha and beta radioactivity set out 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. Groundwater from the Lucas Heights site contains only naturally-occurring radionuclides and low levels of tritium. Groundwater near underground fuel storage tanks is analysed for petroleum hydrocarbons to check for evidence of leaks from the tanks, however no leaks have been detected to date.

**Authorised discharges within limits**

Liquid effluent discharged from ANSTO's NSW sites into the sewer system complied with the radiological and/or chemical concentration acceptance limits for trade wastewater set by the Sydney Water Corporation. Compliance with these limits ensures that liquid effluent discharges meet 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 website. The weather data for Lucas Heights are also available on ANSTO’s website and published by the Bureau of Meteorology on the Lucas Heights Weather Observations page.

ANSTO continues to report annually to the Energy Efficiency in Government Operations (EEGO) and National Greenhouse and Energy Reporting (NGER) programs; the data are aggregated and disseminated by the Department of Industry, Science, Energy and Resources.

All staff are encouraged to report early and often on any potential or actual safety and environmental incidents. All incidents are subsequently investigated, actioned and mitigation controls evaluated for effectiveness via ANSTO’s reporting system.

**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, aside from the packaging process and building footprint.

Liquid wastewater comprising mainly sewage with some trade waste is 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 Cronulla wastewater treatment plant and is ultimately discharged to the ocean at Potter Point. Analyses of marine biota (fish, seaweed and barnacles) from Potter Point confirmed that wastewater from ANSTO has a negligible effect on the local marine environment.

ANSTO continues to support a national approach to safe waste management, including the establishment of a National Radioactive Waste Management Facility.

## Little Forest Legacy Site

ANSTO is responsible for the Little Forest Legacy Site (LFLS) located within the 1.6 km bushland perimeter. 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 1960s 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 publicly available and confirm that the site is being safely managed.

The site is subject to a licence issued by ARPANSA and is managed by ANSTO on behalf of the Government. ANSTO has established a steering committee for the ongoing management of LFLS and continues to conduct detailed scientific studies of the 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

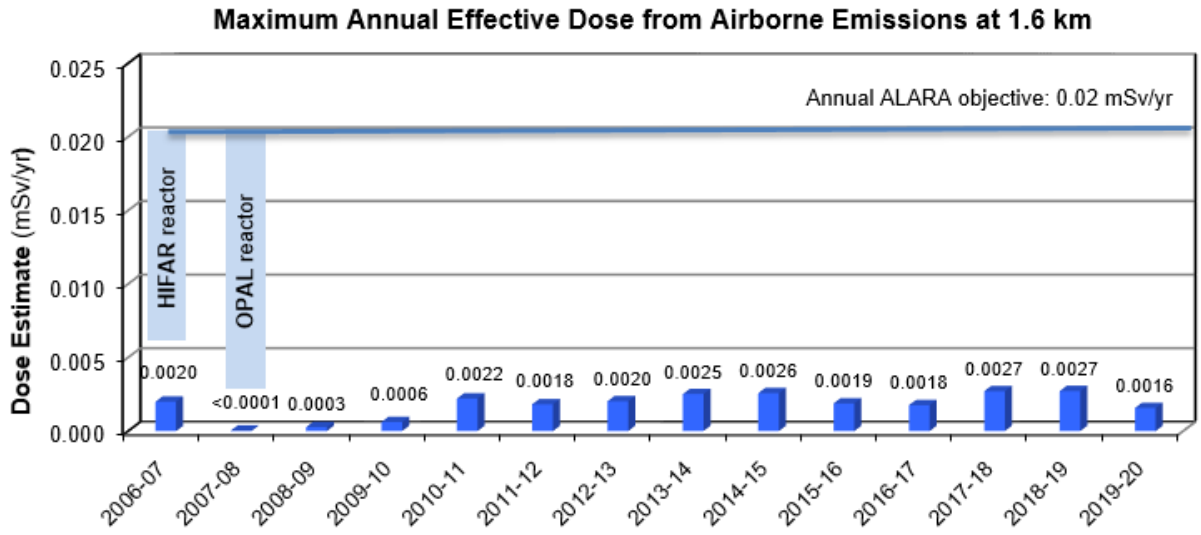
Environmental gamma radiation levels are continuously measured by thermoluminescent dosimeters at the Lucas Heights site and averaged 1.4 millisievert (mSv) for 2019-2020. The environmental dose recorded in surrounding suburbs was also at normal background levels with an average of 1.4 mSv/yr. The dose recorded at the Cronulla wastewater treatment plant was lower at 0.85 mSv/yr, which is typical for this location which is partially shielded. The national average natural background radiation dose is 1.5 mSv/yr*.

Studies carried out for ANSTO's liquid effluent discharges to sewer have confirmed that the radiological risk to 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 airborne emissions 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

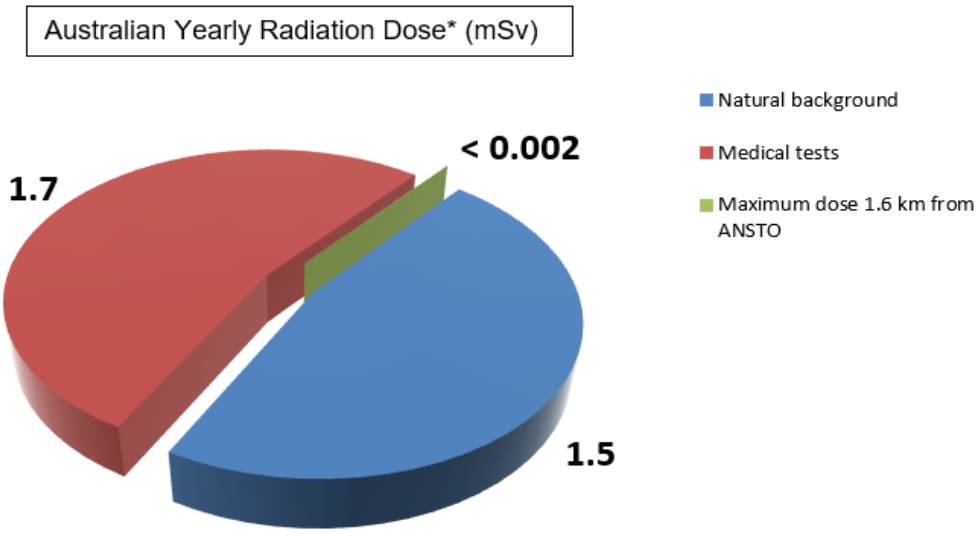
residents from ANSTO's airborne emissions in 2019-2020 was calculated to be 0.0016 mSv. This is less than 0.2 per cent of the annual public dose limit of 1 mSv established by ARPANSA.

**FIGURE 1: MAXIMUM ESTIMATED ANNUAL EFFECTIVE DOSE FROM LUCAS HEIGHTS AIRBORNE DISCHARGES AT THE BOUNDARY OF ANSTO'S 1.6 KM BUSHLAND PERIMETER ZONE, JULY 2006 TO JUNE 2020.**




Doses from ANSTO's airborne emissions in 2019-2020 also remained well below the 0.02 mSv 'as low as reasonably achievable' (ALARA) performance objective despite increased production of beneficial medical isotopes (**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: THE AVERAGE ANNUAL DOSE RECEIVED BY AUSTRALIANS FROM VARIOUS SOURCES* COMPARED TO THE MAXIMUM POTENTIAL AIRBORNE DOSE TO ANSTO'S NEAREST RESIDENTS IN 2019-2020.**




*Source: ARPANSA Fact Sheet http://www.arpansa.gov.au/pubs/factsheets/IonisingRadiationandHealth.pdf

## Radiological protection of wildlife

A screening assessment was performed in 2018 to investigate the potential dose rates received by local wildlife from radiological effluent releases associated with operations at the Lucas Heights site, including expected releases from the ANM Mo-99 Manufacturing Facility.

The assessment applied the methodology laid out in ARPANSA Guide: *Radiation Protection of the Environment*, which is consistent with current international best practice approaches. Dose assessments were performed for a range of terrestrial and marine organisms using conservative radioactivity concentrations for the air and water exposure pathways (determined from routine stack monitoring of airborne emissions and liquid effluent releases to sewer).

Even using a very conservative approach, the potential dose rates to all organisms were below the lowest international benchmark for potential harmful effects (10 µGy/hr). These results were consistent with previous studies that concluded there are no significant impacts to wildlife from ANSTO's operations.

## Managing the ANSTO bushland perimeter

At its Lucas Height campus, ANSTO manages a section of land with an area over ~450 ha within the 1.6 km bushland perimeter in accordance with the ANSTO Bushland Perimeter Plan of Management. This area comprises the Lucas Heights Science and Technology Centre, a number of legacy waste disposal sites and approximately 350 ha of undeveloped native bushland and riparian zones. A qualitative review of the biodiversity potential of the ANSTO Bushland Perimeter assessed 110 sample sites against benchmark criteria for the different vegetation communities, such as native species diversity and density, connectivity,

soil exposure and weediness. The results of this assessment are being used to prioritise management actions for the ANSTO Bushland Perimeter Plan of Management including: revegetation and rehabilitation works, stormwater system upgrades, and weed management programs. This assessment will form the baseline for future assessments utilising the same benchmark criteria to evaluate improvement programs and any ongoing impact of ANSTO's operations on the surrounding environment.

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. An ANSTO staff bush care group meets regularly to target at-risk locations. The work of this group has seen the eradication of noxious weed species such as Crofton Weed, Cotton Bush, African Love Grass and Cassia from over two hectares of riparian vegetation within the ANSTO Bushland Perimeter. Annual hazard reduction burns are planned in consultation with NSW Rural Fire Services and ANSTO also engages with the local Dharawal Indigenous Group to identify and protect areas of cultural importance within the ANSTO Bushland Perimeter.

## Referrals under the EPBC Act

Within this reporting period ANSTO did not submit any new referrals under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC). Construction activities for the expansion of the solid low-level waste facility and the ANM Mo-99 Manufacturing Facility at the Lucas Heights site were completed in 2018-2019, and construction of SYMO continued.

Regular independent inspections have been undertaken throughout the projects to evaluate conformance with the environmental commitments made by ANSTO in the referrals.

## Mitigating environmental impacts

ANSTO encourages staff to cycle, carpool or take public transport to travel 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 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 while minimising the procurement of new equipment.

ANSTO's chemical management system enables staff in different business areas to share and track chemical resources, which will reduce the need to procure new chemicals. ANSTO is also utilising the system to better determine its reporting requirements under the National Pollution Inventory and to improve the identification and control of environmentally hazardous chemicals.

New IT systems and solutions including digital authorisations continue the transition to a paperless office which reduces power and paper consumption. Many functions such as budgeting, business planning, procurement, maintenance, recruitment, on-boarding, training and waste transfers are now managed through online user interfaces.

ANSTO has adopted an integrated approach to planning and decision-making across the business, to optimise the management of all that we do. By managing its people, resources, and infrastructure more effectively, ANSTO aims to increase productivity thereby enhancing the environmental sustainability of our operations.

## Accordance with ecologically sustainable development (ESD) principles

Ecologically sustainable development (ESD) is embedded in ANSTO's core values. The ANSTO Building Code (ABC) provides the minimum standard that new facilities at ANSTO must conform with. Within the ABC, the principles of ESD are mandated through the requirement for all new and refurbished buildings to have an independent ESD consultant involved in the design, achieve a target minimum 4.5 star National Australian Built Environment Rating System (NABERS) rating and comply with the requirements for the Energy Efficiency in Government Operations (EEGO) Policy. Furthermore, minimum standards for the efficient use of water in offices and laboratories, installation of rainwater tanks, re-use of waste water and sub-metering are enforced through the ABC.

ANSTO has integrated environmental protection into management processes by requiring project/construction environmental management plans (P/CEMP) at the project planning phase. All capital projects such as construction of buildings, infrastructure and support facilities must have P/CEMP in place to prevent environmental impacts such as soil erosion, dust, noise and discharges to stormwater. Independent oversight of these projects includes the approval of P/CEMPs, ad hoc inspections and formal audits.

ANSTO is also moving to more sustainable procurement practices. 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, water resource management, wetland health, biodiversity, food provenance, climate variability and global warming impacts such as rising sea levels and temperatures on marine 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 the International Partnership on Non-Proliferation, Disarmament and Verification. ANSTO also collaborates with bodies such as the International Atomic Energy Agency and the Comprehensive Test Ban Treaty Organisation.

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.

# Work Health and Safety Act 2011, Australian Radiation Protection and Nuclear Safety Act 1998

## High reliability – Safety at ANSTO

ANSTO provides a safe and healthy workplace for all workers and other persons under its control, through planned strategies to prevent death, work-related injury and ill health. We are each responsible for our own safety, that of our colleagues and of the public.

Through core values, ANSTO's senior leadership is committed to delivering excellence in our Work, Health and Safety (WHS) performance. ANSTO remains committed to our overriding safety goal of 'zero tolerance for harm to anybody, anywhere, anytime.' Leadership is an important aspect in achieving continuous improvement in safety. The Executive Work, Health and Safety and Environment (WHSE) Committee includes all members of the ANSTO's Group Executive as well as ANSTO's Chief Nuclear Officer. The committee is responsible for providing oversight and setting direction on behalf of the ANSTO Executive for safety and environment strategies, initiatives, incident management processes targets and reporting. They provide continued leadership and oversight by monitoring site-wide risks and learning from incidents that had the potential of a major impact to people, plant/equipment and environment and by endorsing key safety-related projects and initiatives.

ANSTO continued to explore the integration of complementary functions and the sharing of key information during 2019-2020. The High Reliability team provides the safety expertise that supports ANSTO in delivering organisational excellence in safety, ensuring compliance to all regulatory safety requirements whilst promoting the use of best available techniques and practices to deliver a highly reliable organisation. The group provides best practice support of high quality work and services to its customers, by well-respected high calibre staff, enabling ANSTO to deliver outcomes in a safe and reliable manner. Functions within the group include Radiation Protection Services (RPS), Work Health and Safety (WHS), Emergency Management (EM), Health and Hygiene, Operational Sustainability and Continuous Improvement. The broad range of skills and expertise explicit in the group is in response to the varied portfolios of high hazard activities undertaken at ANSTO. ANSTO has eight distinct divisional activities, geographically located across three campuses, each with its prevailing circumstance requiring a tailored approach to safety due to the hazard profile and business outcomes required. ANSTO is also built upon a strong organisational governance and compliance foundation. The hierarchy of safety responsibility at ANSTO is shown in Figure 3.

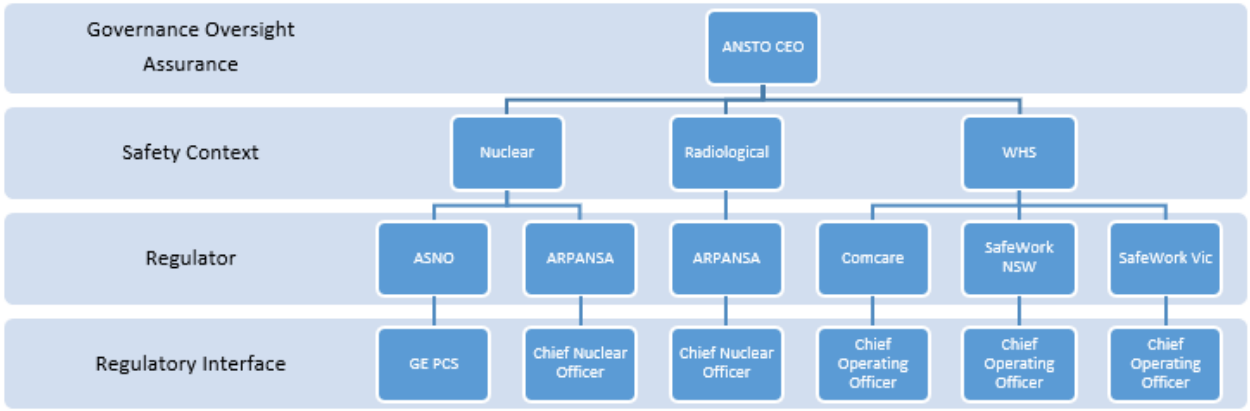



Figure 3: Hierarchy of safety responsibility and regulatory interface

## Strategy

The ANSTO Work Health and Safety Strategy 2018-2022 (the strategy) establishes key objectives and actions for the continuous improvement of safety performance at ANSTO. The Strategy adopted four key objectives:

1. Our workers will be value driven, prepared, trained, aware and engaged;

2. Our workplaces will be managed on a risk informed basis, fit for purpose, reviewed, maintained, compliant and cover all areas where our people work;

3. Our systems, processes and initiatives will be integrated and of high integrity, enabling, informing, measurement based and validated;

4. Our stakeholders will be engaged to improve WHS performance.

To achieve these objectives a number of actions have been identified and are being monitored by the WHSE Committee.

## Occupational hygiene

Occupational hygiene focuses on the risk management of health hazards in the workplace by measuring potential exposure to chemical, physical and biological hazards to assist in the design and implementation of control strategies to prevent ill health to workers.

ANSTO has implemented an occupational hygiene monitoring program that assesses exposure risks to current and legacy hazards in line with the legislative requirements. This function provides support across ANSTO operations and projects by characterising and assessing the risks of these hazards. During 2019-2020 this program has been expanded to include additional monitoring of other high risk chemicals according to the Globally Harmonised System of classification and labelling of chemicals (GHS).

The Health & Wellbeing Centre and Occupational Hygiene have been working closely to ensure ANSTO's health assessment activities are risk based and fit for purpose. A part of this is ensuring that our people are equipped with equipment that is fit for purpose.

The hazards register continues to be a communication tool that lists known hazards, building information and corporate knowledge. ANSTO has an increasing need to record, trend and analyse health-related data. A software solution (Cority) will be implemented during 2020. This project has the objective to record, manage, track and trend this important information for occupational hygiene, medical/health and rehabilitation.

## Key WHS achievements

The key WHS achievements for 2019-2020 for the Organisation are:

1. Ongoing Accreditation of all ANSTO campuses (NSW and Victoria) to ISO 45001 - Occupational Health and Safety Management Systems.
2. The implementation of Safety Conversations that aim to promote a positive safety culture and by engaging workers in two way communication about workplace safety.
3. Conservative approach in the preparation of the Lucas Heights Campus for the first ever Catastrophic Fire Danger days in NSW by closing the campus to all staff not required for essential operations.
4. Response to the evolving COVID-19 global pandemic with the implementations of alternate working arrangements and controls in a changing environment. This resulted in no positive COVID-19 cases recorded for ANSTO staff.
5. Capital projects, major shutdowns and maintenance tasks were delivered without significant injuries or requiring regulatory intervention.
6. The ANSTO influenza vaccination program was expanded this season in light of the COVID-19 pandemic to assist in protecting the health of our workers.

## Safety awareness

All workers are continually engaged and informed through a risk-based WHS focus program combined with safety alerts. The ANSTO STAR (Stop Think Act Review) Safety Essentials were launched in January 2020 as the Safety Focus program for 2020. The program provides information on how staff can manage the safety risk of ten key areas. These ten key areas set out the minimum requirement for ANSTO staff to manage safety risks. In 2019-2020 the areas were electrical safety, confined space work, contractor management, mental health and wellbeing during COVID-19 and radiation protection.

Key WHS alerts during 2019-2020 included: welding fumes, lessons learnt from electrical near miss incident, lessons learnt from falling object near miss incident and working with hazardous chemicals.

In Australia, October is National Safe Work Month, a time for organisations to make their commitment to improving safety and health in their workplace. The theme of this year's program was Mind, Body Role, a total employee health approach focusing on the overall health, safety and wellbeing of workers and their families. This approach provides a gateway to a range of benefits and initiatives designed to support workers in developing psychological, physical and emotional wellbeing.

## Health and wellbeing of our people

The ANSTO Occupational Health and Wellbeing Centre provided advice, services and a comprehensive health program to workers throughout the 2019-2020 financial year. The Centre is staffed by one Occupational Health Nurse role and a Rehabilitation Case Advisor role supported by a contracted Physiotherapist and Occupational Physician. The health programs included men's and women's health, influenza vaccinations, travel and work immunization, workplace conditioning programs, ergonomic and work station assessments and mental health first aid. The Occupational Health and Wellbeing Centre is a central point of support for all aspects of workers' health.

The ANSTO Occupational Physician, Occupational Site Nurse and Radiation Protection Services Manager attended specialist training in emergency preparedness and medical management of radiation incidents at the Radiation Emergency Assistance Center/Training Site in the United States. This training provided industry best practice in response to radiation medical emergencies.

The quarterly ANSTO Health and Well Being Newsletter continued throughout 2019-2020 providing practical health guidance for workers and their families

The engagement of a health care provider closer to the Clayton Campus has been well received by workers. The Valewood medical clinic has engaged with Clayton workers providing an effective and convenient service.

The early intervention strategies implemented by the ANSTO Health Centre continue to support the timely return of workers to pre-injury duties and keep workers engaged with ANSTO during the treatment and rehabilitation processes. The program focuses on providing early assessment and treatment to reduce the consequences of all injuries regardless of an accepted worker's compensation claim. This has proved successful in meeting ANSTO's goal of returning workers to normal duties as productive team members as soon as possible. The ANSTO rehabilitation program continues to be compliant with the requirements of the *SRA Act* demonstrating effective procedures and programs are in place.

## Workers' compensation

The ANSTO premium is dependent on the aggregate premium pool (the total premium to be charged across all Commonwealth agencies) and ANSTO's claim performance. ANSTO premiums are summarised in **Table 6**.

**TABLE 6: ANSTO WORKERS' COMPENSATION PREMIUMS**

| Financial Year | ANSTO Premium |
|---|---|
| **2016-2017** | $826,655 |
| **2017-2018** | $736,528 |
| **2018-2019** | $574,523 |
| **2019-2020** | $1,017,560 |
| **2020-2021** | $795,665* |

* This is ANSTO's indicative premium for 2020-2021 plus the regulatory contribution of $115,998. Comcare have highlighted that as a direct result of the unprecedented events of COVID-19, the Comcare premium fund will be impacted and due to this uncertainty it is expected that the indicative premium amount will change.

## Regulator engagement - Comcare

The main Safety Regulator that ANSTO engages with for WHS oversight is Comcare.

ANSTO continued to work closely with Comcare during 2019-2020, with Comcare representatives visiting ANSTO campuses, gaining additional insights into ANSTO. These visits gave ANSTO insight into best practice activities and allowed us to gain a better understanding of the role of the regulator. This resulted in improved work health and safety outcomes for the business and key projects. Comcare continued to provide support, information and guidance regarding WHS legislative requirements to ANSTO.

ANSTO is required to report incidents to Comcare under the section 35 of the *WHS Act*. This section defines a notifiable incident as:

- the death of a person, or
- the serious injury or illness of a person, or
- a dangerous incident.

During 2019-2020 eight incidents were notified by ANSTO to Comcare outlined in **Table 7**.

### Table 7: Summary of incidents notified to Comcare

| Month of Incident | Description | Location |
|---|---|---|
| **October 2019** | Serious Injury: Injured while playing approved site sport (football) | Soccer field |
| **October 2019** | Dangerous Incident: Uncontrolled escape of a pressurised substance: small section of compressed air supply hose ruptured. | Australian Synchrotron (Main Building Technical Floor) |
| **October 2019** | Serious Injury: Contractor's finger hit by falling formwork resulting in a fracture. | SYMO construction site |
| **November 2019** | Dangerous Incident: Fall or release from a height of any plant, substance or thing. Brick fell from stair landing to area below. | Building 23 |
| **November 2019** | Dangerous Incident: Uncontrolled escape of a gas: Release of hydrochloric and Chlorine gases during a dissolution in a fume cupboard. | Building 21E |
| **November 2019** | Dangerous Incident: Electrical Shock: a worker experienced an electric shock when touching an aluminium trolley/rack that carried electrical laboratory equipment. | Australian Synchrotron (Main Building Technical Floor) |
| **March 2020** | Dangerous Incident: Uncontrolled escape of a pressurised substance: During the operations of an autoclave, the bursting disc activated causing a release of steam. The venting pipe moved discharging the steam towards the wall behind the equipment. | Building 21B |
| **April 2020** | Comcare were notified when an employee of ANSTO was found deceased on a walking trail in the land opposite the ANSTO Lucas Heights Campus. The deceased died from an undiagnosed medical condition that was not work related. | Bushland perimeter |

An ANSTO Contractor also notified Comcare and SafeWork NSW when asbestos air monitoring being performed during non-friable (bonded) asbestos removal work detected fibres above the action limit for respirable fibres. The monitoring results confirmed that the fibres were not indicative of asbestos above the action limit. The How to safely remove asbestos Code of Practice, SafeWork Australia (view code at https://bit.ly/2S2PjOJ), requires licensed asbestos removalists to take certain action depending on the respirable fibre levels measured. The action level dictates what controls and actions need to be implemented.

Comcare also received an anonymous complaint of bullying and psychological hazard in an ANSTO workplace. Comcare found that ANSTO complied with their duties under the *WHS Act* and Regulations.

## Training

ANSTO offers training in a range of work, health and safety related subjects to all workers. WHS training courses aim to provide the necessary information, instruction and skills to workers to assist them in meeting their legislative responsibility and to undertake work without risk to themselves, others and the workplace.

## Incidents

The ANSTO Incident Management System consolidates operational, environmental and safety incidents and any associated actions into one location. The system has allowed for improved trending and data analysis for safety-related incidents which has supported evidence-based decision making. The primary focus of the ANSTO investigation process is to determine what caused the incident and ensure the appropriate response and controls have been adopted in each case to prevent a reoccurrence.

Workers are encouraged to report all incidents following ANSTO's 'No Blame – Full disclosure' principle. ANSTO continues to promote the reporting of all incident types. Refer to **Table 8**. The upward trend in reports indicates a strong reporting culture.

**TABLE 8: NUMBER OF INCIDENTS (SAFETY, OPERATIONAL AND ENVIRONMENTAL) REPORTED PER YEAR.**

| Year | Number of Incidents |
|---|---|
| **2016** | 938 |
| **2017** | 933 |
| **2018** | 1296 |
| **2019** | 1278 |
| **2020** | 1055 |

The ANSTO Incident Management System continues to provide enhanced analysis and trending of incidents including both leading and lagging incident types. Leading incidents are those where there has been no impact to people, facilities or equipment this includes Near Misses/Hits, Hazards and Observations. Lagging incident types have had an impact to people, facilities or equipment and they include injuries, and

exposure to chemicals, biological agents and radiological materials. ANSTO continues to measure Opportunities for Improvement (OFI) as a leading safety measure of ANSTO's incident reporting culture.

In 2019-2020 the majority of incidents reported were leading incident types which is reflected in the OFI of 68 per cent. This is compared to OFIs of 73 per cent (2018-2019), 71 per cent (2017-2018), 80 per cent (2016-2017) and 82.5 per cent (2015-2016).

ANSTO staff are encouraged to report all types of incidents, with 44 per cent of incidents being near hits/misses or hazards/observations. All safety incidents are allocated an actual and potential impact rating. The potential impact rating identifies the 'worst case scenario' of the incident. The majority (72 per cent) of reported safety incidents had a potential impact rating of low significance or minor.

The high reporting rate, especially of OFI and low significant/minor incidents highlights an ongoing positive reporting culture.

## Lost shift and lost time injuries

Lost Shift Injury Frequency Rate (LSIFR) and Lost Time Injury Frequency Rate (LTIFR) are a safety performance measure at ANSTO that are used to separate serious injuries (LTI) from less serious injuries (LSI). These measures relate to injuries that required time taken off work and do not reflect the impact the injury has had on the worker (Refer **Table 9**).

**TABLE 9: LOST SHIFT AND TIME INJURY FREQUENCY RATES**

| Year | LSIFR | LTIFR |
|---|---|---|
| **2016** | 1.0 | 0.5 |
| **2017** | 4.2 | 0.9 |
| **2018** | 1.4 | 3.2 |
| **2019** | 2.3 | 0.9 |
| **2020** | 6.0 | 0 |

In 2019-2020 there were 13 Lost Shift Injuries and no Lost Time Injuries. Staff who exceeded the annual dose limit mentioned above were re-allocated alternate responsibilities on site.

Lost Shift injuries are injuries where workers required less than five days off work; Lost Time injuries are injuries that required five or more days off work. This definition was adopted for benchmarking purposes to be in line with the Safe Work Australia definition of a serious compensation claim of an injury that requires in one working week or more off work.

The early intervention program managed by the ANSTO Health and Wellbeing Centre aims to minimise the time taken off for work related injuries and allows workers to return to work as early as possible.

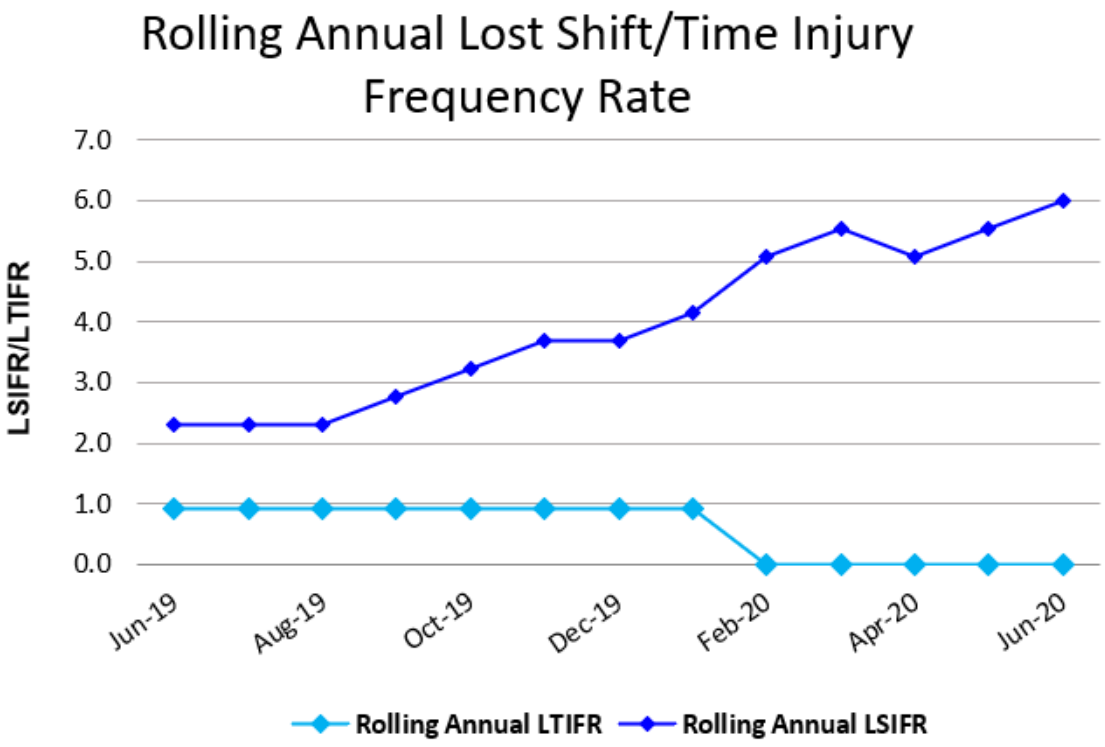
Lost Shift Injury Frequency Rate (LSIFR) and Lost Time Injury Frequency Rate (LTIFR) are a safety performance measure at ANSTO that are used to separate serious injuries (LTI) from less serious injuries (LSI). A LTIFR or LSIR is a frequency rate and refers to the number of lost time or lost shift injuries occurring

per one million hours worked. These measures relate to injuries that required time taken off work and do not reflect the impact the injury has had on the worker (Refer Table 9).

The average time taken off for each of the Lost Shift injuries was two days. The data in Table 9, indicates a downward trend in LTIFR's that require a longer period off work, primarily due to early intervention

The LSIFR/LTIFR is tracked over a 13 month period. In 2019-2020 there were 13 lost shift injuries recorded; eight of these were related to muscular stress. All these injuries were managed by the ANSTO Health and Wellbeing Centre through the early intervention program that allowed most of these workers to return to work within two days. Refer to Figure 5.

**FIGURE 5: ROLLING ANNUAL LOST SHIFT/TIME INJURY FREQUENCY RATE**



## Independent Safety Review of the ANSTO Health Approach to Occupational Radiation Safety and Operational Procedures

In June 2018 a review was conducted by a globally recognised panel of experts, following a directive issued to ANSTO by the regulator, ARPANSA.

The final report by the independent expert review team contains 85 recommendations in respect to ANSTO, to ARPANSA and to the Australian Government. ARPANSA approved ANSTO's Response to the Independent Review of the ANSTO Health Approach to Occupational Radiation Safety and Operational Procedures (Implementation Plan) in December 2019.

The ARPANSA Facility Licence for ANSTO Health was amended to require ANSTO to report to ARPANSA on the process of the Implementation Plan starting with a report for the last quarter of 2019 and then at six monthly intervals until all actions are completed to the satisfaction of the ARPANSA CEO. The reports will be submitted in January and July of each year. The first progress report, since the approval of the Implementation Plan in December 2019, was submitted in January 2020 outlining the governance model that would be followed. As at 30 June 2020, 32 recommendations had been closed by ANSTO.

## Emergency management

Emergency management is part of the business resilience framework that allows ANSTO to respond to disruptive incidents in a cohesive manner that is consistent with organisational objectives. ANSTO has adopted the Australasian Inter-Service Incident Management System (AIIMS) as part of an integrated approach to business resilience including emergency management. ANSTO's Emergency Operations are responsible for the management, coordination, preparation, resourcing and overall operational response for all ANSTO incidents and emergencies.

ANSTO is working to align and implement the requirements of the International Atomic Energy Agency (IAEA) Safety Standards Series No. GSR Part 7, Preparedness and Response for a Nuclear or Radiological Emergency (2015) and other related international guidance. The implementation of this plan has been monitored by ARPANSA as part of routine regulatory oversight.

ANSTO supports Nuclear Powered Warship visits to Australian ports under the Commonwealth Plan for Nuclear Powered Warship visits (OPSMAN 1) by acting as the Leader Radiation Monitoring Group and are the Commonwealth operational representative during a visit. ANSTO also advises the State or Territory on emergency responses during a radiological or nuclear emergency associated with the visit.

## Radiation safety

(*Australian Radiation Protection and Nuclear Safety Act 1998* and Regulations 2018)

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 medicine 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). Equivalent dose and effective dose are specific units used for radiological protection purposes.

ANSTO has a demonstrated capacity to safely manage its diverse set of nuclear activities. During routine operations, ANSTO workers and members of the public are exposed to very low levels of radiation. This low level of exposure is achieved through good management practices, which also allows the delivery of the significant societal benefit associated with ANSTO's nuclear activities.

The safety improvement focus remains on modifications to processes for identifying, assessing, managing and eliminating high hazard consequences from low probability incidents.

## Strategy

The ANSTO Radiation Protection Strategic Plan is used to strengthen ANSTO's high-performance culture. The four objectives of the plan are:

1. Improve radiation safety culture
2. Reduce radiological safety risks
3. Ensure continued regulatory compliance
4. Generate continuous improvement in radiological protection.

## Continuous improvement

ANSTO's safety culture is underpinned by a strong regulatory framework, which includes oversight by ARPANSA, the Therapeutic Goods Administration, Comcare and the ASNO. ANSTO will continue to engage with its Commonwealth and State regulators and other Commonwealth agencies to ensure regulatory requirements are met. The Organisation will also continue to identify opportunities for continuous improvement that not only make a positive contribution to ANSTO's safety culture, but also to its commercial operations and research endeavours.

ANSTO plans to deliver a continuous improvement program that will focus on holistic improvement across all areas of the Organisation through the facilitation of strategic programs in partnership with local management. The target area will be radiological condition awareness that will enhance workers' skills in radiological monitoring and assessing its significance and understanding of local hazards through ownership of enhanced reporting and investigation.

ANSTO is implementing strategies to more strongly align with national and international organisations, such as the International Atomic Energy Agency (IAEA), the UK Safety Directors Forum, the National Physical Laboratory (NPL), the Nuclear Energy Agency; and the International Commission for Radiological Protection (ICRP). One focus is developing ANSTO's nuclear baseline. These strategies will further improve ANSTO's radiological safety culture over the next two to four years and beyond. These international guides often exceed the requirements of the Australian legislation and will align ANSTO with international best practice

## Occupational exposures

According to the most recent data from ARPANSA, the average effective dose an Australian receives from natural background radiation (excluding medical sources) is 1.5 mSv per year. Federal, state and territory regulations require that a member of the public should receive no more than 1 mSv effective dose per year from radiation sources in addition to background radiation and medical procedures.

Effective dose in particular is a central feature of radiological protection. It sums up any number of different exposures into a single number that reflects, in a general way, the overall risk. The concept may be complex, but it makes radiological protection practical to implement.

The regulatory annual limits for radiation workers (Occupationally Exposed Persons) are:

- 20 mSv effective whole body dose (averaged over five years, with no more than 50 mSv in any one year);
- 20 mSv equivalent lens of the eye dose (averaged over five years, with no more than 50 mSv in any one year);
- 500 mSv equivalent dose to the skin;
- 500 mSv equivalent dose to the (hands and feet).

This is derived from recommendations made by the International Commission on Radiological Protection (ICRP 103) that have specified three basic principles for radiation protection, which are applied at ANSTO.

These principles are:

1. Justification of a Practice – All exposures to ionising radiation shall have a positive net benefit.

2. Optimisation of Protection – All exposures shall be as low as reasonably achievable (ALARA), taking into account economic and societal factors.

3. Dose Limitation – All exposures from planned exposure situations shall be less than the relevant statutory limit.

Limits are insufficient in themselves to ensure the best achievable protection under the prevailing circumstances, and both the optimisation of protection and the limitation of doses and risks to individuals are necessary to achieve the highest standards of safety.

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 exposures maintained. The monitoring results for the last five calendar years 2015-2019 (**Table 10**) show that radiation doses received by ANSTO workers remain significantly below regulatory limits. The graph in **Figure 6** compares maximum effective dose to a single worker and the average effective dose across all relevant ANSTO workers. **Table 11** shows the distribution of individual effective doses over the same five year period.

In 2019 the average effective dose across all ANSTO workers was 0.4 mSv. This is equivalent to receiving two chest x-rays[1] or flying from Melbourne to London and back three times.[2] It is also about 20 per cent of the average background radiation exposure received just from living in Australia.

1. https://www.iaea.org/Publications/Factsheets/English/radlife

2. https://www.arpansa.gov.au/understanding-radiation/radiation-sources/more-radiation-sources/flying-and-health

**TABLE 10: EFFECTIVE WHOLE BODY DOSE**

| ALL STAFF | Calendar Year | | | | |
|---|---|---|---|---|---|
| **Effective Dose** | **2015** | **2016** | **2017** | **2018** | **2019** |
| **Max. Individual Dose (mSv)** | 5.3 | 5.4 | 5.2 | 5.8 | 5.27 |
| **Average Dose All ANSTO Workers (mSv)** | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| **Collective Effective (Person-mSv)** | 463 | 529 | 546 | 369 | 351 |

**FIGURE 1: FIGURE 6: COMPARISON OF MAXIMUM AND AVERAGE EFFECTIVE DOSES.**

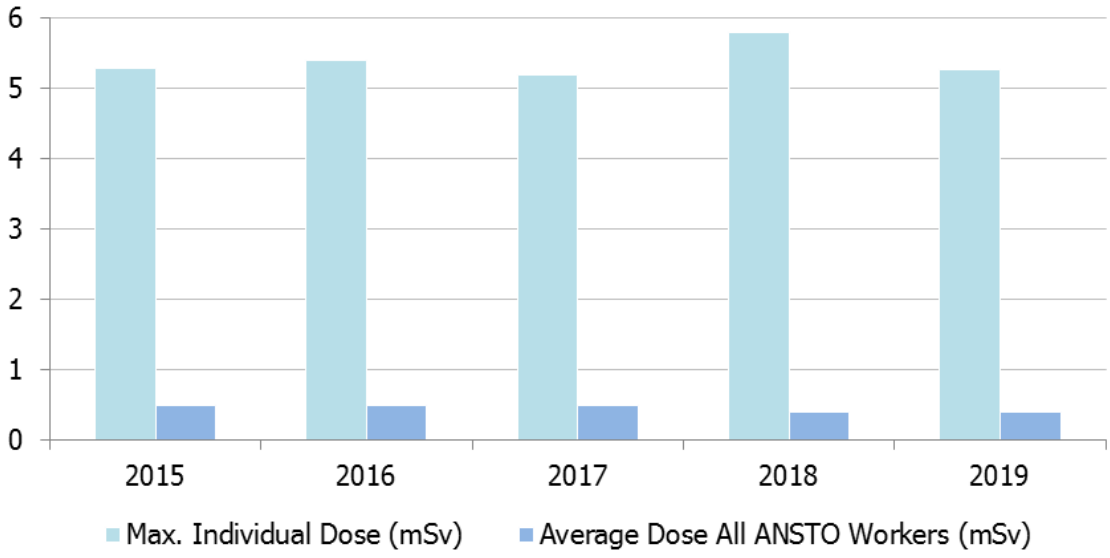



**TABLE 11: DISTRIBUTION OF INDIVIDUAL EFFECTIVE DOSE**

| ALL STAFF | Calendar Year | | | | |
|---|---|---|---|---|---|
| **Effective Dose Range** | **2015** | **2016** | **2017** | **2018** | **2019** |
| **0 to <1 mSv** | 890 | 902 | 918 | 949 | 937 |
| **1 to <2 mSv** | 59 | 78 | 71 | 38 | 22 |
| **2 to < 5 mSv** | 23 | 19 | 27 | 18 | 24 |
| **5 to <6 mSv** | 1 | 3 | 2 | 4 | 1 |
| **6 to <10 mSv** | 0 | 0 | 0 | 0 | 0 |
| **≥10mSv** | 0 | 0 | 0 | 0 | 0 |

## Extremity exposure

The exposure to the hands of ANSTO workers is routinely measured for those operations that require workers to have their hands closer to sources of radiation, such as during radiopharmaceutical product testing. This is called equivalent dose, which is different to effective dose presented above. It focuses on specific organs or parts of the body.

Generally, the radiation exposures to the hands are very low compared to the applicable dose limit of 500 mSv to the skin / extremities. The maximum planned extremity dose to ANSTO operators in 2019 was 72 mSv (with the exception of the three workers indicated below), which is very much less than the legal limit. More than 99 per cent of workers' extremity exposures were below 50 mSv.

Three workers received exceptional doses to the skin caused by an accidental exposure due to Mo-99 contamination. Significant radioactive contamination was transferred to the surface of a shielding pot and operators were exposed locally to the hands when they wiped the pot surfaces. The best estimated dose to the skin from this exposure indicated that two operators exceeded the annual equivalent dose limit of 500 mSv, but received less than the threshold for tissue reactions, such as reddening of the skin; and the third operator received less than the annual equivalent dose limit (~400 mSv).

## Regulator engagement - ARPANSA

The main regulator ANSTO engages with for radiation and nuclear safety is ARPANSA.

ANSTO is required to report accidents under section 58 of the Australian Radiation Protection and Nuclear Safety Regulations 2018. An accident is any occurrence, associated with controlled apparatus, controlled materials or a controlled facility, which results in, or has the potential to result in, exposure to radiation, such as to cause injury, damage or harm to any person or the environment. During 2019-2020 there were no accidents reported to ARPANSA. ANSTO was found in breach of its licences on three occasions. Refer to **Table 12**.

### TABLE 12: SUMMARY OF ANSTO BREACHES

| Facility | Breach | Action taken |
|---|---|---|
| **Mo-99 Facility** | Failure to comply with the requirements of ARPANS Regulation 2018, Section 58 and 79 in relation to personal contamination of three workers. | Impact: Three workers re-allocated to alternate duties until their annual exposure limits were reset. They have returned to normal duties.<br>Actions taken include improved manufacturing process, improved detection system within cell and before removal of product into workers work area, implemented safer techniques for final checks, enhanced training of operators. |
| **ANSTO Gamma Irradiator Suite** | Failure to comply with the requirements of ARPANS Regulation 2018, Section 59 (1) (b) as not all of the requirements of the Code of Practice for the Security of Radioactive Sources (2019) (RPS 11) were implemented by the facility. | Impact: this was an administrative breach.<br>Action taken as removal of the source as planned. The source was transported and relocated under the appropriate Waste Management Services Licence (F0260). |
| **ANSTO Gamma Irradiator Suite** | Failure to comply with the requirements of ARPANS Regulation 2018, Section 60(1) for not taking all reasonably practicable steps to manage the safety of the facility described in the licence. | Impact: this was an administrative breach.<br>Action taken as removal of the source as planned. The source was transported and relocated under the appropriate Waste Management Services Licence (F0260). |

# Freedom of Information Act 1982, section 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 exceptions 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 2020, ANSTO received six requests for information under section 15 of the *FOI Act*.

ANSTO is required to publish information to the public as part of the Information Publication Scheme (IPS).

The IPS is designed to promote open and transparent communication of government information.

Set out below is the information required to be published by ANSTO under Part II of the *FOI Act*.

**1. ANSTO's Agency Plan**

ANSTO's Information Publication Scheme plan is currently available on the ANSTO website at: https://www.ansto.gov.au/access-to-information

**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 at: https://www.ansto.gov.au/governance.

**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 on pages 157-160. Information about ANSTO's purpose and Values, Board Composition, Corporate Plan and Service Charters can be found on ANSTO's website at: https://www.ansto.gov.au/governance

**4. Details of officer appointments at ANSTO**

Details of officer appointments can be found on page 56-66 and a link to this information can also be found on ANSTO's website at: https://www.ansto.gov.au/governance

**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: https://www.ansto.gov.au/corporate-publications

**6. Details of arrangements for members of the public to comment on specific policy proposals 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: https://www.ansto.gov.au/governance

**7. Information which ANSTO routinely gives access to in response to requests for access under the *FOI Act* (excluding documents exempt from production under the *FOI Act*)**

During 2019-2020 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: https://www.ansto.gov.au/access-to-information

**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: https://www.ansto.gov.au/access-to-information

**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 (request to be directed to the FOI Coordinator):
Mail: FOI Coordinator, ANSTO, Locked Bag 2001, Kirrawee DC NSW 2232
Email: foi@ansto.gov.au Telephone: +61 2 9717 3111

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 and information available for the public, including our annual reports, corporate plan, 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. View the database at https://www.ansto.gov.au/research/publications

# Functions and powers of the Organisation under the ANSTO Act 1987

**Section 3: Interpretation**

"scientific research, innovation and training" includes the following, whether or not related to nuclear science and nuclear technology:

(a) any activities in the fields of natural or applied science (including engineering and technology) for the extension or application of knowledge;

(b) any activities that involve innovation or high levels of technical risk for the purposes of creating new or improved materials, products, devices or processes;

(c) the education and training of persons in matters related to activities mentioned in paragraph (a) or (b).

**Section 5: Functions of 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

(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, whether or not 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 co-operate 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.

(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.
(4A) Without limiting paragraph (1)(ea), the Organisation may perform its function under that paragraph for the purposes of scientific research, innovation and training.

**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).

**Section 6A Constitutional limits**

(1) The Organisation may perform its functions only:
(a) for purposes relating to activities that are peculiarly adapted to the government of a nation and cannot otherwise be carried on for the benefit of the nation; or
(b) for purposes relating to trade and commerce:
(i) between Australia and places outside Australia; or
(ii) among the States; or
(iii) within a Territory, between a State and a Territory or between 2 Territories; or
(c) for purposes relating to postal, telegraphic, telephonic or other like services; or
(d) for purposes relating to the security or defence of Australia; or
(e) for purposes relating to astronomical and meteorological observations; or
(f) for purposes relating to statistics; or
(g) for purposes relating to weights and measures; or
(h) for purposes relating to copyrights, patents of inventions and designs, and trade marks; or
(i) for purposes relating to the provision of medical and dental services; or
(j) for purposes related to external affairs, including:
(i) giving effect to any international agreement to which Australia is a party; and
(ii) addressing matters of international concern; and
(iii) by way of the performance of its functions in a place outside Australia; or
(k) for purposes relating to the relations of the Commonwealth with the islands of the Pacific; or
(l) in, or for purposes relating to, a Territory; or
(m) in, or for purposes relating to, a Commonwealth place (within the meaning of the Commonwealth Places (Application of Laws) Act 1970); or
(n) for purposes relating to matters incidental to the execution of any of the legislative powers of the Parliament or the executive power of the Commonwealth.

(2) A term used in subsection (1) and the Constitution has the same meaning in that subsection as it has in the Constitution.

# 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

Functions and Powers – 157-160

## Public Governance, Performance and Accountability Act 2013 (PGPA Act)

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| Annual Report (section 46) | The accountable authority of the entity must prepare and give an annual report to the entity's responsible Minister, for presentation to the Parliament, on the entity's activities during the period, by 15 October; or the end of any further period granted under subsection 34C(5) of the Acts Interpretation Act 1901. The annual report must comply with any requirements prescribed by the PGPA Rule. (Section 46) | Annual Report, 1-172 |
| Annual performance statements (Section 39 (1) and (2) | Includes a copy of the annual performance statements in the entity's annual report that is tabled in the Parliament.<br>The annual performance statements must:<br>a. provide information about the entity's performance in achieving its purposes; and<br>b. comply with any requirements prescribed by the rules (Sections 39(1) and (2)) | Annual Performance Statement, 10-34 |
| Financial statements (sections 42 and 43) | Includes a copy of the annual financial statements and the Auditor-General's report must be included in<br>the Commonwealth entity's annual report that is tabled in the Parliament. | Financial statements, 67-112 |

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| | The annual financial statements and the audit report must comply, and must state whether, in the accountable authority's and the Auditor-General's opinion respectively whether, they:<br>a. comply with the accounting standards and any other requirements prescribed by the rules; and<br>b. present fairly the entity's financial position, financial performance and cash flows.<br>If the financial statements do not comply, the accountable authority of the entity must add the information and explanations required to present fairly those matters.<br>Similarly for the audit report, the Auditor-General must state the reasons, quantify the financial effect and state the amount if possible. (Sections 42 and 43) | |

# Public Governance, Performance and Accountability Rule 2014

### Ministerial oversight

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| Section 17BB | The annual report must be approved and signed by the accountable authority, and include details of how and when approval was given. It must state that the accountable authority is responsible for preparing and delivering the annual report in accordance with the section 46 of the PGPA Act. | Transmittal letter, 1 |
| Section 17BC | The annual report complies with the guidelines for presenting documents to the Parliament. | Annual Performance Statement, 10-34 |
| Section 17BD | The annual report uses plain English and clear design. | Yes |
| Section 17BE (a)-(b) | The annual report must specify the entity's enabling legislation, including a summary of the entity's objects and functions and the purposes of the entity as included in the entity's corporate plan. | Annual Performance Statement, 10-34 |

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| | | Functions and powers of the Organisation under the ANSTO Act 1987, 157-160 |
| Section 17BE (c) | The responsible Minister is specified. | Responsible Minister, 5 |
| Section 17BE (d)-(f) | The annual report provides details of:<br>any direction issued by any Minister under an Act or instrument during the period<br>any government policy orders that applied to the entity under section 22 of the PGPA Act<br>particulars of non-compliance with any of the above directions or orders. | Ministerial oversight, 56-57 |
| Section 17BE (g) | The annual report must include the annual performance statements for the entity for the period in accordance with section 39(1)(b) of the Act and section 16F of this rule. | Annual Performance Statement, 10-34 |
| Section 17BE (h)-(i) | The annual report must include a statement of any significant issue reported to the responsible Minister under section 19(1)(e) of the Act that relates to non-compliance with the finance law in relation to the entity. If such a statement is included, the annual report must include an outline of the action that has been taken to remedy non-compliance. | Ministerial oversight, 56-57 |
| Section 17BE (j) | Information about directors is provided, including names, qualifications, experience, attendance at Board meetings and whether the director is an executive or non-executive member. | Members of the Board, 46-50 |
| Section 17BE (k)-(l) | The annual report must include an outline of the:<br>organisational structure of the entity (including subsidiaries);<br>statistics on the number of employees of the entity, at the end of that and the previous reporting period, for full and part-time employees, gender, location; and location of major activities and facilities of the entity. | Organisational chart, 51 |
| | | Contact details, 172 |

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| | | Statistics on the number of employees, 116-119 |
| Section 17BE (m) | The annual report must include information on the main corporate governance practices used by the entity, including, for example, details of:<br>board committees and their main responsibilities;<br>education and performance review processes for the accountable authority; and<br>ethics and risk management policies. | Board committees, 60-62 |
| Section 17BE (n)-(o) | The annual report discloses the decision-making process undertaken by the accountable authority for making a decision if:<br>the decision is to approve the entity paying for a good or service from another Commonwealth entity or a company, or providing a grant to another Commonwealth entity or a company;<br>the entity, and the other Commonwealth entity or the company, are related entities;<br>the value of the transaction, or if there is more than one transaction, the aggregate value of those transactions, is more than $10 000 (inclusive of GST);<br>If the annual report includes any of the above information:<br>if there is only one transaction—the value of the transaction must be included;<br>if there is more than one transaction—the number of transactions and the aggregate of value of the transactions must be included. | Disclosure of interest, 58 |
| Section 17BE (p) | The annual report details any key activities and changes that affected the operations or structure, which may include:<br>significant events, such as forming or participating in the formation of a company, partnership etc.;<br>operational and financial results;<br>key changes to its status of affairs or principal activities; | Ministerial oversight, 56-57 |

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| | amendments to enabling legislation or any other legislation directly relevant to its operation. | |
| Section 17BE (q)-(r) | The annual report includes particulars of:<br>judicial reviews and decisions of tribunals that have had or may have a significant effect on its operations;<br>reports about the authority made by the Auditor-General (other than one made under section 43 of the PGPA Act), a Parliamentary committee, the Commonwealth Ombudsman, or the Office of the Australian Information Commissioner. | Judicial decisions and reviews by outside bodies, 65 |
| Section 17BE (s) | The annual report includes an explanation if information is missing from a subsidiary that is required to be included in the annual report and states the effect of not having the information in the annual report. | N/A |
| Section 17BE (t) | The annual report includes details of any indemnity that applied during the period given to an officer against a liability, including premiums paid, or agreed to be paid, for insurance against the officer's liability for legal costs. | Indemnities and insurance premiums for officers, 66 |
| Section 17BE (taa) | The annual report must include the following information about the audit committee for the entity:<br>· a direct electronic address of the charter determining the functions of the audit committee;<br>· the name of each member of the audit committee during the period;<br>· the qualifications, knowledge, skills or experience of those members;<br>· information about each of those members' attendance at meetings of the audit committee during the period;<br>· the remuneration of each of those members. | Board committees, 60-62 |
| Section 17BE (ta) | The annual report must include information about executive remuneration in accordance with Subdivision C (s 17CA to 17CE PGPA Rule). | Remuneration Report (Table 1), 120-125 |

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| Section 17BE (u) | The annual report provides an index of annual report requirements identifying where relevant information can be found in the annual report. | Index of compliance, 161-171 |

# Minister's Statement of Expectations (SOEs) February 2020

The Minister for Industry, Science and Technology provided this SOEs to ANSTO on 13 February 2020 and can be found at https://www.ansto.gov.au/governance#content-charters.

ANSTO's Statement of Intent was under development as of 30 June 2020.

MS19-001483

The Hon Dr Annabelle Bennett AC SC
Chairperson
Australian Nuclear Science and Technology Organisation Board
ANSTO
Locked Bag 2001
KIRRAWEE DC NSW 2232

Dear Dr Bennett

I am writing to outline my expectations of the Australian Nuclear Science and Technology Organisation (ANSTO).

As you know, the Australian Government places high importance on science and innovation as drivers of our economy, employment, social wellbeing and positive environmental outcomes. It is therefore essential that ANSTO continues to play a role in advancing the Government's broader economic agenda by fostering a strong science and research base, innovation and links to businesses and enterprises.

I am confident ANSTO, as Australia's nuclear science and technology agency, will continue its core mission to drive the application of nuclear science and research, and address national challenges, with benefits for all Australians.

I expect ANSTO to fulfil its purpose in a way that will achieve its vision to be a global science, research and engineering partner with a reputation for tackling complex problems and delivering outcomes to create a more sustainable world.

I expect ANSTO to use its nuclear facilities, infrastructure and capabilities to contribute to the economic, health and environmental wellbeing and security of Australians.

## Resolving national challenges

| Expectation | Section of report expectation is addressed |
|---|---|
| 1.1 ANSTO plays an important role in Australia's science, technology and health systems. The ultimate goal of our contributions into these systems is to improve the way we live and to solve problems through translatable world-leading research.<br>I expect ANSTO to continue to deliver world-class research and nuclear science services as Australia's national home of nuclear expertise and nuclear science facilities. I expect ANSTO to conduct a broad spectrum of nuclear-related research and development, and possess an expert understanding of global nuclear research, developments and emerging issues and opportunities.<br>I expect ANSTO to continue to assist the Government in protecting the national interest through the provision of specialised nuclear advice to Government, to Australian businesses with nuclear interests to ensure their global competitiveness and to act as a means of liaison between Australia and other countries on nuclear issues. | Delivery of research outcomes, 13-22 |
| | Advice to Government, 28-32 |
| | Business and innovation, 33 |
| | ANSTO Precinct, 35 |

## Advancing the Government's policy priorities

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| 2.1 The Government has a range of policy priorities that relate to science. I expect that ANSTO will continue to make an important contribution to government initiatives under the 2017 Science Statement; the 2016 National Research Infrastructure Roadmap; and the 2015 National Innovation and Science Agenda.<br>As the Government's priorities develop, I consider it important that our own science and research efforts are brought to bear on these key challenges. As such, I expect you to work with the department on how the science and research capabilities of ANSTO can be harnessed in support of the emerging policy priorities of Government. | Advice to Government, 28-32 |
| *2.2 Supporting the health of Australians with nuclear medicines*<br>I also expect ANSTO to maximise its capacity to provide specialised services and products, including providing nuclear | Business and innovation, 33 |

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| medicine to the Australian community, as a priority, and to the global community.<br><br>In the manufacturing and supply of nuclear medicines, I expect ANSTO to undertake this function efficiently, effectively and in line with best practice, ensuring an appropriate level of innovation and improvement towards future sustainability and service provision.<br><br>As part of ANSTO's financial sustainability, I expect ANSTO to continue to work with the Government towards ensuring that, in the supply of nuclear medicines, the full costs of their production and transportation and of the management of the resulting radioactive waste are reflected. | |
| | Products and services, 38-41 |
| *2.3 Working collaboratively to advance Australian industry*<br><br>In advancing the Government's agenda, I expect ANSTO to collaborate with industry, universities and other publicly funded research agencies to achieve common objectives and solve real-world problems.<br><br>In particular, ANSTO should use national and international collaboration to increase the nation's ability to translate research into outcomes. I also expect ANSTO to engage with the Chief Scientist of Australia.<br><br>I also expect ANSTO to encourage engagement between researchers and business, including by facilitating mobility between ANSTO and other research organisations and industry. I expect ANSTO to encourage its researchers to engage with businesses to commercialise their discoveries and support the realisation of commercial outcomes for industry. I also expect ANSTO to engage with those industries where ANSTO's capabilities and intellectual property can help those industries to become more globally competitive. | ANSTO Precinct, 35 |
| | Partnerships and collaborations, 45 |
| *2.4 Managing research infrastructure and national facilities*<br><br>ANSTO hosts Australian world-class research infrastructure that supports our leading-edge science and innovation. I am pleased to see that ANSTO is encouraging a wide range of users, including researchers and businesses to access and benefit from these facilities, and is committed to ensuring their sustainable and effective use.<br><br>The Government wants to ensure that Australia's public science and research infrastructure is aligned with our broader economic strategy and is supporting innovation in the wider Australian economy. To meet this goal, I want to ensure that Australia maintains or increases utilisation rates of major science infrastructure. | Strategic management of landmark and national infrastructure, 23-27 |

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| Please continue to facilitate the use of major research infrastructure by Australian and international researchers, and encourage industry access to the usage and development of relevant facilities. You should leverage collaboration with research institutions, universities and businesses to maximise the benefits that such infrastructure can provide. ANSTO should also continue to work with my department to develop and use metrics to measure the success of this objective. | |
| *2.5 Embracing the digital economy*<br>The digital economy is transforming how we do business and undertake our science and research. We know that Australia's ongoing economic success will depend on our ability to harness technological advances to improve existing businesses, create new products and improve daily life. I encourage ANSTO to continue to use its digital capabilities and new technologies to benefit research outcomes.<br>I expect ANSTO to ensure that it complies with the Australian Cyber Security Centre Top Four Cyber Security Mitigation Strategies and to have sound general ICT controls. I also expect that ANSTO will continue to build a culture of awareness regarding the importance of security to the organisation's mission, and maintain resilience and response capabilities to cyber-attacks. | Embracing the digital economy, 44 |
| *2.6 Promoting STEM equity*<br>My department recently released the Advancing Women in STEM Strategy and supported the development of the Women in STEM Decadal Plan, led by the Australian Academy of Science. I congratulate ANSTO on becoming one of the inaugural champions of the plan. I encourage ANSTO to continue to work closely with my department, the Women in STEM Ambassador and other key stakeholders across the STEM sector to drive cultural and social change. I expect ANSTO to build on its Science in Australia Gender Equity accreditation to provide an equitable workplace for all employees. | Leadership team representation, 11 |
| | Equal opportunity, diversity and inclusion, 113-119 |

# Driving your organisation's performance

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| *3.1 Legislative requirements*<br>I acknowledge the functions of ANSTO as set out in the Australian Nuclear Science and Technology Organisation Act 1987 (the ANSTO Act).<br>I expect ANSTO to be an exemplar of the Government's commitment to the effective governance and performance of its agencies, governed by the *Public Governance, Performance and Accountability Act 2013 (the PGPA Act)*.<br>In accordance with the *PGPA Act*, I expect ANSTO to develop an annual report and corporate plan and to provide these to me, as the responsible portfolio Minister, and to the Minister for Finance. In developing the annual report and corporate plan, I expect ANSTO to consult with me and my department, and to take into account the priorities and policies of the Government, especially as articulated in this Statement of Expectation.<br>ANSTO should keep developing and using metrics that measure meaningful success as well as identify what could be improved upon. The targets, highlighted in ANSTO's Corporate Plan, need to ensure that each measure can be clearly traced back to the objectives established, and serve as milestones for gauging progress. | Annual Report, 1-172 |
| | Our Corporate Plan 2019–2020, 4 |
| | Annual Performance Statement, 10-34 |
| *3.2 Sustainable operations and governance*<br>I expect ANSTO to have a strategic and disciplined focus on the delivery of core responsibilities, consolidating past achievements, and driving enhancements to safety performance, financial management and the delivery of essential projects that support current legislative functions. I recognise that organisational change is a process that can take time to achieve, and in this context expect that ANSTO will be proactive in driving change.<br>This will require ANSTO to ensure that it has effective internal and external reporting arrangements, robust and proportional controls for managing risk, clear accountabilities and well understood delegations. Putting in place and monitoring the implementation of rigorous asset and capital management plans, including committing to a strategic plan for nuclear decommissioning, will be important areas for the Board's nearer-term considerations, contributing to the longer-term certainty and stability of ANSTO. I also expect that ANSTO will continue to discharge its statutory responsibilities in a diligent manner and meet, and where prudent, exceed the standards required for public entities in relation to the management of its finances and other resources. | Governance Statement, 56-66 |

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| I expect the establishment of arrangements for the regular, independent evaluation of the Board. This is to ensure that Board performance continues to improve, and that members are assured that their contributions are delivering intended results. | |
| | Financial statements, 67-112 |
| *3.3 Agency staff and health*<br>I expect ANSTO to continue being a collaborator, partner and employer of choice by providing a workplace environment, culture and opportunities that will attract and retain the very best talent. I also expect ANSTO to continue to promote a safe and positive working environment, including through responding to its health and safety obligations under the Work Health and Safety Act 2011.<br>It is critical that ANSTO maintain the highest of safety standards across the organisation, and that the Board maintain safety as a fundamental priority for the leadership of the organisation.<br>I expect and trust that ANSTO has effective arrangements in place to ensure that its activities minimise potential risks to ANSTO itself, its staff, the community and the environment, and to comply with relevant legislative and regulatory obligations. | Safe work environment, 12 |
| | Equal opportunity, diversity and inclusion, 113-119 |
| | Work Health and Safety Act 2011, 140-154 |
| *3.4 Communication of ANSTO's science and research*<br>I expect that ANSTO will continue to raise community awareness of its activities and communicate its research and technical knowledge and health, industry and environmental outcomes. | Engaging with ANSTO, 36-37 |
| *3.5 Working with my department and office*<br>I look forward to ANSTO working closely with my department. Aside from regular meetings between you and me, I ask that you keep me informed of significant issues relating to the work health and culture of the organisation. Your timely and accurate advice to my department and office is essential in allowing me to communicate ANSTO's important work.<br>To this end, I expect that ANSTO will discuss ministerial briefings and correspondence with the relevant areas of my office and my department, and provide copies in parallel. Further, I expect ANSTO to provide prior notice, to my office and my department, of significant announcements and events that are likely to attract media attention. | Advice to Government, 28-32 |

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Front cover: Dr David Boardman, inventor of a new radiation imaging technology, credits curiosity and determination as key drivers in the development of the novel solution.
From the project's early days, physicist Alison Flynn, has played a key role in both the R&D and commercialisation of the technology. For the full story, see page 19.

Australian Government


**Locations**

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