



ANSTO Submission

Joint Standing Committee on Foreign Affairs,
Defence and Trade - Inquiry into the implications
of the COVID-19 pandemic for Australia's foreign
affairs, defence and trade

ANSTO

June 2020

Introduction

ANSTO (the Australian Nuclear Science and Technology Organisation) is pleased to make this submission to the Joint Standing Committee on Foreign Affairs, Defence and Trade.

ANSTO operates a large proportion of Australia's landmark research infrastructure, including the OPAL multipurpose reactor, the Australian Synchrotron, the Australian Centre for Neutron Scattering, and the Centre for Accelerator Science. This infrastructure places Australia at the forefront of research and innovation for the benefit of public health, industry and the environment, and is used by researchers and industry from around Australia and internationally.

A primary function of ANSTO, as mandated by the *Australian Nuclear Science and Technology Organisation Act 1987* (ANSTO Act), is to undertake research and development in relation to the production and use of nuclear medicines that are used in the diagnosis and treatment of many medical conditions, and to encourage and facilitate their application and use. ANSTO also utilises isotopic techniques for medical, scientific and agricultural research. For instance, research undertaken at ANSTO's Australian Synchrotron has enhanced the medical community's understanding of COVID-19¹.

Furthermore, the ANSTO Act mandates the organisation to "act as a means of liaison between Australia and other countries in matters related to its activities". In this capacity, ANSTO is recognised as a global leader in nuclear science and technology. The organisation maintains over 50 bilateral relationships, and represents Australia's interests in several multilateral fora, including the International Atomic Energy Agency, the OECD's Nuclear Energy Agency, and the Forum for Nuclear Cooperation in Asia.

The organisation is also an international exporter of nuclear medicines and irradiated silicon (which is used in high-tech applications such as bullet trains and super computers), and supports the export aspirations of many Australian mining and mineral extraction companies.

ANSTO is therefore well placed to provide comment in response to several of the terms of reference.

¹ For further information visit: <https://www.ansto.gov.au/news/helping-fight-against-covid-19>

Threats to the global rules based order that emerged due to actions by nation states during the pandemic, and how such threats can be mitigated in the event of future crises

ANSTO represents Australia's interests in several international and regional nuclear fora, which will arguably become more important in the aftermath of COVID-19 as the world looks to mitigate the impact of future crises. The International Atomic Energy Agency (IAEA) is arguably the most important international body for nuclear issues. Known as the United Nations' "nuclear watchdog", Australia was a founding Member State of the IAEA and continues to strongly support its safeguards activities, as part of our commitments as signatory to the Treaty on the Non-Proliferation of Nuclear Weapons.

While this is an important aspect of its mandate, the IAEA is also the central international organisation for nuclear safety, nuclear security, power and non-power applications of nuclear technology, and technical cooperation (the Agency's programme for assisting the socio-economic development of Member States using nuclear technology which includes programs on health, the environment, and sustainable development). In relation to COVID-19, the IAEA has assisted some developing Member States in developing skills in the use of real time reverse transcription-polymerase chain reaction (real time RT-PCR). Real time RT-PCR is a highly accurate, nuclear derived technique used to detect viral pathogens, including those that cause COVID-19. The objective is to support Member States in restoring capacities, competencies and services in the case of disease outbreaks, natural emergencies or other disasters. The IAEA has previously supported Member State to develop RT-PCR capabilities in response to outbreaks of Avian influenza, Ebola virus disease and Zika virus disease.

ANSTO leads Australia's activities at the IAEA in nuclear applications, nuclear energy, and technical cooperation. An example of this is the Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific (RCA) which is an IAEA-centred, treaty-level programme for implementation of technical cooperation in Asia and the Pacific, consisting of some 22 Member States. ANSTO also supports Government with the provision of advice across the Agency's other activities. This active participation in the Agency's technical programmes supports Australia's ongoing role in the governance of the IAEA via a permanent seat on the Board of Governors (see below).

IAEA Board of Governors

The chief policy-making organisation of the IAEA is the Board of Governors, a body of 35 Member States which meets five times a year to direct the Agency's programme and budget. Membership consists of 13 permanent members who are the most advanced in nuclear science and technology, with at least one from each regional group, and 22 non-permanent members who are elected to serve two-year terms. The South-East Asia and Pacific (SEAP) group – of which Australia is a part – has one permanent member, one non-permanent member, and two rotational non-permanent members that are shared with other regional groups.

Historically, Australia has held the permanent position in SEAP as the most advanced country in the region in nuclear science and technology. To continue to justify this position, Australia needs to maintain high-quality expertise and capacity in nuclear science and technology, as well as engage with the IAEA and its Member States, particularly those from SEAP, in its activities.

In addition to the IAEA, ANSTO supports Australia's ongoing commitment to the global, rules-based order through active participation in several other fora including:

- OECD Nuclear Energy Agency (NEA) – A group of 31 countries with advanced nuclear infrastructure. The NEA focuses particularly on safety, environmental and economic aspects of nuclear technology, both power and non-power; and
- Forum for Nuclear Cooperation in Asia (FNCA) – A Japanese-led initiative that brings together 12 member states from the Asia-Pacific to facilitate cooperative research and development of nuclear techniques.

Consistent with the objectives of the 2017 Foreign Policy White Paper, Australia will need to continue these leadership roles in international fora to ensure the rules-based global order is maintained as the world looks to recover from the disruptions caused by the COVID-19 pandemic.

Supply chain integrity / assurance to critical enablers of Australian security (such as health, economic and transport systems, and defence)

Nuclear Medicine

ANSTO produces a number of nuclear medicines, which are key to the diagnosis and treatment of a variety of health conditions. The most common of these is molybdenum-99 (Mo-99) whose daughter isotope, technetium-99m (Tc-99m), is used in approximately 80 per cent of nuclear

medicine procedures worldwide for the diagnosis of conditions such as cancer, heart disease and neurological disorders.

With the completion of the ANSTO Nuclear Medicine (ANM) Facility in 2019, in addition to meeting domestic demand ANSTO is now able to supply up to 25 per cent of the Mo-99 required globally. This capacity has come on-line at a time when many of the major producing reactors across the world are coming to the end of their design life. In addition to pursuing contracts in existing markets, such as North America and Europe, use of nuclear medicine in developing markets – particularly in Asia – is expected to increase substantially as economic development in these countries facilitates better access to health care. As Mo-99 has a short half-life (only half of the original radioactivity remains after 66 hours), a highly efficient logistics chain is essential to ensure efficient transportation to hospitals and health care centres across the globe.

The COVID-19 pandemic has underscored the importance of Australia having a domestic Mo-99 production capability. The reduction in flights as a result of COVID-19 has meant that access to overseas supplies of this important isotope has become more difficult and more unreliable. If Australia did not have such a capability, there could have easily been major shortages in supply of this life-saving product during the height of the pandemic, especially given our remoteness from the main producers in Europe.

In addition to production of Mo-99 and some other medical radioisotopes such as Lutetium-177, ANSTO also imports and distributes some highly specialised, small-scale isotopes to hospitals and health centres across the country. The COVID-19 pandemic again provided some unique challenges to the continuity of supply of these isotopes, most critically, Iodine-123MIBG from Japan, which is used in the diagnosis and treatment of paediatric neuroblastoma (cancer in the nerve cells of children). Iodine-123 has a half-life of just over 13 hours, so efficient transportation and distribution to Australian hospitals is vital. Australia's capacity to produce Iodine-123 ceased with the closure of the National Medical Cyclotron in 2009. Since then, the product has been imported, in recent years from Japan. As a result of the widespread cancellation of both international and domestic commercial flights, it has been necessary for ANSTO to fund international and domestic charter flights to ensure that this essential product reaches patients, at not insignificant expense. While passenger flights between Japan and Australia and domestic flights have recently been reinstated, obviating the need for future charter flights, this case again highlights the potential for disruption to the import of nuclear medicines caused by pandemics.

Rare Earth Minerals

For over 40 years, ANSTO Minerals has provided practical solutions and innovative technology to support Australia's mining and minerals processing industries, supporting the nation's growth.

In recent years, ANSTO Minerals has developed a strong capability in the processing of rare earth minerals, providing specialised consulting on the processing of minerals including monazite,

bastnasite and xenotime, as well as from less frequently exploited rare earth sources. Australia has one of the world's largest deposits of rare earth minerals, and if there were significant investment into supply chain infrastructure could make a significant contribution to the global supply chain – which is currently dominated by China – and reduce reliance on imports. Rare earth minerals are essential to the manufacture of a wide range of strategic products including magnets and super magnets, motors, electronic and computing equipment, batteries, and medical imaging equipment.

What policy and practical measures would be required to form an ongoing effective national framework to ensure the resilience required to underpin Australia's economic and strategic objectives;

As demonstrated above, nuclear science and technology support many of Australia's economic and strategic objectives. In order to support Australia's continued autonomy and ability to effectively respond to global pandemics and other crises, a number of policy and practical measures should be considered, namely:

- Reconfirming policy support for key international nuclear organisations such as the IAEA and OECD Nuclear Energy Agency;
- Reconfirming and, where needed, regularising Australia's payment of contributions to key international nuclear organisations such as the IAEA;
- Where appropriate, Government should consider making extra-budgetary contributions to key international nuclear organisations such as the IAEA on issues which support national resilience and crisis preparedness;
- Providing increased direct financial support to bilateral cooperative projects that support increased resilience. Where appropriate, this may include wider consideration of overseas development assistance criteria for proposed or ongoing bilateral cooperation with developing countries of particular strategic importance to Australia; and
- Note the role played by having a domestic nuclear medicine production capability to produce life-saving nuclear medicine in securing Australia's health outcomes.