Australian Government

Australian Safeguards and Non-Proliferation Office

Annual Report

2022–23

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Annual Report 2022–2023

Produced By

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Cover photographs from left to right:
1. Escorted by plant officials, IAEA Director General Rafael Mariano Grossi toured Zaporizhzhya Nuclear Power Plant Ukraine. March 2023 Photo Credit: Fredrik Dahl / IAEA

2. Director General ASNO was Australia's Head of Delegation at the Chemical Weapons Convention Fifth Review Conference at the Hague.

3. OPCW officers responding to the use of chemical weapons. Photo Credit: OPCW

Guide to the Report

This report complies with the formal reporting obligations of the Director General ASNO. It provides an overview of ASNO's role and performance in supporting nuclear safeguards and the non-proliferation of weapons of mass destruction.

The report has five parts:

1. report by the Director General ASNO on key developments in 2022–23 and a preview of the year ahead
2. review of selected topics in ASNO's work
3. functional overview of ASNO, including its operating environment and Outcomes–Outputs structure (the first Outcome demonstrates accountability to Government and the second outlines public outreach and education)
4. report on ASNO's performance during 2022–23
5. key features of ASNO's corporate governance and the processes by which ASNO is directed, administered and held accountable.

As ASNO is funded as a division of the Department of Foreign Affairs and Trade (DFAT), some mandatory annual report information for ASNO is incorporated in the DFAT Annual Report. This includes:

- financial statements
- corporate governance and accountability framework
- external scrutiny
- human resource management, including work health and safety
- asset management
- purchasing
- agency-specific social inclusion strategies
- advertising and market research
- ecologically sustainable development and environmental performance.

Letter of Transmittal

Australian Government
Australian Safeguards and Non-Proliferation Office

26 September 2023

The Hon Penny Wong
Minister for Foreign Affairs
Parliament House
CANBERRA ACT 2600

Dear Minister

I submit the Annual Report on the operations of the Australian Safeguards and Non-Proliferation Office (ASNO) for the financial year ended 30 June 2023. This report is made in accordance with section 51 of the *Nuclear Non-Proliferation (Safeguards) Act 1987*, section 96 of the *Chemical Weapons (Prohibition) Act 1994* and section 71 of the *Comprehensive Nuclear-Test-Ban Treaty Act 1998*.

During the reporting period all relevant statutory and treaty requirements were met, and ASNO found no unauthorised access to, or use of, nuclear materials or nuclear items of safeguards or security significance in Australia. All requirements were met under Australia's safeguards agreement with the International Atomic Energy Agency and under the Chemical Weapons Convention, and further progress was made developing the verification capabilities of the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization. All Australian Obligated Nuclear Material was satisfactorily accounted for.

As outlined in this Report, ASNO continued its major contribution to advancing Australia's interests in effective non-proliferation measures against weapons of mass destruction through our activities at the domestic, regional and international levels, and through working closely with colleagues in the Department of Foreign Affairs and Trade in Canberra and Australia's diplomatic missions, and in other departments and agencies.

Yours sincerely

Geoffrey Shaw (Dr)
Director General

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“Since joining the NPT, Australia has been an example to the world on non-proliferation and disarmament.”

Minister for Foreign Affairs, Senator the Hon. Penny Wong
23 January 2023

Overview of Australian Safeguards and Non-Proliferation Office

The goal of Australian Safeguards and Non-Proliferation Office (ASNO) is to enhance Australian and international security through activities which strengthen the effectiveness of regimes against the proliferation of weapons of mass destruction.

ASNO ensures that Australia’s international obligations are met under the Nuclear Non-Proliferation Treaty (NPT), Australia’s NPT safeguards agreement with the International Atomic Energy Agency (IAEA), the Amended Convention on the Physical Protection of Nuclear Material (A/CPPNM) and Australia’s nuclear cooperation agreements (NCAs). In the nuclear area, ASNO has four main areas of responsibility:

1. the application of safeguards in Australia
2. the physical protection and security of nuclear items in Australia
3. the operation of Australia’s network of NCAs, including tracking Australia’s uranium exports
4. contribution to the operation and development of IAEA safeguards and the strengthening of the international nuclear non-proliferation regime.

ASNO ensures that Australia’s international obligations under the Chemical Weapons Convention (CWC) are met while at the same time ensuring that the rights of relevant areas of the chemical industry are protected. ASNO also promotes effective international implementation of the CWC, particularly in Australia’s immediate region.

ASNO coordinates work in Australia developing the verification system for the Comprehensive Nuclear-Test-Ban Treaty (CTBT), including facilitating the operation of 21 Treaty-monitoring facilities in Australia. ASNO also contributes to the technical work of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) Preparatory Commission in developing procedures for the conduct of CTBT verification activities.

The position of Director General, ASNO incorporates the statutory responsibilities of Director of Safeguards, Director, Chemical Weapons Convention Office (CWCO) and Director, Australian Comprehensive Test Ban Office (ACTBO). The Director General reports directly to the Minister for Foreign Affairs.

IAEA Safeguards Symposium 2022 Ministerial Panel.

Section 1
Director General's Report

The Year in Review

Geoffrey Shaw (Dr)

Director General

Australian Safeguards and Non-Proliferation Office

The International Non-Proliferation Environment

Over the past year, the day-to-day implementation of the international nuclear and chemical non-proliferation regimes has remained strong and effective, with most States continuing to discharge their respective mandates transparently and in full compliance. However, with rising strategic tensions, the actions by certain States including Russia, Iran and Democratic People's Republic of Korea (DPRK), continued to challenge the non-proliferation architecture and threaten global peace and security

Russia's invasion of Ukraine and subsequent threats to use nuclear weapons led the United Nations (UN) Security Council to conclude that the risk of a nuclear weapon being used is at its highest since the Cold War. Russia's continued occupation of the Zaporizhzhia Nuclear Power Plant (ZNPP) has also placed the largest nuclear power plant in Europe at risk.

Following a visit by International Atomic Energy Agency (IAEA) Director General Rafael Grossi (DG IAEA) to ZNPP in September 2022, an ongoing IAEA presence was established there to provide independent objective monitoring and assessment of the situation. In January 2023 the IAEA deployed additional teams to Ukraine's other nuclear power plants – Khmelnitsky, Rivne, South Ukraine and Chornobyl – facilitating IAEA's continuous oversight of these major nuclear facilities.

Iran continued building substantial stockpiles of high enriched and low enriched uranium while failing to address the IAEA's investigation of its past non-compliance with its Comprehensive Safeguards Agreement (CSA). Progress on restoring the Joint Comprehensive Plan of Action has stalled. There would now be considerable challenges for the IAEA to re-establish a baseline inventory of sensitive aspects of Iran's nuclear fuel cycle program, such as the manufacturing of centrifuge components.

Director General ASNO lays a wreath at the Hiroshima Peace Memorial Museum.

DPRK's illicit nuclear weapons program continues to defy the UN Security Council's resolutions. DPRK has continued to refuse the international community's calls to return to compliance with IAEA safeguards and the Nuclear Non-Proliferation Treaty (NPT) as a non-nuclear weapon State. I acknowledge the IAEA's important work in continuing to maintain its enhanced readiness to return to DPRK to verify the dismantlement of its nuclear weapon program once circumstances allow.

This year marked major anniversaries for the two instruments that are central to the contemporary NPT safeguards standard: 50 years since the first IAEA CSA entered into force and 25 years since entry into force of the first IAEA Additional Protocol. The combination of both instruments equips the IAEA to verify not only that declared nuclear material is accounted for at declared sites but also that there are no undeclared nuclear material or activities in the State.

The Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) has made good progress in increasing the number of State ratifications and in ensuring the network of over 300 international monitoring stations and laboratories are able to detect covert nuclear tests both now and when the Comprehensive Nuclear-Test-Ban Treaty (CTBT) can enter into force globally. It was particularly pleasing to welcome several States from the region, including Solomon Islands, Timor Leste and Tuvalu, as we continue to bring the CTBT into force.

Regrettably, the Fifth Review Conference of the Chemical Weapons Convention (CWC) failed to achieve a consensus report due to Russia blocking consensus. However, despite this, the Organisation for the Prohibition of Chemical Weapons (OPCW) continued to fulfill its mandate, verifying States' compliance with CWC commitments.

On a personal note, I visited Japan to deepen engagement on nuclear safeguards and non-proliferation issues. The trip provided an opportunity to visit the Hiroshima Peace Memorial Museum, listen to the testimony of a *hibakusha* – a survivor of the nuclear bomb dropped on Hiroshima on 6 August 1945 – and lay a wreath at the shine. The visit was incredibly powerful, a stark reminder of why we work so hard to prevent the proliferation of weapons of mass destruction (WMD).

In this regard, during the year and a half I have been in this position, I have seen first-hand the dedication, professionalism and expertise of ASNO staff as we strive for best practice regulation and as we support Australia's ability to shape and strengthen the global non-proliferation architecture, uphold treaty compliance mechanisms and strengthen non-proliferation implementation across the region.

ASNO farewelled Dr John Kalish in November 2022 after more than 12 years as Assistant Secretary. The ASNO staff and I thank him for his contribution to the Office and to Australia's international non-proliferation reputation. We welcomed Dr Craig Everton into the role in March 2023 and in expanding to two branches in June 2023, we have also welcomed Ms Charlotte East as an additional Assistant Secretary.

Nuclear Non-Proliferation and Safeguards Developments

Naval Nuclear Propulsion for Australia

On 14 March 2023, Prime Minister Albanese, US President Biden and UK Prime Minister Sunak announced the optimal pathway for Australia's acquisition of a conventionally armed nuclear-powered submarine capability. An important element of the joint leaders' statement was the commitment to "set the highest nuclear non-proliferation standard" and to continue to work with the IAEA "on a non-proliferation approach that sets the strongest precedent for the acquisition of a nuclear-powered submarine capability".

Following the extensive engagement with the IAEA during the lead up to the announcement of the optimal pathway in March 2023, the IAEA conducted its first visit related to Australia's nuclear-powered submarine program in May 2023. The visit, led by the IAEA's Deputy Director General for Safeguards, included an in-field design information verification activity and, at Australia's invitation, a transparency visit to an Australian naval base. During the visit I led the opening of negotiations with the IAEA on safeguards arrangements for the program, in close collaboration with colleagues from the Departments of Foreign Affairs (DFAT), Defence and the Attorney General's Department.

The IAEA's developing a first-of-a-kind safeguards approach with Australia for naval nuclear propulsion will be a complex task that needs to enable the IAEA to meet its technical objectives while protecting classified and controlled information and assets. To support this, ASNO received budget supplementation in the 2023 Federal Budget to build Australia's sovereign safeguards capability and to better support the IAEA in its critically important nuclear safeguards mission.

Prime Minister Albanese with President Biden and Prime Minister Sunak announcing the AUKUS deal in March 2023.

International Safeguards Developments

The IAEA's Safeguards Implementation Report (SIR) for 2022 highlighted the long-term trend of increasing demands on the Agency to implement effective verification, including due to armed conflict in Ukraine. For the first time, the SIR included a new section on naval nuclear propulsion.

The IAEA continued to report that it found no indication of the diversion of declared nuclear material from peaceful nuclear activities and no indication of undeclared nuclear material or activities in Australia. The IAEA has drawn this 'broader conclusion' that all nuclear material remained in peaceful activities for Australia every year since 2000. Overall, 74 States received the broader conclusion in 2022.

As of 30 June 2023, 181 Non-Nuclear-Weapon States (NNWSs) have concluded a comprehensive safeguards agreement and the Additional Protocol was in force in 141 States and Euratom. Another 12 States have signed the Additional Protocol but have yet to bring it into force.

Regional Safeguards Developments

Asia-Pacific Safeguards Network (APSN)

The 13th Annual General Meeting of APSN was held in December 2022 in Hanoi, hosted by the Vietnam Agency for Radiation and Nuclear Safety (VARANS) and was preceded by two days of IAEA safeguards training targeted at the needs of the members. At this first in-person APSN meeting since 2019, ASNO joined representatives from safeguards authorities from 14 countries, along with the IAEA and the Institute of Nuclear Materials Management (INMM) to look at ways to support safeguards implementation in the region.

Bilateral Safeguards Developments

During 2022–23, all Australian Obligated Nuclear Material (AONM), predominantly derived from uranium ore concentrate (UOC) exported from Australia, was accounted for in accordance with the procedures and standards prescribed in Australia's network of 25 Nuclear Cooperation Agreements (NCAs), covering 43 countries, plus Taiwan (see Appendix A). The total quantity of AONM tracked by ASNO now exceeds 230,000 tonnes.

ASNO continued to work closely with our international partners to support Ukraine's energy security. Under our NCA with Ukraine, I approved on a case-by-case basis the retransfer of nuclear fuel assemblies containing AONM for use in reactors outside of the conflict zone, based on rigorous risk assessments and in consultation with relevant international and domestic partners.

Domestic Safeguards Developments

During the reporting period, ASNO ensured that all nuclear material and nuclear activities in Australia were accounted for and controlled in accordance with IAEA requirements. The IAEA conducted 16 inspections and in each case the inspectors were able to meet their inspection objectives, including a design information verification activity at the proposed location for Australia's future submarine construction (see Output 1.1 and Appendix D).

Nuclear Security Developments

ASNO conducted nine nuclear security inspections during the reporting period, covering a range of nuclear facilities across Australia. Inspectors were able to achieve inspection objectives and the physical protection and nuclear security systems met with permit requirements.

ASNO participated in the IAEA-hosted International Conference on Computer Security in the Nuclear World: Security for Safety, a forum that brought together nuclear security practitioners and regulators to focus on strengthening cyber security in the face of emerging threats.

ASNO experts also participated in an IAEA advisory group assessing how to detect clandestine laser uranium enrichment programs.

Comprehensive Nuclear-Test-Ban Treaty

The CTBT drew ever closer to universalisation with four additional ratifications in the reporting period, including two in the Pacific, and the International Monitoring System (IMS) continued to meet the strict performance measures defined in the Treaty. In Australia, ASNO supported the CTBTO's ongoing maintenance and sustainment work on the Australian IMS stations, notably upgrading communications equipment at the Warramunga Seismic and Infrasound Research Primary Station and repairing and hardening the cabling for the Cape Leeuwin Hydrophone Station.

ASNO and Agensi Nuklear Malaysia concluded the negotiation of an MOU to enable the sharing of CTBT analysis techniques between Australian and Malaysian experts. This MOU will advance regional nuclear monitoring capabilities and strengthen technical cooperation between Australia and Malaysia.

The CTBTO commenced development of an Integrated Field Exercise (IFE) scheduled for 2025 in Sri Lanka. Last held in Jordan in 2014, IFE25 is intended to test the field readiness of the CTBTO On-Site Inspection verification capability. ASNO joined experts from around the globe in commencing this work.

The reconstruction of the Radionuclide Monitoring Station at Macquarie Island, Australia.

Chemical Weapons Convention Developments

International CWC Developments

ASNO played an active leadership role at the Fifth CWC Review Conference (RevCon) (May 2023), where I was head of delegation, Chair of the Western and Others Group and a Vice Chair of the RevCon. ASNO supported several Pacific Island States to attend and advocated for geographical and gender diversity as an outcome of the conference.

On 12 May 2023, I attended the opening of the OPCW's Centre for Chemistry and Technology in The Netherlands. This centre will be an essential tool for strengthening the capacity of the OPCW to respond to chemical threats and for enhancing the capability of OPCW Member States to effectively implement the CWC by providing state-of-the-art laboratory analysis, international cooperation and capacity-building activities.

Regional CWC Developments

ASNO continued our efforts to support effective CWC implementation in the region. In partnership with Malaysia and the OPCW, Australia hosted a Subregional Forum on CWC Implementation for Pacific Island States in Brisbane in October 2022. The forum provided an opportunity to exchange views on shared challenges and to support each other. Assistant Minister for Foreign Affairs the Hon. Tim Watts MP addressed the Subregional Forum, reiterating Australia's readiness to work with Pacific Island partners in support of CWC objectives. This includes building networks so partners can access relevant expertise to keep the region free from chemical weapons.

A highlight was the keynote address by OPCW Director-General Fernando Arias emphasising the tangible benefits of the CWC, especially in preventing the re-emergence of chemical weapons. It also provided an opportunity for the Director-General to hear directly from Pacific nations on their challenges implementing the CWC. These insights provide an excellent foundation for further work to elevate Pacific voices in these important global discussions.

Domestic CWC Developments

ASNO facilitated two industry inspections by the OPCW in Australia, which successfully demonstrated treaty compliance (see Output 1.5). ASNO conducted 19 inspections and industry outreach visits pursuant to the *Chemical Weapons (Prohibition) Act 1994* (see Output 1.5).

Disarmament Activities

With a view to supporting any potential future nuclear disarmament activities, ASNO continued to focus on the development of practical verification tools and techniques. The International Partnership for Nuclear Disarmament Verification (IPNDV), a group of some 25 like-minded countries established in 2014, is a key forum for advancing these efforts.

In December 2022, ASNO was pleased to co-host with DFAT the first face-to-face IPNDV plenary meeting since COVID-19. The meeting, held in Sydney, brought together experts from 20 States to discuss practical ways to support disarmament including developing a multilateral nuclear disarmament toolkit for the 2026 NPT review conference.

In the year ahead, ASNO will launch a research and development program to advance safeguards through technology.

The Year Ahead

ASNO officers attend training at the Los Alamos National Laboratory in New Mexico, USA.

In the coming year, ASNO will restructure and expand to ensure it is fit-for-purpose to meet existing and new regulatory responsibilities.

In accordance with statutory responsibilities under the *Nuclear Non-Proliferation (Safeguards) Act 1987*, ASNO will ensure Australia's NPT safeguards obligations are fully met, including those that will apply to Australia's nuclear-powered submarine program. ASNO will lead Australian government negotiations with the IAEA to develop a safeguards and verification approach that will allow the IAEA to meet its technical safeguards objectives while protecting classified and controlled information and assets.

ASNO will launch a research and development program to advance safeguards through technology and to build Australia's sovereign safeguards capabilities. This program, in part delivered through the Australian Safeguards Support Program, will also support IAEA priorities for emerging technologies and advanced analytical capabilities.

ASNO will manage Australia's network of bilateral NCAs and provide detailed oversight of the transfer and use of AONM around the world. The return to in-person meetings and reconciliation visits with our international counterparts will help strengthen regulatory ties.

ASNO will implement risk-informed nuclear security regulation domestically, continuing our oversight of the security and secure transport of nuclear materials, equipment and technology at permit holder premises. Internationally, ASNO will attend the International Conference on Nuclear Security: Shaping the Future in 2024 with a view to sharing best practices in nuclear security and fostering international cooperation. We will contribute to the development of international nuclear security recommendations and guidance to service the IAEA's Nuclear Security Guidance Committee.

ASNO will support CTBT implementation in the Indo-Pacific, including through regional training programs. Through an enhanced partnership with Geoscience Australia, ASNO will ensure that Australia's National Data Centre can respond to potential nuclear threats in a coordinated way.

As IPNDV celebrates the 10th year since establishment, ASNO will continue its leadership role, including as an IPNDV working group co-chair. A focus will be further outreach activities in the Indo-Pacific.

ASNO will ensure all CWC obligations are fully meet. Following on from the success of the OPCW Australia–Malaysia Partnership Program, ASNO is working with Malaysia and the OPCW on a proposal for a laboratory twinning program. ASNO will identify other regional program opportunities to progress CWC implementation.

Section 2
Current Topics

Director General ASNO was Head of Delegation at the Chemical Weapons Convention Fifth Review Conference at the Hague.

Safeguarding Naval Nuclear Propulsion

The Australian Government is committed to pursuing Australia's naval nuclear propulsion (NNP) program in a way that sets the highest non-proliferation standard.

The NNP program will sit within the framework of Australia's CSA and Additional Protocol (AP) with the IAEA. These agreements, along with the Statue of the IAEA, provide the IAEA with the authority and mandate to engage directly with Australia on the establishment and application of safeguards and verification arrangements, including in relation to NNP.

Under the *Non-Proliferation (Safeguards) Act 1987*, ASNO is responsible for ensuring that Australia meets its safeguards treaty obligations, including those that apply to the NNP program. ASNO will work with the IAEA, DFAT, Australian Submarine Agency (ASA), other domestic stakeholders and trilateral partners to put in place safeguards and verification measures that enable the IAEA to meet its technical objectives under the CSA and AP throughout the lifecycle of the NNP program while protecting classified and controlled information and assets. This will include developing an arrangement pursuant to Article 14 of Australia's CSA. Australia commenced negotiations with the IAEA on an Article 14 arrangement in May 2023.

Australia has made non-proliferation commitments related to the most proliferation-sensitive stages of the nuclear fuel cycle, namely, not to enrich uranium or reprocess spent fuel as part of the NNP program. This commitment does not impact the pre-existing small-scale research and development on enrichment carried out by private companies, regulated by ASNO and subject to IAEA safeguards (see Output 1.1).

25-Year Anniversary of Australia's Implementation of the Additional Protocol (AP)

The year 2022 marked 25 years since the AP was adopted by the IAEA Board of Governors in May 1997, with the anniversary celebrated during the IAEA Symposium on International Safeguards held in October–November 2022.

The AP significantly increases the IAEA's ability to verify the peaceful use of all nuclear material in States with comprehensive safeguards agreements. ASNO played a key role in the development of the AP by actively participating in the IAEA DG's Standing Advisory Group on Safeguards Implementation (SAGSI), Program 93+2 process and Committee 24, and by providing practical support in road testing AP methodologies, including hosting trials of new verification techniques and expanded declarations.

Australia was the first country to bring the AP into force, on 12 December 1997. The AP is now in force in 141 States and Euratom. In 2000, Australia became equal first State (with the Holy See) to receive the IAEA's broader conclusion. This confirmed the IAEA's confidence that Australia had not diverted any declared nuclear material and that there was no undeclared nuclear material or activities in Australia. Since then, the IAEA has continued to improve the effectiveness and efficiency of safeguards implementation, including through customised State-level approaches for States with the broader conclusion.

Looking ahead, safeguards will need to remain fit-for-purpose to meet new challenges, such as advances in nuclear technology and an ever-growing stockpile of nuclear material around the world. Member States will have a role to play, by working with the IAEA to modernise declarations, develop new verification methodologies and leverage next-generation technologies. Australia, through the Australian Safeguards Support Program, will remain at the forefront of these efforts.

Chemical Weapons Convention

A CWC landmark moment occurred just outside the reporting period of this Annual Report but is mentioned here given its significance and implications for the future direction of OPCW's work.

On 7 July 2023, the OPCW announced that the last **declared** chemical weapon in the world had been destroyed, taking the total of all OPCW-verified destructions since 1997 to 72,304.34 metric tonnes.

So, what is next? In an increasingly complex strategic environment and with new risks emerging from scientific and technological advancements, the OPCW will play a vital role in preventing the re-emergence and use of chemical weapons, by States or non-state actors.

OPCW Chemtech Centre opened in May 2023. Australia was one of the contributing countries to its establishment.

The Nuclear Industry – Some Current Issues

As of May 2023, there were 436 operable reactors and 59 under construction. In the calendar year to date, four reactors were connected to the grid and five reactors shut down.[1]

While the main growth of nuclear power is from countries where nuclear technology is already well established, interest in nuclear power continues to grow in potential new starters, with around 30 countries considering, planning or actively constructing their first nuclear power plants.

In 2022, nuclear power capacity increased slightly to 414 GW and global nuclear power reactors generated more than 2,500 TWh of electricity for the sixth year running, supplying one-third of the world's low-carbon electricity and accounting for approximately 10 per cent of global power generation. Nuclear power generation in Asia increased and is forecasted to continue to do so. Nuclear generation in the rest of the world remained largely unchanged.[2, 3]

The challenge of net zero carbon emissions coupled with demands for energy security has stimulated significant interest in small modular reactor (SMR) technologies. As of 2023, there are more than 80 commercial modular reactor designs under development in 19 countries, with target applications including power generation, heating, water desalinisation and steam for industrial applications.[4]

SMRs are advanced nuclear reactors with a power capacity less than 300 MW, which can be built in one location (such as a factory), then shipped to, commissioned and operated at a separate site. In comparison to existing reactors, proposed SMR designs are generally simpler, have reduced fuel requirements and given their smaller physical footprint, can be sited on locations not suitable for larger nuclear power plants.

[1] https://pris.iaea.org/pris/home.aspx
[2] www.iea.org/reports/nuclear-power-and-secure-energy-transitions/executive-summary
[3] Small nuclear power reactors – WorldNuclear Association (world-nuclear.org)
[4] https://www.neimagazine.com/features/featureiaea-ups-support-for-smrs-10528638/

Uranium Exports and Production

Australia has approximately one-third of the world's uranium deposits and, as at 30 June 2023, has two operating uranium mines in South Australia – Olympic Dam and Beverley/Four Mile.

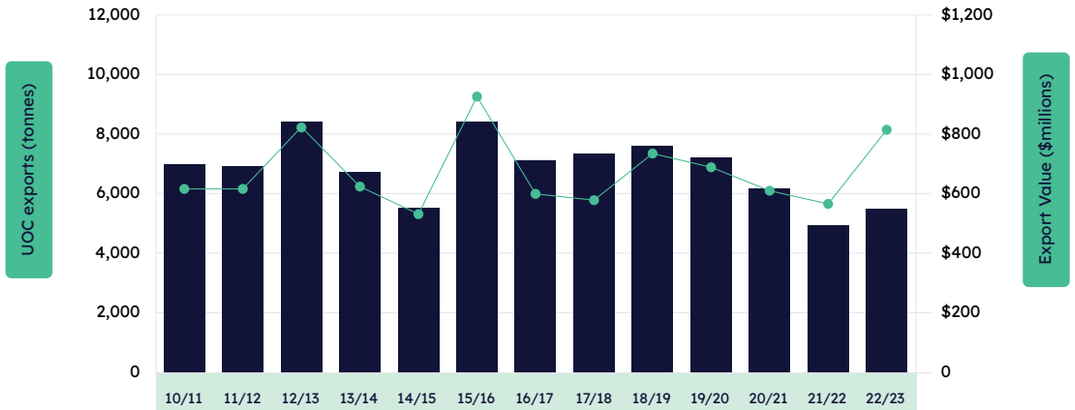
In 2022, Australia (8.4%) remained behind Kazakhstan (43%), Canada (15%) and Namibia (11%) as the fourth largest producer of UOC.

In Australia there are two projects in the process of resuming, or commencing, uranium mining.

The Honeymoon Mine in South Australia is continuing to work to restart production in the final quarter of 2023. Mulga Rock in Western Australia is expecting to complete an updated feasibility study in 2024 with production anticipated by 2026.

Table 1: UOC (U_3O_8) export and nuclear electricity statistics

Item	Data
Total Australian UOC exports FY2022–23	5,485 tonnes
Value Australian UOC exports	$812 million
Australian exports as percentage of world uranium requirements[5]	7.1%
Power generated by these exports	188 TWh
Expressed as percentage of total Australian electricity production[6]	71%



	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
UOC exports (tonnes)	6,950	6,918	8,391	6,701	5,515	8,417	7,081	7,343	7,571	7,195	6,166	4,933	5,485
Value (A$ millions)	$610	$607	$823	$622	$532	$926	$596	$575	$734	$688	$606	$564	$812

[5] Based on a comparison of global uranium requirements and TWh of nuclear energy produced for countries eligible to use AONM, from the World Nuclear Association's World Nuclear Power Reactors & Uranium Requirements, August 2023.

[6] Based on Australia's electricity generation in 2020–2021 of 266 TWh from the Department of Industry, Science, Energy and Resources, Australian Energy Update 2022.

Looking ahead, safeguards will need to remain fit-for-purpose to meet new challenges, such as advances in nuclear technology and an evergrowing stockpile of nuclear material around the world.

Section 3
ASNO Functions

Director General ASNO presenting on the Asia-Pacific Safeguards Network at the IAEA's 2022 Symposium on International Safeguards.

Nuclear Safeguards Functions

Entering into force in March 1970, the *Treaty on the Non-Proliferation of Nuclear Weapons* (NPT) is the cornerstone of the international nuclear non-proliferation regime.

ASNO officer presenting at the INMM and ESARDA second annual Joint Annual Meeting at the Austria Centre in Vienna

Nuclear Non-Proliferation (Safeguards) Act 1987

The *Nuclear Non-Proliferation (Safeguards) Act 1987* (Safeguards Act), which took effect on 31 March 1987, forms the legislative basis for ASNO's nuclear safeguards and security activities across Australia.

The Safeguards Act gives effect to Australia's obligations under:

- the NPT
- Australia's Comprehensive Safeguards Agreement and Additional Protocol with the IAEA
- agreements between Australia and various countries (and Euratom) concerning transfers of nuclear items and cooperation in peaceful uses of nuclear energy[7]
- the Amended Convention on the Physical Protection of Nuclear Material (A/CPPNM)
- the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT).

The Safeguards Act also establishes a system for control over nuclear material and associated items in Australia through requirements for permits for possession and transport. Communication of information contained in sensitive nuclear technology is also controlled through the grant of authorities.

The functions of ASNO and the myself are set out in Part IV of the Safeguards Act and include:

- ensuring the effective operation of the Australian safeguards system
- ensuring the physical protection and security of nuclear material and items in Australia
- carrying out Australia's obligations under Australia's safeguards agreement and Additional Protocol with the IAEA
- carrying out Australia's obligations under Australia's NCAs with other countries and Euratom
- operating Australia's bilateral NCAs and monitoring compliance with the provisions of these agreements
- undertaking, coordinating and facilitating research and development in relation to safeguards
- advising the Minister for Foreign Affairs on matters relating to the international nuclear non-proliferation regime and the international safeguards system.

[7] See Appendix A

Comprehensive Nuclear-Test-Ban Treaty Functions

Article IV of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) provides that its verification regime shall be capable of meeting the requirements of the Treaty when it enters into force. This has required a substantial program of preparation in advance of the Treaty's entry into force.

To make the necessary preparations, a Preparatory Commission for the CTBT Organization (CTBTO) was established in 1997, made up of CTBT States Signatories and supported by a Provisional Technical Secretariat. The tasks of the CTBTO include the establishment and provisional operation of an International Monitoring System (IMS) comprising 337 facilities around the world and an International Data Centre in Vienna. The CTBTO must also establish a capability to conduct an on-site Inspection if concerns are raised about a possible nuclear explosion.

ASNO is Australia's designated national authority for the CTBT. This role is one of liaison and facilitation to ensure that the IMS is established efficiently and relevant domestic arrangements are in place. Key functions include:

- national point of contact for liaison on CTBT implementation
- establishing and maintaining legal, administrative and financial mechanisms to give effect to the CTBT in Australia
- coordinating the operation of IMS facilities in Australia and of measures to enable Australia to effectively monitor and analyse IMS and other CTBT verification data
- contributing to the development of Treaty verification, through the CTBTO and its working groups
- participating in development and implementation of Australian policy relevant to the CTBT
- supporting regional CTBT implementation.

Comprehensive Nuclear-Test-Ban Treaty Act 1998

The *Comprehensive Nuclear-Test-Ban Treaty Act 1998* (CTBT Act) gives effect to Australia's obligations as a party to the CTBT. It prohibits the causing of any nuclear explosion at any place within Australian jurisdiction or control and establishes a penalty of life imprisonment for an offence against this prohibition. The CTBT Act also prohibits Australian nationals from causing a nuclear explosion in any other place.

The CTBT Act requires the Australian Government to facilitate verification of compliance with CTBT provisions, including the obligation to arrange for the establishment and operation of Australian IMS stations and the provision of data from these. It provides the Government with the authority to establish IMS stations and to make provision for access to them for CTBT monitoring purposes. The CTBT Act makes provision for the Minister for Foreign Affairs to enter into arrangements with the CTBTO to facilitate cooperation in relation to monitoring stations under Australian control.

Chemical Weapons Convention Functions

Malaysia, OPCW and Australia co-hosted a Subregional Forum on CWC for Pacific Island States in Brisbane. Participants were addressed by OPCW Director-General, Arias and Assistant Foreign Minister, Watts.

The Convention on the Development, Production, Stockpiling and Use of Chemical Weapons and Their Destruction (or Chemical Weapons Convention CWC) prohibits the development, production, acquisition, stockpiling, retention, transfer and use of chemical weapons.

Its verification regime is based on declarations by States Parties of facilities and activities dealing with particular chemicals, and on confirmation of compliance through on-site inspections.

ASNO is Australia's designated national authority for the CWC. It acts as the primary liaison between domestic CWC stakeholders (such as declared chemical facilities), the Organisation for the Prohibition of Chemical Weapons (OPCW) and the national authorities of other States Parties.

ASNO officer at the 24th National Authorities Meeting.

Through a system of permits and notifications under the *Chemical Weapons (Prohibition) Act 1994* and the Customs (Prohibited Imports) Regulations 1956, ASNO gathers information from the chemical industry, traders, universities and research institutions to compile declarations that Australia must submit to the OPCW. ASNO conducts compliance inspections of relevant facilities in Australia. ASNO conducts outreach activities, including site visits, to promote compliance and to check the accuracy of information provided by industry.

The OPCW conducts routine inspections of facilities listed in Australia's CWC declarations. ASNO facilitates these inspections to ensure Australia's obligations are met and to protect the rights of facility operators.

ASNO promotes effective international implementation of the CWC, particularly in Australia's region. It works with the OPCW and other States Parties to formulate policy and provide practical implementation assistance.

ASNO's key CWC functions are:

- Australia's point of contact for liaison on CWC implementation
- identifying and gathering information on industrial chemical facilities and other activities, subsequently reported to the OPCW if declarable
- preparing for and facilitating OPCW inspections in Australia
- promoting awareness and effective implementation of the CWC, both domestically and internationally
- providing technical and policy advice to Government
- administering and developing related regulatory and administrative mechanisms.

Chemical Weapons (Prohibition) Act 1994

The *Chemical Weapons (Prohibition) Act 1994* (CWP Act) was enacted on 25 February 1994.

The CWP Act gives effect to Australia's obligations, responsibilities and rights as a State Party to the CWC. In particular, the CWP Act:

- prohibits activities connected to the development, production or use of chemical weapons, including assisting anyone engaged in these activities, whether intentionally or recklessly – such offences are punishable by life imprisonment
- establishes permit and notification systems to provide a legal framework for the mandatory provision of data to ASNO by facilities which produce or use chemicals as specified by the CWC, so that ASNO can lodge declarations with the OPCW
- provides for routine inspections of declared facilities and challenges inspections of any facility or other place in Australia by OPCW inspectors to verify compliance with the CWC and for inspections by ASNO to verify compliance with the CWP Act provides for procedures should another State Party seek clarification concerning compliance with the CWC at any facility or other place or by any person in Australia.

Regulations under the CWP Act prescribe procedures and details of other arrangements under the CWP Act. In particular, the Regulations define conditions that are to be met by holders of permits issued under the CWP Act and for granting privileges and immunities to OPCW inspectors when carrying out inspections in Australia.

Other Functions

South Pacific Nuclear Free Zone Treaty

The South Pacific Nuclear Free Zone (SPNFZ) Treaty (also known as the Treaty of Rarotonga) prohibits the manufacture, possession, stationing and testing of nuclear explosive devices, as well as research and development relating to manufacture or production of nuclear explosive devices, in any area for which the Signatory Parties are responsible. The SPNFZ Treaty also bans the dumping of radioactive waste at sea. Australia ratified the Treaty on 11 December 1986, which enabled its entry into force. The Treaty has 13 Parties: Australia, Cook Islands, Fiji, Kiribati, Nauru, New Zealand, Niue, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

The SPNFZ Treaty has three protocols. Under Protocol 1, the US, UK and France are required to apply the basic provisions of the Treaty to their respective territories in the zone established by the Treaty.

Under Protocol 2, the US, France, UK, Russia and China agree not to use or threaten to use nuclear explosive devices against any party to the Treaty or to each other's territories located within the zone.

Under Protocol 3, the US, France, UK, Russia and China agree not to test nuclear explosive devices within the zone established by the Treaty.

France and the UK have ratified all three protocols. Russia and China have ratified the protocols relevant to them, Protocols 2 and 3. The US is yet to ratify the SPNFZ Treaty protocols.

South Pacific Nuclear Free Zone Treaty Act 1986

The *South Pacific Nuclear Free Zone Treaty Act 1986* (SPNFZ Act) came into force in Australia on 11 December 1986 and gives effect to Australia's obligations, responsibilities and rights under the SPNFZ Treaty.

The SPNFZ Act also establishes the framework for SPNFZ Treaty inspections.

Inspectors appointed under the Safeguards Act are also inspectors for the purposes of the SPNFZ Act. These inspectors are to assist SPNFZ Treaty inspectors and authorised officers in carrying out SPNFZ Treaty inspections and to investigate possible breaches of the SPNFZ Act.

IAEA Director General meeting with Minister for Foreign Affairs in Adelaide August 2022.

Outcomes and Outputs Structure

Table 2: ASNO's Outcomes and Outputs structure

Outcome 1	**Australian and international security protected and advanced through activities which contribute to effective regimes against the proliferation of nuclear and chemical weapons**	
	Output 1.1	Operation of Australia's national system of accounting for, and control of, nuclear material, items, activities and facilities
	Output 1.2	Protection of Australia's nuclear facilities, nuclear material and associated items against unauthorised access, removal and sabotage, including the overseas transport of Australian uranium. Internationally agreed physical protection standards are applied to Australian Obligated Nuclear Material (AONM) overseas.
	Output 1.3	Nuclear material and associated items exported from Australia under bilateral agreements remain in exclusively peaceful use and obligations under nuclear cooperation agreements are effectively implemented
	Output 1.4	Contribution to the development and effective implementation of international safeguards and the nuclear non-proliferation regime
	Output 1.5	Regulation and reporting of Australian chemical activities in accordance with the Chemical Weapons Convention and strengthening international implementation of the CWC
	Output 1.6	Development of verification systems and arrangements in support of Australia's commitments related to the Comprehensive Nuclear-Test-Ban Treaty
	Output 1.7	Contribution to the development and strengthening of other weapons of mass destruction non-proliferation and disarmament regimes and a world without nuclear weapons
	Output 1.8	Provision of high-quality, timely, relevant and professional advice to Government
Outcome 2	**Knowledge about Australian's efforts to prevent the proliferation of weapons of mass destruction enhanced through public advocacy**	
	Output 2.1	Provision of public information on the development, implementation and regulation of weapons of mass destruction, non-proliferation regimes and Australia's role in these activities

ASNO has a long history delivering on Australia's WMD treaty commitments. We are a respected voice for advancing global non-proliferation.

ASNO officers took a tour of the Westinghouse Fuel Fabrication Facility in Sweden.

Section 4
Performance

National Safeguards Systems

Operation of Australia's national system of accounting for, and control of, nuclear material, items and facilities.

Performance Measures

Australia continues to receive the broader conclusion that 'all nuclear material remained in peaceful activities' from the IAEA.

Australia's system of safeguards permits and authorities is administered in a timely and effective manner.

Australia's obligations are met under Australia's Comprehensive Safeguards Agreement and Additional Protocol with the IAEA.

The quantities, categories, locations and intended end-uses of nuclear material and associated items within Australia are accounted for.

Performance Assessment

International Obligations

Reporting Obligations under Australia's Comprehensive Safeguards Agreement

During the reporting period, ASNO submitted all reports, declarations and notifications to the IAEA on nuclear materials, facilities and activities, ensuring that Australia met its obligations under its safeguards agreements with the IAEA.

Table 3: Material balance areas (MBAs) in Australia for IAEA safeguards purposes

Location	MBA	Name of facility or location outside facility (as designated in Australia's subsidiary arrangements with the IAEA)
Lucas Heights	AS-A	HIFAR (Note: de-fuelled in 2007)
Lucas Heights	AS-C	Research and development laboratories
Lucas Heights	AS-D	Vault storage
Elsewhere	AS-E, ASE1 & ASE2	Other locations in Australia (e.g. universities, industrial radiography companies, hospitals)
Lucas Heights	AS-F	Open-pool Australian Lightwater (OPAL) reactor
Lucas Heights	AS-H	Synroc-Molybdenum waste immobilisation (SyMo) plant
CSIRO (various sites)	AS-I	CSIRO

For each material balance area (MBA) (summarised in Table 3), ASNO provided reports to the IAEA as required by the Comprehensive Safeguards Agreement.

Table 4 is a summary of total quantities of nuclear material by category in Australia. A small quantity (2.75 kg) of ^{235}U in high enriched uranium is retained in Australia and used for a variety of purposes primarily due to the utility of the particular chemical, physical and isotopic characteristics.

Typical uses of this material include: research and development related to nuclear non-proliferation activities; validating the commercial application of the Australian Nuclear Science and Technology Organisation's (ANSTO) Synroc waste immobilisation technology; nuclear forensics for identifying illicit nuclear materials; neutron detection; development of other detection technologies and chemistry work. The quantity comprises several items in various locations around Australia such as ANSTO and some universities.

As well as requiring reporting on nuclear material inventory and transactions, the Comprehensive Safeguards Agreement also requires reporting on design and operational attributes (relevant to safeguards) of nuclear facilities and locations outside facilities (LOFs). During the reporting period, ASNO submitted an updated Design Information Questionnaire (DIQ) for the ASH-Synroc waste immobilisation (SyMo) plant. On 10 March, ASNO submitted preliminary design information in accordance with Modified Code 3.1 of the Subsidiary Arrangements to the Comprehensive Safeguards Agreement for planned new facilities related to the naval nuclear propulsion program

The Safeguards Act requires permits for possession of nuclear material, as well as associated material, associated equipment and associated technology (collectively termed associated items). The Safeguards Act also requires permits to establish or decommission a nuclear facility. Permits for associated items ensure Australia can maintain regulatory controls on technology, equipment and material with potential proliferation risks, can report on design attributes for DIQs and meet other reporting obligations under various NCAs. Table 5 lists the inventory of associated items in Australia.

Table 4: Nuclear material in Australia at 30 June 2023

Category	Quantity	Intended end-use
Source Material		
Uranium ore concentrate (UOC)	720 tonnes	Export for energy use pursuant to bilateral agreements
	3.5 tonnes	Storage
Natural uranium (other than UOC)	4,487 kg	Research, storage
Depleted uranium	28,788 kg	Research, shielding
Thorium ore residues	59 tonnes	Storage/disposal
Thorium (other than thorium ore residues)	1,936 kg	Research, industry
Special Fissionable Material		
^{235}U – low enriched	240,929 grams[8, 9]	Research, radioisotope production, storage
^{235}U – high enriched	2,754 grams[2]	Research, storage
^{233}U	3.8 grams[2]	Research
Plutonium (other than ^{238}Pu)	1,201 grams	Research, neutron source

[8] The quantity of ^{235}U in low enriched uranium in Australia increased between 30 June 2022 and 30 June 2023 primarily due to the import of fresh fuel assemblies for the OPAL reactor.

[9] Quantities of ^{235}U and ^{233}U are isotope weights.

Table 5: Associated items[10] in Australia at 30 June 2023

Category	Quantity	Intended end-use
Associated material		
Deuterium and heavy water	20.9 tonnes	Research, reactors
Nuclear grade graphite	83.3 tonnes	Research and storage
Associated equipment		
HIFAR[11]	1	Reactor
HIFAR coarse control arms (unused)	5	Reactor components
HIFAR coarse control arms (used)	14	Reactor components
HIFAR safety rods	3	Reactor components
HIFAR fuel charging and discharging machines	2	Reactor components
OPAL reactor[12]	1	Reactor
OPAL control rods	14	Reactor components
OPAL control rod drives	6	Reactor components
Nuclear-grade zirconium tubes	<50 kg	R&D and storage
Self-powered neutron detectors	46	Reactor components

Reporting Obligations under the Australia–IAEA Additional Protocol

The Additional Protocol gives the IAEA greater access to information and locations related to nuclear fuel cycle activities, thereby allowing the IAEA to provide greater assurances not only that all declared nuclear material is accounted for, but also that States do not have any undeclared nuclear material or activities. Australia was the first country to sign and ratify an Additional Protocol with the IAEA, which came into force for Australia on 12 December 1997.

ASNO prepares and provides annual declarations under a range of Additional Protocol categories, as well as quarterly declarations on relevant exports. An important aspect of the Additional Protocol is reporting to the IAEA on nuclear fuel cycle-related research and development activities and plans relevant to the development of the fuel cycle. ASNO ensured that all IAEA requirements were met during the reporting period, including with respect to Australia's intention to acquire conventionally armed, nuclear-powered submarines.

International Atomic Energy Agency Consultancy Meetings

ASNO provided expert advice at two consultancy meetings held at the IAEA, in November 2022 and April 2023. ASNO's subject matter expert attended the 'Consultancy Meeting on Guidelines to Assess the Development and Deployment of an Undeclared Enrichment Plant using Isotope Separation with Laser Technologies' to draft technical reference documents to provide IAEA staff with guidance on performing acquisition path analysis for an undeclared enrichment plant using isotope separation with laser technologies.

Safeguards Developments in Australia

The IAEA implements safeguards in Australia in accordance with the provisions in a range of legal instruments: the Comprehensive Safeguards Agreement; Additional Protocol; Subsidiary Arrangements; facility attachments and LOF attachments for each MBA.

Australia's MBAs are described in Table 3. The overarching framework the IAEA uses to prioritise and optimise various in-field verification and IAEA headquarters analysis activities under these instruments is the State-level approach for Australia.

ANSTO continues to construct its SyMo plant and the IAEA conducted DIVs at the facility in May 2022 and June 2023. The IAEA is likely to conduct baseline environmental sampling in 2024.

All entities holding a permit to possess nuclear material are required to conduct an annual physical inventory taking (PIT) (a stocktake of nuclear material held). The 2023 PITs were completed successfully with subsequent reporting to the IAEA submitted on time.

ASNO continued to engage with the Australian Radioactive Waste Agency (ARWA) in its mandate to establish a facility for Australia's radioactive waste.

Permits and Authorities System

ASNO continued to operate Australia's State system of accounting for and control of nuclear material (SSAC) in accordance with Australia's Comprehensive Safeguards Agreement with the IAEA and national legislation. Australia's SSAC is implemented through permits issued under the Safeguards Act. Notices of all permit changes were published in the Australia Government Gazette as required by subsection 20(1) of the Safeguards Act. A summary of all permits granted, varied, revoked and expired in the reporting period is in Table 6.

During the reporting period, all permits of the following types were varied and extended as part of ASNO's rolling plan of permit updates: permit to possess associated technology for patent attorneys and archives; permits to possess UOC for mines; and permits to transport and export UOC (see Output 1.2).

Essential for the operation of the permit system is a fit-for-purpose database for managing permits and preparing routine reports on nuclear material inventory and transactions to the IAEA. ASNO continued to work with the database development team (under DFAT's Information Management Division) on the continuing development of ASNO's NUMBAT database.

Table 6: Status of permits and authorities under the Safeguards Act at 30 June 2023 and changes in the reporting period

Permit or authority	Current total	Granted	Varied	Revoked	Expired
Possess nuclear material	116	2	9	0	1
Possess associated items	9	0	7	0	1
Transport nuclear material	16	0	1	0	0
Transport associated items	0	0	0	0	0
Establish a facility	1	0	0	0	0
Decommission a facility	2	0	0	0	0
Communicate information contained in associated technology	6	0	5	0	1
Total	**150**	**2**	**22**	**0**	**3**

[10] Not including items categorised as associated technology.

[11] The ANSTO Board decided to cease operation of HIFAR in January 2007. The reactor was de-fuelled in May 2007. It is awaiting decommissioning.

[12] Includes, inter alia, the reactor reflector vessel and core grid.

IAEA Inspections

The IAEA conducted several inspections in accordance with standard arrangements under Australia's Comprehensive Safeguards Agreement and the Additional Protocol. ASNO officers facilitated access for the IAEA inspectors in accordance with conditions under respective permits issued under the Safeguards Act and accompanied the inspectors during all of their activities.

In the reporting period, IAEA inspectors made four separate visits to Australia. The IAEA conducted a random interim inspection at short notice at the OPAL reactor and a random interim inspection of hot cells at ANSTO Research and Development Laboratories in October 2022. The IAEA conducted an interim inventory inspection in which it verified the uranium content of solid radiopharmaceutical waste from molybdenum-99 production using the active well coincidence counter and then applied dual containment seals to the verified waste. The IAEA also conducted environmental sampling inside of a hot cell in ANSTO Research and Development Laboratories.

The IAEA conducted its annual, scheduled physical inventory verification (PIV) inspections at ANSTO in June 2023, as well as PIV inspections at two LOFs in October 2022: the CSIRO (Black Mountain ACT) and Ubaryon Pty Ltd (Lucas Heights NSW). In May the IAEA conducted a design information verification (DIV) at the declared location for the planned construction of Australia's nuclear-powered submarines. The IAEA also conducted complementary access at University of Melbourne, ANSTO, Ranger Mine and CSIRO (Floreat WA) during the reporting period. Details on all inspections are provided in Table 7. The IAEA's findings from these inspections (where available at the time of publishing this Annual Report) are listed in Appendix D.

Table 7: IAEA safeguards inspections 2022–23

Date	Facility	MBA[13]	Type[14]
13 October 2022	ANSTO	AS-F	Random Interim Inspection of OPAL Reactor
14 October 2022	ANSTO	AS-C	Random Interim Inspection of hot cells
18 October 2022	CSIRO	AS-I	PIV
20 October 2022	Ubaryon Pty Ltd	ASE1	PIV
21 October 2022	ANSTO	AS-C	DIV including Hot Cell Environmental Sampling
24–28 October 2022	ANSTO	AS-C	Interim Inventory Verification
21 March 2023	University of Melbourne	AS-E	Complementary Access (4.a.i)
23 March 2023	ANSTO	AS-C AS-D	Complementary Access (4.a.i)
8 May 2023	Not yet assigned	Not yet assigned	DIV
2–9 June 2023	ANSTO	AS-C	DIV and PIV
		AS-F	DIV and PIV
		AS-H	DIV
13 June 2023	Ranger Mine	AS-E	Complementary Access (4.a.i)
15 June 2023	CSIRO	AS-I	Complementary Access (4.a.i)

[13] See explanation of each MBA in Table 3. The IAEA chose not to conduct a PIV in MBA AS-D during the reporting period.

[14] Details on different types of inspections are outlined in Appendix D.

ASNO officer at a Pre-PIV inspection.

Technical Workshop International Safeguards Implementation in SQP States in Bangkok, Thailand.

At Australia's invitation, the IAEA also participated in a transparency visit to a naval base that will be used for the maintenance of nuclear-powered submarines.

Overall, the IAEA has maintained the 'broader conclusion' for Australia that 'all nuclear material remained in peaceful activities' (see Appendix E).

ASNO Safeguards Inspections

ASNO accompanied the IAEA on all the inspections listed above to ensure Australia's obligations were met in a timely and efficient manner and to ensure the inspections were conducted effectively and in accordance with relevant information protection requirements. ASNO inspectors are able also to use these opportunities to observe the inspected organisation's performance against their domestic permit conditions, where applicable.

ASNO also conducted domestic inspections and separately visited some permit holders to discuss their arrangements for implementing permit conditions (see Output 1.2).

Throughout the year, ASNO assisted several organisations in Australia to characterise legacy items of nuclear material, ensuring that each item was measured with sufficient accuracy to enable accurate reporting to ASNO and the IAEA.

Inventory Balances

ASNO performed the annual material balance evaluation of the nuclear inventory accounts for each MBA with minor differences between book and physical inventories. These inventory differences were reported to the IAEA in conjunction with inventory change reports, physical inventory lists and material balance reports. Details are provided in Table 8. Differences were primarily due to re-measurement of small batches of nuclear material at universities and research institutes.

Table 8: Inventory differences recorded during 2022–23

MBA	Difference between book and physical inventories	Comment
AS-C	-0.09 kg natural uranium	Re-measurement of a batch weight
AS-F	+0.01 g element weight (+0.01 g ^{235}U) enriched uranium	Correction of rounding errors
Other locations (MBA AS-E and ASE1)	+1.89 kg depleted uranium	Re-measurements of weights of certain batches of chemical reagents, mainly to correct errors mistaking gross or net weights with element weights.
	+0.43 kg natural uranium	
	-0.06 kg thorium	

Nuclear Security

Protection of Australia's nuclear facilities, nuclear material and associated items against unauthorised access, removal and sabotage, including the overseas transport of Australian uranium. Internationally agreed physical protection standards are applied to Australian Obligated Nuclear Material (AONM) overseas.

Performance Measures

Security of nuclear material, technology and facilities meets Australia's obligations under the A/CPPNM, the ICSANT and bilateral NCAs and accords with relevant IAEA guidelines.

Proactive and professional contributions are made to the development and effective implementation of nuclear security worldwide

Internationally agreed standards for the security of nuclear material are applied to all AONM.

Performance Assessment

Australian Nuclear Material Categories

The tables below list the permit holders for which physical protection or information security is required, categorised according to the materials or items held.

Table 9: Distribution of nuclear material permit holders

Nuclear Material Category	Type of permitted activity	Number of permit holders
Category II[15]	Research reactor, storage	1
Category III	Storage, scientific research	1
Category IV[16]	Scientific research	1
Uncategorised[17]	LOFs, radiographers	107
Uranium ore concentrate	Uranium mines and concentration plants	4
Transport of nuclear material	Transport companies, ports, shipping lines	19

[15] Nuclear material category is based on IAEA Nuclear Security Series No. 13

[16] Category IV limits are 15g≥Pu>10g; 15g ≥(^{235}U≥20%)>10g; 1,000g ≥(^{235}U<20%-10%)>10g; 10 000g ≥(^{235}U<10%)>10g; 15g ≥^{233}U>10g; unirradiated source material ≤5,000kg. (%-enrichment)

[17] That is, below Category IV quantities

Table 10: Distribution of associated item permit holders

Associated items	Type of permitted activity	Number of permit holders
Associated items	Research, storage	4
Associated technology only	Patent attorneys and archives	5

International and Bilateral Obligations

Australia continues to subscribe to the IAEA's fundamental principles of nuclear security and is committed to incorporating IAEA nuclear security recommendations.[18]

The regulation of ASNO permit holders verifies that security arrangements at Australian nuclear facilities are in accordance with Australia's obligations under the A/CPPNM and relevant bilateral NCAs.

Throughout the reporting period, ASNO ensured that domestic nuclear security arrangements incorporated IAEA recommendations. During the export of UOC from Australia, ASNO notified relevant parties of transhipments to meet Australia's international shipment notification obligations under the A/CPPNM.

Exports of Australian Uranium

Australian uranium (UOC) exports are undertaken in accordance with transport permit requirements that are applied across all transport modes. Minimum security requirements include verifying the integrity of containers holding UOC and checking of container seals at each port of unloading or transhipment. There were no security incidents (malicious acts) involving the transport of UOC in Australia during the reporting period.

Minor incident reports were received, each of which was reviewed and managed appropriately with no ongoing security issues. In November 2022, a shipment of UOC in transport departed from the approved route due to an unrelated incident and consequent road closure. Communication with road and traffic authorities allowed for the controlled rerouting of the shipment to ensure timely delivery.

Nuclear Security of UOC at Australian Mines and in Transport

During the reporting period, ASNO inspected three uranium mines and one transport company, with no significant security deficiencies identified.

In August 2022, ASNO conducted a routine inspection at Heathgate Resources Beverley Uranium Mine, evaluating security plans and procedures against ASNO permit requirements and verifying implemented measures arising from previous inspection recommendations. The inspection included a review of security upgrades to the UOC calciner and new equipment and verifying packaging plant access control measures and UOC transport documentation.

ASNO conducted a routine inspection in May 2023 of BHP Olympic Dam Mine and specifically the plans and arrangements associated with the production and storage of UOC. The inspection included BHP's security and accountancy arrangements, physical protection and security monitoring capability and the accounting of nuclear material in storage and transport.

The physical protection of UOC in transport extends from mine to port and in keeping with ASNO's outreach and engagement activities, a scheduled inspection of a transport company in August 2022 included being a passenger during conveyance of UOC from mine to the approved storage location near the port. ASNO observed that transport security procedures, planned brief stops and storage incidental to transport were correctly implemented by the carrier.

[18] The 2014 *Joint Statement on Strengthening Nuclear Security Implementation* was distributed by the IAEA as INFCIRC/869 and can be found at: www.iaea.org/sites/default/files/publications/documents/infcircs/infcirc869.pdf

A routine ASNO inspection at a mine (Heathgate).

ASNO also conducted an inspection at the Energy Resources of Australia Ltd (ERA) Ranger Mine in June 2023. The mine stopped UOC production in 2021 and is progressing with decommissioning through the deconstruction of processing plant and other infrastructure. ASNO verified the suitability of systems for access control and unauthorised access detection and response, which are required permit conditions.

ASNO concluded that BHP, Heathgate and ERA continue to meet permit conditions related to nuclear security and accountancy to satisfactory levels.

Review of Permits to Possess and Transport Nuclear Material or Associated Items

ASNO keeps permits under ongoing review according to industry type or permit class, with major review done on a five-year cycle. All revised permits conform with relevant governance and risk management policies under the Government's regulatory reform agenda.

During the reporting period, ASNO reviewed and updated (March 2023) the class U1 model permits that apply to uranium mines that produce and export UOC. ASNO also reviewed and updated (September 2022) the class P1 and P2 model permits for the possession of associated technology, and the associated authority to communicate information.

Changes introduced included more detailed reporting requirements to improve compliance on annual inventory reporting. ASNO continues regulatory oversight of permit holders' activities and reporting of the storage of associated technology.

Transport of Nuclear Material, Including UOC

Shipping and port supply-chain disruptions and delays were ongoing and affected many shipments of Australian UOC to international converters. Ongoing communication with relevant government agencies and overseas counterparts minimised the physical security impacts of delays and vessel changes.

ASNO officer presenting at the ITC29 - International Training Course on the Physical Protection of Nuclear Materials and Nuclear Facilities, USA.

In October 2022, ASNO was advised of the requirement to vary a road transport of nuclear material due to an event beyond the planning covered in the transport plan. ASNO verified that the nuclear material remained under adequate security provisions, that a documented risk assessment was prepared and that the adopted variation ensured completion of a secure transport.

Major Design Basis Threat Review

As a central concept in the IAEA nuclear security guidance document, NSS13[19], the design basis threat (DBT) is a statement of credible adversary intentions and capabilities that is designed to represent a 'worst-case credible threat'. Physical protection systems at high-consequence nuclear facilities are designed and implemented to provide high assurances of protection against the DBT. NSS13 recommends that the State should continuously review the threat and evaluate the implications of any changes in the threat assessment or DBT.

ASNO completed a planned major review of Australia's DBT and published the document in November 2022. ASNO maintains the DBT with the support of other Australian Government agencies.

Nuclear Security at Lucas Heights (ANSTO)

In August 2022, ASNO completed an in-depth review of several ANSTO buildings holding nuclear material. The inspection focused on reviewing physical protection features, plans and arrangements for compliance against submitted facility security plans. Three additional buildings, with existing approved or noted facility security plans, were also inspected.

The OPAL reactor facility was inspected for physical protection features including siting physical components in each area; inspecting layers of physical protection and measures for the different security levels at the facility and observing access control features against the Reactor Facility Security Plan.

ASNO completed a visit to the Synroc facility (SyMo) under construction. Physical protection elements were identified in the facility, including access controls for sensitive areas. ASNO has issued approval for the facility to proceed to cold commissioning.

ASNO completed detailed inspections in March 2023 to verify and sight physical components and characteristics at two buildings at ANSTO; inspecting all physical protection systems and measures and observing access control features against the facility security plans. Personnel with operational and management responsibilities for these facilities were also interviewed for their understanding of the nuclear material physical protection systems and processes, including insider threat.

ASNO accompanied a shipment of nuclear material transported to Lucas Heights in May 2023. The inspection assessment met permit requirements and was in accordance with the transport security plan for the transfer of unirradiated target plates and to examine and assess the overall nuclear security arrangements as detailed in the transport security plans.

[19] Also referred to as INFCIRC/225/Rev.5

ASNO officers at a nuclear security meeting.

Australia subscribes to the IAEA's fundamental principles of nuclear security and is committed to incorporating IAEA nuclear security recommendations.

As part of the OPAL reactor regulatory licensing requirements, ANSTO submitted an integrated Periodic Safety and Security Review (PSSR) to the CEO of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) and myself as Director General ASNO. The PSSR examines individual aspects and synergies of security and safety factors in place for the OPAL reactor, following relevant ARPANSA and ASNO regulatory requirements. Launched in March 2018 and drawing on international best practice, the completed PSSR is a large scope of work. ASNO is continuing to review the document to ensure that security improvements are adopted in ongoing reactor operations.

SILEX Enrichment Technology

ASNO conducted a routine inspection at Silex Systems Limited (SSL) in May 2023 to verify security procedures. SSL holds several ASNO permits, including to possess associated technology for research and development of the Silex process towards commercialisation. ASNO continued regulatory oversight of SSL activities, including movements of sensitive nuclear technology.

Ubaryon Enrichment Technology

Ubaryon Pty Ltd holds a Permit to Possess Associated Technology for research and development into a uranium enrichment technique. ASNO conducted an inspection of a new Ubaryon location and laboratory in May 2023. Ubaryon had been affected by flooding at one of its previous locations and ASNO worked closely with Ubaryon to verify the retrieval of associated technology. ASNO continued to work closely in supporting the company to mature their security measures and culture and issued a revision of Ubaryon permits in June 2023.

Inspection of Locations Outside of Facilities

In May, ASNO conducted an inspection of nuclear material held at the Environmental Research Institute of the Supervising Scientist (ERISS) with offices and research laboratories located in Darwin. Protective security measures and storage arrangements were inspected against permit requirements.

Nuclear Security Guidance Committee

The primary role of the Nuclear Security Guidance Committee (NSGC) is to manage the production of guidance documents in the IAEA Nuclear Security Series (NSS). The NSGC comprises over 50 IAEA Member States and Australia (ASNO) has been a member since its inception in 2012.

During the reporting period, the NSGC met twice, with a focus on the continued development of nuclear security guidance, the nuclear safety/security interface and the revision or drafting of future publications. ASNO also coordinated input to the Member State's survey in relation to IAEA guidance document NSS20 *(Objective and Essential Elements of a State's Nuclear Security Regime)* and participated in the *Second Meeting of Legal and Technical experts on the need for revision of the Nuclear Security Fundamentals* document.

Strengthening Global Security

ASNO participated in the adversary pathway selection, cyber and physical protection system components of a hybrid Regional Response Technical Exchange co-hosted by ANSTO, Australian Federal Police, the US Department of Energy (International Nuclear Security Division) and ASNO in September 2022.

Russia's invasion of Ukraine has created unique safety and security risks to nuclear facilities in Ukraine, particularly at the Zaporizhzhia Nuclear Power Plant (ZNPP). The IAEA has deployed expert teams of IAEA staff, including nuclear security experts, to provide ongoing assessment of the situation at ZNPP. The IAEA's regular reporting continues to conclude that nuclear material has not been removed from the power plant. Other Ukraine nuclear facilities remain under their regulatory control and also have an IAEA expert team on-site.

Bilateral Safeguards

Nuclear material and associated items exported from Australia under bilateral agreements remain in exclusively peaceful use and obligations under NCAs are effectively implemented.

Performance Measures

AONM is accounted for in accordance with the procedures and standards prescribed under relevant bilateral agreements.

Foreign obligated nuclear material (FONM) is accounted for in accordance with the procedures and standards prescribed under relevant bilateral agreements.

NCAs are effectively implemented and administrative arrangements are reviewed and revised as necessary to ensure their continuing effectiveness.

Performance Assessment

Australian Obligated Nuclear Material

A principal responsibility of ASNO under the NCAs listed in Appendix A is to maintain accurate inventories of AONM as it moves through the international fuel cycle (as described in Appendix C). Based on ASNO's analysis of reports and other information from counterparts on AONM located overseas, ASNO concluded that all AONM remained in peaceful use and was satisfactorily accounted for. Details are provided in Table 11. The information is provided for the calendar year 2022, as this is the standard reporting period in all NCAs.

During 2022 there were 39 UOC shipments from Australia to NCA partner countries. ASNO notified the safeguards authorities in relevant countries of each export and these authorities confirmed receipt of the shipment. ASNO also notified the IAEA of each UOC export, under Article 35(a) of Australia's Comprehensive Safeguards Agreement in the case of exports to non-nuclear weapon States, and under the IAEA's Voluntary Reporting Scheme in the case of exports to Nuclear Weapon States.

A summary of transfers of AONM through the network of countries with NCAs is provided in Table 13. The AONM typically starts as UOC and moves through several countries before its intended end-use of electric power production in civil nuclear reactors and research or development for civilian applications. AONM cannot be used for any military purpose.

During the reporting period Canada made a correction to its inventory of AONM due to an overestimation of processes losses in Canadian conversion facilities between 1999 and 2020. Canada confirmed that no physical material had been unaccounted for and that the difference has arisen from the use of more accurate data to better assess internal process losses. All Canadian facilities are under IAEA safeguards and Canada has continued to receive the Broader Conclusion from the IAEA that all nuclear material remained in peaceful activities. Canada and Australia have since agreed that 142 tonnes of natural uranium would be added to Canada's AONM inventory in 2022 to reflect the improved data.

ASNO officers conducting inspections of physical protection systems and arrangements for nuclear material.

Table 11: Summary of net accumulated AONM by category, quantity and location as of 31 December 2022[20]

Category	Location	Tonnes[21]
Depleted uranium	Canada, China, European Union[22], Japan, Republic of Korea, Russia, United Kingdom, United States	146,554
Natural uranium	Canada, China, European Union, India, Japan, Republic of Korea, United Kingdom, United Kingdom, United States	36,394
Uranium in enrichment plants	China, European Union, Japan, United Kingdom, United States	29,594
Low enriched uranium	Canada, China, European Union, Japan, Mexico, Republic of Korea, Switzerland, Taiwan, United Kingdom, United States, Ukraine	21,012
Irradiated plutonium	Canada, China, European Union, Japan, Mexico, Republic of Korea, Switzerland, Taiwan, United Kingdom, United States	225
Separated plutonium[23]	European Union, Japan, United Kingdom[24]	11
Total		**233,780**

Table 12: Exports of Australian uranium by destination during 2022[25]

Region	Tonnes UOC (U_3O_8)	Percentage of total
Canada	2,527	55%
France	1,463	27%
United States	833	18%
Total	**4,823**	**100%**

[20] Figures are based on yearly reports to ASNO in accordance with Australia's bilateral agreements and other information held by ASNO.

[21] All quantities are given as tonnes weight of the element uranium or plutonium. The isotope weight of ^{235}U is 0.711 per cent of the element weight for natural uranium and from 1 to 5 per cent for low enriched uranium.

[22] Euratom is the European Atomic Energy Community. The Australian–Euratom NCA covers all 27 Member States of the European Union.

[23] Separated plutonium is plutonium recovered from reprocessing, before return to reactors for re-use in reactors for further power generation. This plutonium is used for reactor fuel after being mixed with uranium—termed mixed oxide (MOX) fuel. A significant proportion of Australian obligated separated plutonium is stored as MOX. Separated plutonium holdings fluctuate as plutonium is fabricated as MOX fuel and returned to reactors. On return to reactors the plutonium returns to the "irradiated plutonium" category.

[24] The UK has now agreed to independently report irradiated and separated plutonium. Some plutonium previously reported as 'irradiated' hasnow been corrected to 'separated'. UK separated plutonium is located at Sellafield.

[25] Export destinations for Australian uranium are decided by commercial factors including the availability of conversion capacity and customer preference.

Table 13: Summary of AONM transfers received in 2022[26]

Fuel cycle Stage	Destination	U (tonnes)
Conversion	Canada	2,299
	European Union	1,213
	United States	803
Deconversion	United Kingdom	1,730
Enrichment	European Union	414
	United Kingdom	364
	United States	256
Fuel fabrication	European Union	120
	Japan	15
	Republic of Korea	23
	United Kingdom	66
	United States	215
Reactor	European Union	21
	Switzerland	7
	Ukraine	1

Foreign Obligated Nuclear Material

Just as Australia's bilateral treaty partners report on AONM in their jurisdiction, ASNO in turn maintains an inventory and reports on the movement of FONM within Australia. FONM is nuclear material that an Australian entity has imported in accordance with a nuclear cooperation agreement with a foreign partner or nuclear material that has been produced using previously imported FONM. An example of this is the fuel and target plates used in the production of radiopharmaceuticals at ANSTO's OPAL reactor.

Foreign obligations are additional to the IAEA safeguards that apply to all nuclear material in Australia. Given the international, but jurisdictionally independent, nature of the nuclear fuel cycle (as described in Appendix C), nuclear material can be obligated by more than one bilateral treaty partner. Exporting countries may also choose not to place an obligation on particular types of nuclear material they export to Australia if they feel that IAEA safeguards alone can provide sufficient assurance of peaceful use.

ASNO tracks the movement of FONM in Australia and provides a FONM report to all bilateral treaty partners each year to reciprocate receipt of their annual AONM report. A breakdown of all FONM in Australia is at Table 14.

In addition to nuclear material, foreign obligations can be placed on non-nuclear material such as heavy water (referred to as 'associated material'), equipment and technology.

[26] Figures are for transfers completed between jurisdictions from 1 January to 31 December 2021.

Table 14: The total quantity of FONM in Australia (by category) from all partner countries as of 31 December 2022

Category	Quantity
Source Material	**kilograms**
Natural uranium (other than UOC)	49
Depleted uranium	2,611
Thorium (other than thorium ore residues)	739
Associated or non-nuclear material	**kilograms**
Heavy water and deuterium	10,695
Special fissionable material	**grams**
^{235}U – low enriched	224,295
^{235}U – high enriched	714
^{233}U	3.7
Plutonium (other than ^{238}Pu)	1,196

Bilateral Agreements

Engagement on Nuclear Cooperation Agreements

During the reporting period, ASNO held productive bilateral meetings with regulatory counterparts from Euratom, France, India, Sweden, Switzerland, the UK and the US. All meetings served to strengthen these important bilateral relationships and progress initiatives related to improving transparency and accountability for exported nuclear material.

In September 2022, ASNO hosted a specialist meeting with regulatory authorities of like-minded nations to discuss best practice approaches to monitoring and tracking obligated nuclear material as it moves through the nuclear fuel cycle. The meeting covered options to address contemporary nuclear safeguards challenges as well as nuclear accountancy and reporting arrangements. Follow-up meetings were held later in the reporting period.

Australia–US Technical Workshop

ASNO hosted a technical workshop with US regulatory counterparts on nuclear material accountancy. The bilateral training and development initiative increased mutual understanding of each country's regulatory systems, practices and processes to ensure robust reporting and efficient cooperation. Following the workshop, ASNO presented at an annual user training event for the US civilian nuclear industry.

Australia–Ukraine NCA and Australia–Russia NCAs

Australia maintains NCAs with Russia and Ukraine (see Appendix A). Regulatory controls were implemented to prevent AONM from being used for Russian domestic purposes in response to the shooting down of flight MH17 and Russia's temporary occupation of Crimea since 2014.

In 2016 Westinghouse Electric Sweden started supplying nuclear fuel to Russian-designed reactors in Ukraine, and nuclear fuel transfers to Ukraine that contained AONM commenced in 2021. Following Russia's full-scale invasion of Ukraine in 2022, ASNO has implemented a case-by-case basis approval process for the transfer of Australian uranium-based nuclear fuel to the Ukraine based on a robust risk assessment.

International Safeguards and Non-Proliferation

Contribution to the development and effective implementation of international safeguards and the nuclear non-proliferation regime.

Performance Measures

- Contribute to the strengthening of international safeguards in ways that advance Australia's interests.
- Contribute to policy development and diplomatic activity by DFAT.
- Contribute to the IAEA's Standing Advisory Group on Safeguards Implementation (SAGSI).
- Manage the Australian Safeguards Support Program (ASSP).
- Cooperate with counterparts in other countries in the strengthening of international safeguards and improvement of domestic safeguards implementation.
- Provide advice and assistance to the Australian Intelligence Community in support of national and international non-proliferation efforts.
- Manage ASNO's international outreach program.
- Assess developments in nuclear technology.

Performance Assessment

Strengthening International Safeguards

ASNO continues its active role in international efforts in shaping and developing the effective implementation of nuclear safeguards, through engagement in a range of fora and projects. This includes working directly with the IAEA, as well as with other international bodies, notably through ASNO's active membership of the Asia-Pacific Safeguards Network (APSN).

On broader aspects of safeguards implementation, ASNO's engagement included the IAEA Director General's SAGSI, technical meetings on IAEA safeguards projects and various conferences and workshops. In September 2022, ASNO participated in the annual IAEA General Conference, contributing to the negotiation of the Safeguards Resolution ('Strengthening the Effectiveness and Improving the Efficiency of Agency Safeguards') which was adopted by consensus.

ASNO participated in the IAEA's quadrennial Symposium on International Safeguards in October–November 2022

Director General ASNO joined colleagues from the IAEA to discuss Australia's Safeguards Program, in Vienna Austria.

presenting on experience gained over 25 years of Additional Protocol implementation. ASNO assisted researchers from CSIRO to present on deep borehole disposal and ANSTO to demonstrate gamma imaging equipment. The Symposium also provided an opportunity to highlight projects under the Australian Safeguards Support Program (ASSP), including particle analysis at Curtin University and University of Western Australia (UWA) and open-source information analysis at University of Sydney. ASNO sponsored travel for a student from University of New South Wales as a winner of the IAEA paper competition for students for his paper on potential applications of distributed ledger technology to nuclear material accountancy.

Australian Safeguards Support Program

The ASSP is one of 23 programs established by Member States and the European Commission to assist the IAEA in safeguards research, development and implementation. Australia has one of the longest-running programs, in place since 1980.

Under the ASSP, ASNO coordinated contributions from several Australian agencies including ANSTO, CSIRO, the Office of National Intelligence (ONI), University of Sydney and UWA to several ongoing projects, including research and development on new safeguards technology and approaches, delivery of safeguards training and provision of technical services.

ANSTO's Centre for Accelerator Science and UWA's Centre for Microscopy, Characterisation and Analysis continue to participate in the IAEA Department of Safeguards' Network of Analytical Laboratories (NWAL), providing analysis of IAEA environmental swipe samples.

Throughout the reporting period, UWA has continued to use its large-geometry secondary ion mass spectrometer (LG-SIMS) for uranium isotopic characterisation of particles in environmental samples from IAEA inspections, one of only a handful of labs in the world that are certified to provide this service to the IAEA. Over the last two years, UWA has increased its capacity to analyse IAEA samples from about 20 per year to 40 to help meet the IAEA's growing demand for particle analysis.

The IAEA Deputy Director General and Head of Safeguards, visited the Centre in May 2023 to thank UWA for its contributions to the NWAL. During the visit, UWA demonstrated the LG-SIMS for analysis of uranium isotopics, as well as a variety of other facilities and capabilities for particle characterisation of potential relevance to safeguards, including uranium particle age determination techniques.

Since 2009, Australia has provided annual proliferation analysis training to IAEA safeguards staff to enhance their ability to apply structured analytical techniques to complex proliferation issues. This training assists IAEA staff to analyse disparate sources of information, including State-declared and open-source information. Following the cessation of COVID-19 travel restrictions, the Office of National Intelligence provided the latest proliferation analysis workshop in April 2023.

In February 2023, ASNO, Australian National University (ANU) and Swinburne University joined the IAEA's new support program project studying the feasibility of large-scale muon detection arrays for monitoring non-diversion of nuclear material from geological repositories.

During the reporting period, the IAEA continued to develop the Robotised Cerenkov Viewing Device (RCVD), which was developed out of the Robotics Challenge hosted by CSIRO in 2017. The IAEA tested the RCVD in spent fuel ponds at nuclear power plants overseas, demonstrating the robot's potential to replace the time-consuming manual tasks required to verify nuclear material in spent fuel with more precise, automated measurements. CSIRO Data61 is assisting the IAEA by developing the software for the robot's autonomous navigation features and refining the design to enable efficient workflow during inspection.

In May 2023, ANSTO hosted a field test of the IAEA's handheld neXt Generation Cerenkov Viewing Device (XCVD) at the OPAL reactor during the PIV inspection. The XCVD was successfully used to manually verify spent fuel at the reactor.

Cooperation with Other States

ASNO actively worked to strengthen relationships with safeguards partners across the region, including through both bilateral engagement and through various projects under both the APSN's and the IAEA's Comprehensive Capacity-Building Initiatives (COMPASS). This included assistance, expert advice, peer review of procedures and training for professionals in counterparts in several countries.

ASNO provided a technical expert at the Regional Technical Workshop 'International Safeguards Implementation in Small Quantities Protocol States' in Thailand, in September 2022. The Workshop was hosted by the US Department of Energy's National Nuclear Security Administration (NNSA) in partnership with the APSN and the Office of Atoms for Peace (OAP), Thailand.

ASNO partnered with the US Department of Energy's NNSA and the APSN to host a Pacific Islands Regional Seminar 'Strengthening International Nuclear Safeguards – Advancing Regional Security and National Development' in Vienna, in April 2023. The regional seminar included technical visits to the IAEA Incident and Emergency Centre and the IAEA Centre of Nuclear Techniques at Seibersdorf. ASNO gave presentations on Australia's experiences in nuclear safeguards.

Asia-Pacific Safeguards Network

The 13th Annual General Meeting (AGM) of APSN was held in December 2022 in Hanoi, hosted by the Government of the Socialist Republic of Vietnam and organised by Vietnam Agency for Radiation and Nuclear Safety (VARANS). The AGM was immediately preceded by an IAEA–APSN Safeguards Workshop. ASNO joined representatives from 14 States, the IAEA and the Institute of Nuclear Materials Management.

The meetings were the first in-person events since 2019 and representatives welcomed the opportunity to attend both the IAEA Workshop and AGM at the same venue. ASNO experts contributed to the IAEA lead workshop, which comprised presentations, table-top exercises and mock IAEA inspections.

During the AGM, representatives provided updates on recent nuclear and safeguards activities and challenges in their respective countries. Director IAEA Safeguards Operations A delivered a presentation on IAEA's activities over the past year and future priorities.

As coordinator of the APSN Working Group 1 on Safeguards Infrastructure Implementation and Awareness, ANSO delivered a presentation on 25 years of implementation of the Additional Protocol in Australia.

The final session of the AGM saw the APSN Chair (Director General VARANS) and Secretariat handed over to Thailand (OAP) and the APSN Steering Committee Chair (myself) handed over to Japan for calendar years 2023–2024. I continue as a member of the APSN Steering Committee.

IAEA Standing Advisory Group on Safeguards Implementation

SAGSI is tasked with providing recommendations to the IAEA Director General on current safeguards implementation issues. The Group currently comprises international experts from 16 Member States. The members serve on the Group in a personal capacity. Dr Stephan Bayer, Director IAEA Safeguards Section, ASNO, has been appointed to serve as a member of SAGSI until the end of 2024.

During the reporting period SAGSI completed a major report for the further strengthening of safeguards. SAGSI also formulated recommendations on evaluation of safeguards effectiveness, the drawing of safeguards conclusions and on the value of knowledge management and asset management in safeguards efficiency and effectiveness.

Chemical Weapons Convention Implementation

Regulation and reporting of Australian chemical activities in accordance with the CWC and strengthening international implementation of the Convention.

Performance Measures

Australia's obligations under the CWC are met.

Effective regulation of CWC-related activities in Australia.

Contribute to strengthening CWC verification and implementation, including through cooperation with the OPCW and with CWC States Parties.

Contribute to enhancing regional CWC implementation through targeted outreach.

Performance Assessment

Meeting Chemical Weapons Convention Obligations

ASNO maintained Australia's strong record of performance in meeting its CWC obligations. Comprehensive and timely annual declarations, amendments and notifications were provided to the OPCW via its Secure Information Exchange portal as follows:

- Article VI declaration of imports and exports of CWC-scheduled chemicals and of past activities at 36 facilities with CWC-relevant chemical production, processing or consumption activities during 2022 (declared in March 2023)
- Article VI declaration of anticipated activities at nine CWC-scheduled chemical facilities for 2023 (declared in September and October 2022)
- Article X, paragraph 4, declaration of Australia's national programs for protection against chemical weapons during 2022 (declared in April 2023)
- responses to OPCW Third Person Notes including routine clarification of the operational status of declared chemical plants
- responses to OPCW notifications and amendments/corrections to inspector details and deletions or additions to the OPCW inspectorate.

Organisation for the Prohibition of Chemical Weapons (OPCW) Inspections

Since entry-into-force in 1997, the OPCW has conducted 68 routine inspections in Australia. The inspections have occurred at declared chemical plants and a Defence protective purposes laboratory suite in accordance with the provisions of Article VI of the CWC.

In the current reporting period, ASNO facilitated two routine OPCW inspections including the 12th inspection of Australia's Schedule 1 Facility for protective purposes (June 2023). A further inspection at an 'Other Chemical Production Facility' in New South Wales was also conducted in June 2023.

Both inspections proceeded smoothly and received excellent support and cooperation from the inspected facilities. The OPCW inspection team verified Australia's declarations, including the absence of any undeclared CWC Schedule 1 chemical production, in accordance with the inspection mandates.

Legislation and Regulation

Table 15 provides statistics for the permits issued to facilities producing, processing or consuming CWC-scheduled chemicals during the current reporting period. Thirty facility permits were in effect at 30 June 2023.

During the 2022–23 period, 64 import permits and seven import permit variations were issued for the import of CWC-Schedules 2 and 3 chemicals; one permit was issued for the import of CWC-Schedule 1 chemicals.

Table 15: Permits for CWC-scheduled chemical facilities

CWC-scheduled Chemicals	CWP Act 1994	Permit type	Permits at 30 June 2023[27]	New permits 2022–23	Re-issued permits 2022–23	Permits cancelled 2022–23
Schedule 1	s19(4)	Production (Protective)	1	0	0	0
	s19(5)	Production (Research)	9	0	1	0
	s19(6)	Consumption	11	0	0	1
Schedule 2	s18(1)	Processing	6	0	1	0
Schedule 2	s18(1)	Consumption	1	1	0	0
Schedule 3	s18(1)	Production	2	0	1	0

Cooperation with the OPCW and CWC States Parties

ASNO continued to support effective implementation of the CWC.

In October 2022, in partnership with Malaysia and the OPCW, Australia hosted a Subregional Forum on CWC Implementation for Pacific Island States in Brisbane. Both the OPCW Director-General Fernando Arias and the Assistant Minister for Foreign Affairs the Hon. Tim Watts MP addressed the meeting. The Forum provided an opportunity to exchange views on shared challenges and for the Director-General to hear directly from Pacific nations on their challenges implementing the CWC – laying an excellent foundation for further work to elevate Pacific voices in these important global discussions.

Australia's Defence Science and Technology Group (DSTG), an OPCW Designated Laboratory for both biomedical and environmental sample analysis, successfully prepared test samples for the Eighth Official OPCW Biomedical Proficiency Test (February 2023). Assistant Minister for Defence the Hon. Matt Thistlethwaite MP, Assistant Minister of Foreign Affairs the Hon. Tim Watts MP, Australia's Chief Defence Scientist Professor Tanya Monro AC and OPCW Director-General Ferando Arias participated in a signing ceremony to formalise the technical agreement to support the proficiency test (October 2022).

Malaysia, OPCW and Australia co-hosted a Subregional Forum on CWC for Pacific Island States in Brisbane. Participants were addressed by OPCW Director-General, Arias and Assistant Foreign Minister, Watts.

ASNO provided technical advice and contributed to policy development in preparation for the Fifth Review Conference of the CWC, OPCW Executive Council meetings, industry cluster meetings and informal consultations in The Hague. ASNO attended the Workshop on Best Practices in the Development of a Legislative and Regulatory Framework on Chemical Security (July 2022), the Annual Meeting for National Authorities and the Conference of the States Parties (November 2022).

In May 2023, I met with Director-General Arias and OPCW senior management to discuss CWC challenges, Russian and Syrian non-compliance with the CWC and ways to support the OPCW Technical Secretariat and CWC implementation globally, with a focus on the Indo-Pacific region.

Malaysia Partnership Program

Australia concluded a successful OPCW Partnership Program with Malaysia in 2022, with ASNO leading Australia's participation.

A partnership program meeting was held in Malaysia in August 2022 to support the practical implementation of the CWC and capacity building within Malaysian entities. Following in-depth discussions and a joint outreach activity at a Malaysian university, a proposal for a laboratory twinning program is being progressed, as well as other regional program opportunities to progress CWC implementation.

Domestic Outreach

ASNO continued its close cooperation on CWC implementation issues with relevant Australian Government departments and agencies.

To assist with meeting CWC reporting obligations and ensuring compliance with CWC-relevant legislation, ASNO strengthened engagement with its constituency in industry, research and trade, including with non-government agencies and associations.

ASNO conducted industry outreach visits at 19 facilities – two in New South Wales, four in South Australia, two in Tasmania and 11 in Victoria – and at two industry associations during the reporting period.

ASNO Chemical Database

Online reporting by regulated chemical facilities and import permit holders, in accordance with statutory obligations, enabled ASNO's preparation of Australia's declaration of past and anticipated chemical activities to the OPCW.

As mentioned in previous annual reports, a key challenge for ASNO is assisting with the development and implementation of a new chemical database to support Australia's reporting obligations under the CWC.

ASNO's current chemical database and online portal are no longer fit-for-purpose. ASNO continues to work with other entities to develop a new chemical database system with an industry access online portal to improve the end-user stakeholder experience and the efficiency of ASNO's regulatory function.

[27] Permit numbers include new, existing and renewed permits.

Comprehensive Nuclear-Test-Ban Treaty Implementation

Development of verification systems and arrangements in support of Australia's commitments related to the Comprehensive Nuclear-Test-Ban Treaty.

Director General ASNO Shaw met with CTBTO Executive Secretary Floyd in Vienna.

Performance Measures

Australia's obligations under the CTBT are met.

Legal and administrative mechanisms which support Australia's commitments related to the CTBT are effective.

Contribute to the development of CTBT verification, including through the work of the CTBTO Preparatory Commission.

Contribute to Australia's CTBT outreach efforts and support regional CTBT implementation.

Performance Assessment

International Obligations

Although the CTBT is not yet in force, its IMS is now substantially in place, with around 90 per cent of Treaty-designated stations certified for operation by 2022.

Australian CTBT IMS stations performed well during the reporting period. Australia's seismo-acoustic stations, operated by Geoscience Australia (GA) and the ANU, had an average operational performance of 99.2 per cent across the 13 stations (11 managed by GA and two by ANU). Radionuclide monitoring data availability, obtained by ARPANSA, remained high across the seven stations (and the radionuclide stations in Fiji and Kiribati for which ARPANSA provides maintenance services), with an average 97.5 per cent over the 12-month reporting period.

The Cape Leeuwin hydrophone array (HA01), installed in 2001 with an expected design life of 20 years, has been a high-performing, critical node of the IMS's hydro-acoustic network. The CTBTO (in collaboration with GA and ASNO) continued to monitor the performance and data integrity of the HA01 for any signs that the array is no longer able to perform its primary function, now that the station is operating past its design parameters. This monitoring included the CTBTO contracting a local underwater engineering firm to conduct annual near-shore diver inspection and sustainment repairs to the cable's outer shell, most recently in June 2023.

Construction of new accommodation for the Macquarie Island radionuclide detection station (AUP07) commenced during the reporting period, part of the Australian Antarctic Division's Macquarie Island Research Station Modernisation Project. The limited access to the island and adverse weather have made construction difficult, but progress continues through the dedication and commitment of the scientific community that supports the station.

Australia's IMS stations span the gamut of environmental conditions (Antarctic cold and shifting ice, remote desert heat and tropical humidity) requiring innovative solutions to maintain the operational performances required under the CTBT.

ASNO has been working with ARPANSA and the Australian Antarctic Division to manage CTBTO expectations on the accuracy of the position of Australia's IMS stations on the Antarctic sheet ice (a Treaty-defined parameter), which continue to move away from the pole at an increasing rate due to rising temperatures.

Nuclear-Test-Ban Verification

ASNO administers funding for GA to manage and operate Australia's National Data Centre, ensuring both signals from Australia's IMS stations reach the CTBTO's International Data Centre and Australia is able to monitor events from the global IMS. This arrangement, set out in a Letter of Understanding between GA and ASNO, is reviewed each year. ASNO is satisfied that GA has met its requirements under the Letter of Understanding during the reporting period.

Since the last declared nuclear explosion in 2017, GA has assessed seismic data – from the CTBTO International Data Centre (IDC) and domestic monitoring capabilities – and reported to ASNO 80 seismic events located in the vicinity of the DPRK's test site at Punggye-ri, including 21 events during the reporting period. Based on the signal characteristics and proximity to the site, some of these events appear to be a series of aftershocks following the large September 2017 test explosion.

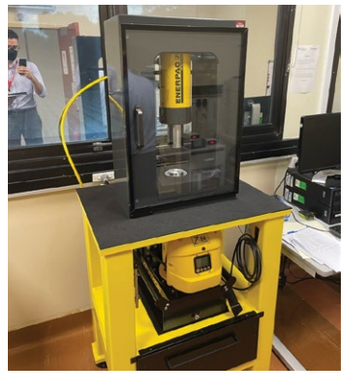
Australian Participation in Comprehensive Nuclear-Test-Ban Treaty Office Verification Development Activities

The CTBTO Preparatory Commission, including its Member States, continues to carry out work to ensure the Treaty's verification regime will be ready to meet requirements in the CTBT when the Treaty enters into force.

ASNO coordinates and contributes to Australia's specialist support for this work, focused on meetings of the CTBTO's Working Group B. Experts from GA and ARPANSA contribute mainly in relation to ongoing development of the CTBT's IMS and IDC.

When the CTBT enters into force, it will provide for on-site inspections (OSIs) to determine whether a nuclear explosion has taken place in a particular area. An ASNO officer joined the Scenario Taskforce (STF) of the OSI Integrated Field Exercise in 2025 (IFE2025) – recently announced as taking place in Sri Lanka. He will be joining former ASNO Director Malcolm Coxhead, who will lead the STF and who is contracted to the CTBTO.

ASNO coordinates the involvement of Australians in training aimed at supporting the operation of the IMS, IDC and OSI. During the reporting period, this included representatives from ANSTO and ARPANSA participating in CTBT on-site inspections training and training in the operation of radionuclide and waveform stations.



CTBT RN Radionuclide Pre-PIV inspection.

Nuclear Disarmament and Non-Proliferation

Contribution to the strengthening of the WMD non-proliferation and disarmament regimes.

ASNO officers at the Foreign Obligations U.S. – Australia Bilateral Technical Exchange Workshop in Canberra.

Performance Measures

Provide support and assistance to Australia's Permanent Mission to the Conference on Disarmament in Geneva in their efforts to advance Australia's non-proliferation and disarmament objectives.

Contribute to technical developments in the field of nuclear disarmament relevant to Australia's interests, in particular through the International Partnership for Nuclear Disarmament Verification.

Support other developments in the field of non-proliferation and disarmament that are relevant to Australia's interests.

Performance Assessment

ASNO contributes routinely to Australia's efforts to strengthen international non-proliferation efforts through the provision of technical advice to support diplomatic multilateral engagement. This support included advice on disarmament for the tenth NPT Review Conference, the Foreign Minister's participation in the Friends of the CTBT meeting and as an Advisor to the 'UN Group of Government Experts to further consider nuclear disarmament verification issues'.

International Partnership for Nuclear Disarmament Verification

In December 2022, ASNO and DFAT hosted a plenary meeting of the International Partnership for Nuclear Disarmament Verification (IPNDV) in Sydney. The IPNDV plenary brought together 78 diplomatic, arms control and nuclear disarmament experts from 20 countries to discuss practical verification solutions for future multilateral disarmament agreements. ASNO also continued to co-chair a working group of the IPNDV at this meeting.

The meeting was opened by Assistant Trade Minister, Senator the Hon. Tim Ayres, and included opening remarks from US Under Secretary of State for Arms Control and International Security, Ambassador Dr Bonnie Jenkins, Nuclear Threat Initiative (NTI) Senior Vice-President, Carmen MacDougall and me. The plenary saw the expansion of IPNDV's membership to include Romania and was the catalyst for a refocusing of IPNDV's structure, direction and engagement strategy, with the goal to deliver a nuclear disarmament verification toolkit by the Eleventh NPT Review Conference in 2026.

The week-long set of meetings also included a virtual reality nuclear disarmament verification experience by the University of Hamburg and a Disarmament 'Continuity of Knowledge' demonstration conducted by ASNO, ANSTO and the US Sandia National Laboratories at ANSTO's Lucas Heights site. Two unique radiation detection systems; ANSTO's CORIS360 radiation imaging system and Sandia's Trusted Radiation Identification System (TRIS) were deployed at Lucas Heights in a practical demonstration of how technology could be used to verify the disassembly of a nuclear weapon. The demonstration successfully confirmed that the TRIS and CORIS360 technology has the capability to trace the presence, or verify the absence, of specific nuclear material within a defueled nuclear reactor vessel. This provided assurance to the IPNDV that radiation imaging technologies will serve as reliable tools in the verification of disassembled nuclear weapon in the future.

Since the December 2022 meeting in Sydney, Australia's contribution to IPNDV has grown. An ASNO officer is now Co-Chair of a new IPDNV Limitations Working Group – looking at the verification requirements for a multilaterally verified Nuclear Weapon Limitation Treaty and participated in the first 'Information Barrier' workshop held in April 2023 in in Albuquerque, New Mexico, US.

UN Group of Government Experts on Nuclear Disarmament Verification

May 2023 saw the conclusion of the UN Group of Government Experts (GGE) to further consider nuclear disarmament verification issues, after a truncated 18-month schedule. Despite the current global tensions, experts were able to reach a set of consensus conclusions, which will be presented to the First Committee of the UN General Assembly.

An ASNO officer supported the Australian Mission to the Conference of Disarmament in Geneva – both in person and remotely – as a Disarmament Verification Advisor throughout the 18 months.

Advice to Government

Provision of high-quality, timely, relevant and professional advice to Government.

Performance Measures

Provide policy advice, analysis and briefings that meet the needs of Ministers and other key stakeholders.

Contribute to the development of Australia's policies on WMD non-proliferation and disarmament.

Cooperate on technical issues across Government, including with the Australian intelligence community

Performance Assessment

Two ASNO staff participated in Australia's delegation to the 2022 Nuclear Non-Proliferation Treaty Review Conference (delayed from 2020 due to COVID-19 restrictions) and provided expert advice particularly in relation to nuclear safeguards issues considered in Main Committees II and III.

During the reporting period ASNO:

- provided technical advice to key stakeholders, including the Nuclear-Powered Submarine Taskforce, on IAEA safeguards, the operation of the Australian safeguards system and on nuclear security
- provided technical safeguards and nuclear security advice to the ARWA to support safeguards-by-design for the National Radioactive Waste Management Facility and provided advice to the Department of Industry, Science and Resources and the Department of Home Affairs on the regulatory requirements for exporting controlled ores
- hosted a National Training Course on State Systems of Accounting for and Control of Nuclear Material for participants from ASNO, Department of Defence and CSIRO (June–July 2023). ASNO staff presented on Australia's regulatory framework, the Australian system of accounting for and control of nuclear material, import/export reporting, domestic inspections and the Australian Safeguards Support Program
- assisted in the delivery of a Nuclear Law Course for lawyers across government departments in May 2023
- continued a seminar series on non-proliferation and safeguards for government agencies.

ASNO worked closely with ARPANSA to incorporate best practice for the security of nuclear material, particularly where there are security and safety interfaces, such as:

- spent fuel management
- PSSR for the ANSTO OPAL research reactor
- material out of regulatory control (MORC).

Public Information

Provision of public information on the development, implementation and regulation of WMD in non-proliferation regimes and Australia's role in these activities.

Performance Measures

Effective public education and outreach

Performance Assessment

In 2022–2023, ASNO attended peak industry forums and conducted on-site outreach visits, as well as lectures and presentations in academic and other fora.

A list of presentations are included in Appendix F.

Expansion of Strategic Communications Activities

ASNO embarked on a significant enhancement of its strategic communications to respond to contemporary global challenges and increased responsibilities. This has included:

- the recruitment of a strategic communications capability
- the reinstitution of ASNO's Twitter platform
- the commencement of a program of the development of a brand and update to ASNO's website
- participation in Nuclear Agencies Communications Group which includes representation from other Australian nuclear government organisations.

Industry Outreach and Engagement

During 2022–23, ASNO updated several template permits and compliance codes for our current permit and authority holders. In the interests of informing future potential permit holders and the public on regulatory requirements, the updated template permits and compliance codes are publicly available online.[28]

[28] Template permits and compliance codes, ASNO, DFAT.

OPCW inspection at an 'Other Chemical Production Facility' in New South Wales.

Section 5
Management and Accountability

Corporate Governance

Portfolio Minister

Responsibility for administration of the legislation under which ASNO operates – the *Nuclear Non-Proliferation (Safeguards) Act 1987*, *Chemical Weapons (Prohibition) Act 1994* and *Comprehensive Nuclear Test-Ban Treaty Act 1998* – rests with the Minister for Foreign Affairs.

Director General ASNO

I report directly to the Minister for Foreign Affairs. The position combines the statutory offices of the:

- Director of the national authority for nuclear safeguards (formerly Director of Safeguards), as established by the *Nuclear Non-Proliferation (Safeguards) Act 1987*
- Director of the national authority for the CWC, as established by the *Chemical Weapons (Prohibition) Act 1994*
- Director of the national authority for the CTBT, as established by the Comprehensive *Nuclear-Test-Ban Treaty Act 1998*.

The Director General ASNO is a statutory position, appointed by the Governor-General. Remuneration for this position is determined by the Remuneration Tribunal.

I took up the position of Director General ASNO from 24 January 2022.

Assistant Secretaries ASNO

The Assistant Secretary ASNO deputises for me, helps manage the work of ASNO and the technical expertise of the staff, as well as provides input to Australia's policies on nuclear and chemical non-proliferation architecture. Dr Craig Everton commenced this position on 6 March 2023.

As a result of the Federal Budget outcome, a second Assistant Secretary, Charlotte East, was appointed in June. This position was created to manage additional responsibilities arising from Australia's planned acquisition of nuclear-powered submarines.

ASNO Staff

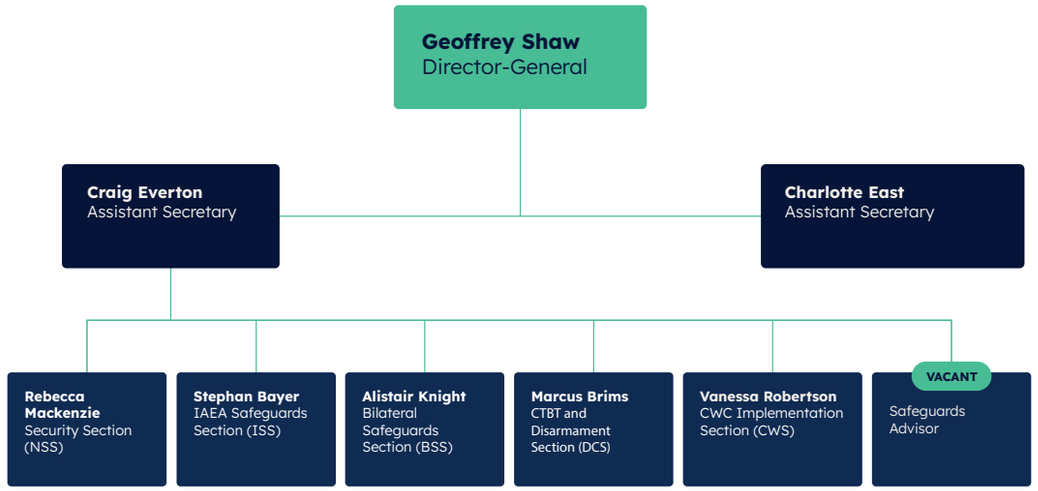
ASNO staff, other than myself, are employed under the Public Service Act 1999 as a division within DFAT and subject to the DFAT Enterprise Agreement.

Table 16: ASNO staff at 30 June 2023

	Male	Female	Total
Director General	1	0	**1**
SES B1	1	1	**2**
Executive Level 2	3	2	**5**
Executive Level 1	4	3	**7**
APS Level 6	3	4	**7**
APS Level 5	2	1	**3**
TOTAL	**14**	**11**	**25**

ASNO officers at their planning day in Canberra.

Figure 2: ASNO's Organisational Structure at 30 June 2023



Financial Management

The *Public Audit Act 2001* requires ASNO to submit an annual financial statement to the Auditor-General. As ASNO is funded as a division of DFAT, this financial statement is published in the DFAT Annual Report. Further details of ASNO activities relating to financial management and performance are also contained in the DFAT Annual Report.

Administrative Budget

Table 17: ASNO administrative costs

	2021–22	2022-23
Salaries	2,380,260	2,558,094
Running Costs		
(DFAT general)	479,257	439,117
(DFAT/AUKUS general)		1,085,200
Seismic monitoring[29]	555,413	562,633
Sub-total	1,034,670	2,086,950
Total	**$3,414,930**	**$4,645,044**

Regulatory Performance Measures

Previously, ASNO has reported its Regulatory Performance in a stand-alone product available on the ASNO and DFAT websites. This reporting is now be done in the ASNO Annual Report.

Continuous Improvement and Building of Trust	
Performance Measures	**Performance**
Continuous improvement in the chemical and nuclear database and associated portal (see Outputs 1.1 and 1.5)	Met

[29] Undertaken by Geoscience Australia.

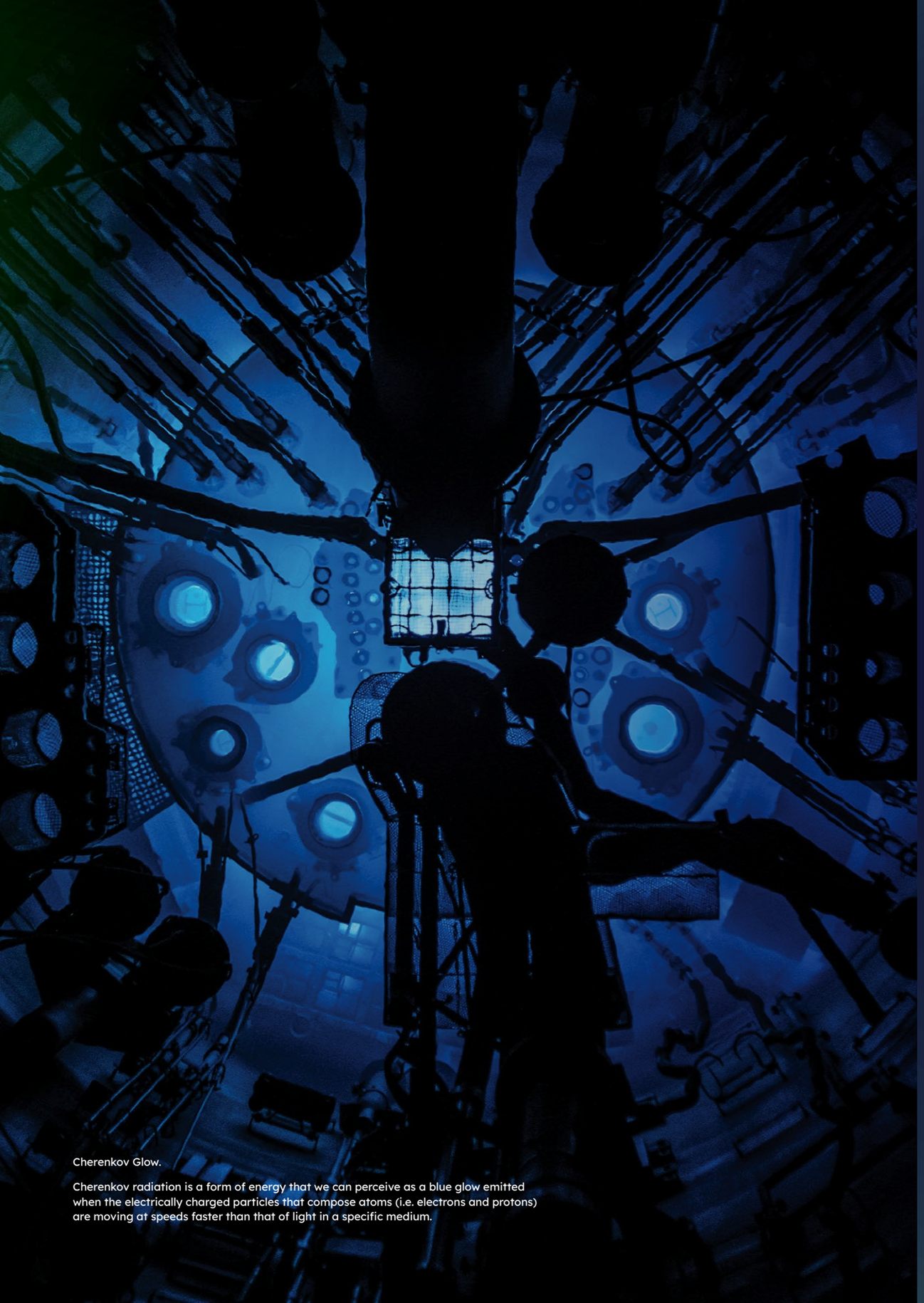
Risk-Based and Data-Driven	
Performance Measures	**Performance**
Processing of permits and approvals	
90% of nuclear permits to possess and transport nuclear material are processed (new, varied, revoked and expired) within 21 calendar days (see Outputs 1.1 and Output 1.2)	Met
95% approvals for the transfer of UOC internationally are within 7 calendar days (see Output 1.3)	Met
95% of Schedules 2 or 3 chemical import permit applications are processed within 7 calendar days (see Output 1.5)	Met
95% of Schedule 1 chemical import permit applications are processed within 43 calendar days (see Output 1.5)	Met
95% of chemical facility permit applications processed within 21 calendar days (see Output 1.5)	Met
International inspections	
100% of IAEA inspections in Australia are facilitated by ASNO staff (see Output 1.1)	**Met**
100% of OPCW inspections in Australia are facilitated by ASNO staff (see Output 1.5)	**Met**
Domestic outreach/ASNO inspections	
Conduct outreach visits/ASNO inspections to 10 or more permit holders (see Outputs 1.1, 1.2 and 1.5)	**Met**

Collaborations and Engagement	
Performance Measures	**Performance**
Transparent implementation of Regulations	
ASNO Annual Report (www.dfat.gov.au/international-relations/security/asno/annual-reports)	Met
Publish Cost Recovery Implementation Statement for the Uranium Producers Charge (www.dfat.gov.au/sites/default/files/uranium-producers-charge-cost-recovery-implementation-statement.pdf)	Met
International reporting	
Australia meets all its reporting requirements to the IAEA and the IAEA maintains the 'broader conclusion' for Australia that all nuclear material in Australia remains in peaceful use (see Output 1.1, Appendix D, Appendix E)	Met
All exported AONM and FONM are satisfactorily accounted for (see Output 1.3)	Met
Australia implements best practice for nuclear security in Australia and maintains high standing as a world leader in nuclear security (see Output 1.2)	Met
Australia meets all of its reporting requirements to the OPCW (see Output 1.5)	Met

Uranium Producers Charge

ASNO is responsible for the Uranium Producers Charge. This charge is payable to Consolidated Revenue Fund on each kilogram of uranium ore concentrate production (set on 1 November 2022 at 18.7839 cents per kilogram). Previously, the charge rate was 13.5502 cents per kilogram UOC produced, set in 2018.

Section 6
Appendices



Cherenkov Glow.

Cherenkov radiation is a form of energy that we can perceive as a blue glow emitted when the electrically charged particles that compose atoms (i.e. electrons and protons) are moving at speeds faster than that of light in a specific medium.

Appendix A: Australia's Nuclear Cooperation Agreements

Australia's NCAs at 30 June 2023[30]

Country/region	Date of entry into force
Republic of Korea (ROK)	2 May 1979
Finland	9 February 1980
Canada	9 March 1981
Sweden	22 May 1981
France	12 September 1981
Philippines	11 May 1982
Japan	17 August 1982
Switzerland	27 July 1988
Egypt	2 June 1989
Mexico	17 July 1992
New Zealand	1 May 2000
United States (covering cooperation on SILEX Technology)	24 May 2000
Czech Republic	17 May 2002
United States (covering supply to Taiwan)	17 May 2002
Hungary	15 June 2002
Argentina	12 January 2005
People's Republic of China[31]	3 February 2007
Russian Federation	11 November 2010
United States	22 December 2010
Euratom[32]	1 January 2012
United Arab Emirates	14 April 2014
India	13 November 2015
Ukraine	15 June 2017
United Kingdom	1 January 2021

Note: The above list does not include Australia's Comprehensive Safeguards Agreement with the IAEA, concluded on 10 July 1974 or the Protocol Additional to that Safeguards Agreement concluded on 23 September 1997. In addition to the above Agreements, Australia has an Exchange of Notes constituting an Agreement with Singapore Concerning Cooperation on the Physical Protection of Nuclear Materials, which entered into force on 15 December 1989.

[30] Several of the NCAs have been renegotiated over the years to keep them up to date. This list only includes the most recent NCAs for each country/region.

[31] Australia has two agreements with China: one covering nuclear material transfers and one covering nuclear cooperation.

[32] Euratom is the European Atomic Energy Community. The Australia–Euratom NCA covers all 27 Member States of the European Union.

Appendix B: Australia Uranium Export Policies

Australia's Nuclear Safeguards Policy

The Australian Government's uranium policy limits the export of Australian uranium to countries that: are a party to the Treaty on the NPT[33]; have a Safeguards Agreement and Additional Protocol with the IAEA in force; and are within Australia's network of bilateral NCAs. These NCAs are designed to ensure IAEA safeguards and appropriate nuclear security measures are applied to AONM exported overseas, in addition to several supplementary conditions. Nuclear material subject to the provisions of an Australian nuclear cooperation agreement is known as Australian Obligated Nuclear Material (AONM). The obligations of Australia's agreements apply to uranium as it moves through the different stages of the nuclear fuel cycle and to nuclear material generated using that uranium.

All of Australia's NCAs contain treaty-level assurances that AONM will be used exclusively for peaceful purposes and will be covered by safeguards arrangements under each country's safeguards agreement with the IAEA. In the case of NNWSs, it is a minimum requirement that IAEA safeguards apply to all existing and future nuclear material and activities in that country. In the case of nuclear-weapon States, AONM must be covered by safeguards arrangements under that country's safeguards agreement with the IAEA and is limited to use for civil (that is, non-military) purposes.

The principal conditions for the use of AONM set out in Australia's NCAs are:

- AONM will be used only for peaceful purposes and will not be diverted to military or explosive purposes (here 'military purpose' includes: nuclear weapons; any nuclear explosive device; military nuclear reactors; military propulsion; depleted uranium munitions; and tritium production for nuclear weapons)
- IAEA safeguards will apply
- Australia's prior consent will be sought for transfers of AONM to third parties, enrichment to 20 per cent or more in the isotope ^{235}U and reprocessing[34]
- fall-back safeguards or contingency arrangements will apply if, for any reason, NPT or IAEA safeguards cease to apply in the country concerned
- internationally agreed standards of physical security will be applied to AONM in the country concerned
- detailed administrative arrangements will apply between ASNO and its counterpart organisation, setting out the procedures to apply in accounting for AONM
- regular consultations on the operation of the agreement will be undertaken
- provision will be made for the removal of AONM in the event of a breach of the agreement.

Australia currently has 25 bilateral NCAs in force, covering 43 countries plus Taiwan.[35]

[33] On October 2012, the Australian Government announced that it would exempt India from its policy allowing supply of Australian uranium only to those States that are Parties to the NPT.

[34] Australia has given reprocessing consent on a programmatic basis to EURATOM and Japan. Separated Australian-obligated plutonium is intended for blending with uranium into mixed oxide fuel (MOX) for further use for nuclear power generation.

[35] Euratom is the European Atomic Energy Community. The Australia–Euratom NCA covers all 27 Member States of the European Union.

ASNO officer presenting at the 2023 NMMSS annual users training meeting.

Accounting for Australian Uranium

Australia's bilateral partners holding AONM are required to maintain detailed records of transactions involving AONM. In addition, counterpart organisations in bilateral partner countries are required to submit regular reports, consent requests, and transfer and receipt documentation to ASNO.

ASNO accounts for AONM on the basis of information and knowledge including:

- reports from each bilateral partner
- shipping and transfer documentation
- calculations of process losses, nuclear consumption and nuclear production
- knowledge of the fuel cycle in each country
- regular liaison with, and reconciliation and bilateral visits to, counterpart organisations
- regular liaison with industry
- IAEA safeguards activities and IAEA conclusions on each country.

Australia's Uranium Transhipment Security Policy

For States with which Australia does not have a bilateral nuclear cooperation agreement in force, but through which Australian UOC is transhipped, there must be arrangements in place with those States to ensure the security of UOC during transhipment. If the State:

- is a party to the Convention on the Physical Protection of Nuclear Material (CPPNM)
- has a safeguards agreement and has adopted the IAEA's Additional Protocol on strengthened safeguards
- acts in accordance with these agreements

then arrangements on appropriate security can be set out in an instrument with less than treaty status.[36] Any arrangements of this kind are subject to risk assessments of port security. For States that do not meet the above requirements, treaty-level arrangements on appropriate security may be required.

[36] See page 26 of ASNO's 2008–09 Annual Report for more details on the establishment of this policy.

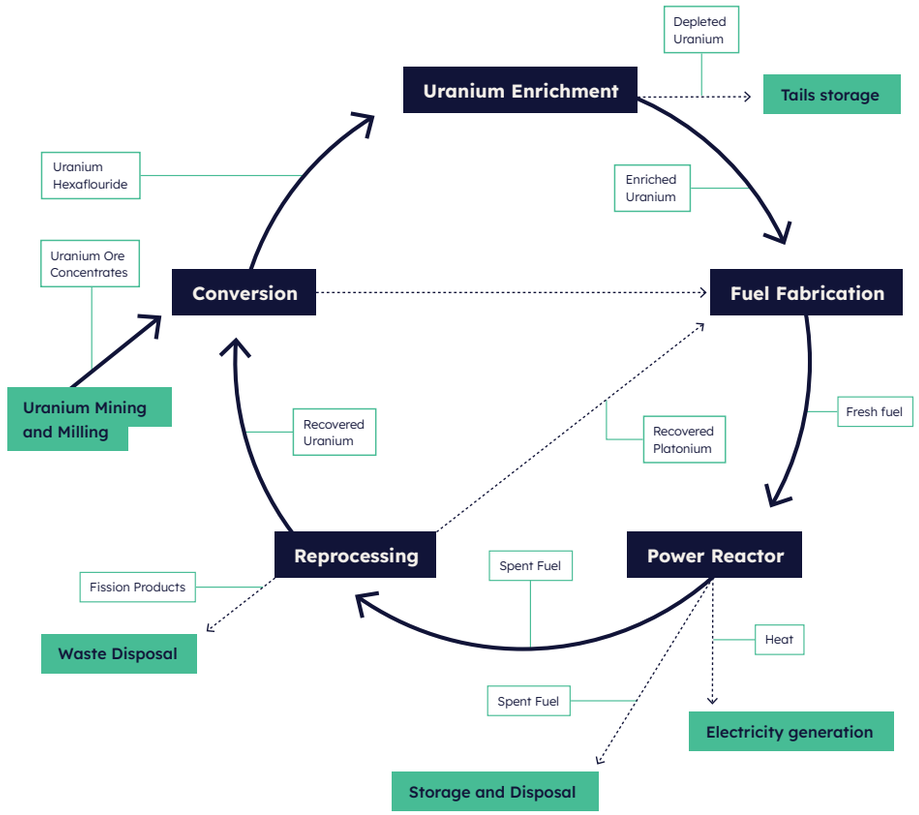
Appendix C: The International Nuclear Fuel Cycle

A characteristic of the nuclear fuel cycle is the international interdependence of facility operators and power utilities. It is unusual for a country to be entirely self-contained in the processing of uranium for civil use. Even in nuclear-weapon States, power utilities will often go to other countries seeking the most favourable terms for uranium processing and enrichment.

It would not be unusual, for example, for a Japanese utility buying Australian uranium to have the uranium converted to uranium hexafluoride in Canada, enriched in France, fabricated into fuel in Japan and reprocessed in the UK.

The international flow of nuclear material means that nuclear materials are routinely mixed during processes such as conversion and enrichment and as such, cannot be separated by origin thereafter. Therefore, tracking of individual uranium atoms is impossible. Since nuclear material is fungible – that is, any given atom is the same as any other – a uranium exporter can ensure its exports do not contribute to military applications by applying safeguards obligations to the overall quantity of material it exports.

Figure 3: Civil Nuclear Fuel Cycle



ASNO officers at Safeguards Activities in Japan.

This practice of tracking quantities rather than atoms has led to the establishment of universal conventions for the industry, known as the principles of equivalence and proportionality. The equivalence principle provides that, where AONM loses its separate identity because of process characteristics (for example, mixing), an equivalent quantity of that material is designated as AONM. These equivalent quantities may be derived by calculation, measurement or from operating plant parameters. The equivalence principle does not permit substitution by a lower-quality material.

The proportionality principle provides that where AONM is mixed with other nuclear material and is then processed or irradiated, a corresponding proportion of the resulting material will be regarded as AONM.

Appendix D: IAEA Statements of Conclusions and Other Inspection Findings for Australia in 2022–23

IAEA Inspection Regime in Australia

The IAEA conducts verification activities (under different names, but all essentially inspections) in Australia under the Comprehensive Safeguards Agreement[37] and under the Additional Protocol[38], with the scope and focus differing between these two agreements.

Under the Comprehensive Safeguards Agreement the IAEA conducts inspections to verify nuclear material inventory and facility design features.

There are four types of inspection conducted in Australia each year under the Comprehensive Safeguards Agreement:

- **Physical inventory verification (PIV):** a scheduled inspection in a selected MBA[39] to verify the stocktake of physical inventory (known as a physical inventory taking) from that MBA. PIVs involve a more complete verification of inventory than random interim inspections (RII[40], see below). The frequency of PIVs depends on the types and quantities of nuclear material held in each MBA. In Australia's case, PIVs are scheduled annually for the OPAL reactor (AS-F) and ANSTO's R&D laboratories (AS-C). ANSTO's storage areas (AS-D) have previously been subject to annual inspection, but in this reporting period the IAEA chose not to conduct a PIV at AS-D pursuant to its state-level approach for Australia. PIVs for each MBA are scheduled together each year so the IAEA can complete them all with one visit to Australia. In total, these usually take five days to complete in conjunction with DIVs (see below). For MBAs AS-E, ASE1, ASE2 and AS-I, the IAEA schedules a PIV periodically for AS-E/ASE1/ASE2 combined, selecting one location (usually a university) taken as a representative sample of all such locations; and similarly for one of CSIRO's locations in MBA AS-I. These PIVs are usually conducted in one day.
- **Interim inventory verification (IIV):** an inspection in a selected MBA to verify specific types of nuclear material, scheduled at a time other than the PIV. The IAEA conducted an IIV at ANSTO's R&D laboratories (AS-C) in October 2022 to measure the uranium content in solid waste from molybdenum 99 (Mo-99) radiopharmaceutical production using an active well coincidence counter (AWCC). It is anticipated that the IAEA will schedule an IIV approximately once every two years for AS-C.
- **Random interim inspection (RII):** an inspection called by the IAEA at a random time with limited notice. The IAEA calls an RII once or twice each year at the OPAL reactor with three hours' notice to ASNO and ANSTO. In 2022, the IAEA decided, pursuant to its State-level approach for Australia, to begin also conducting RII at buildings with hot cells at ANSTO. An RII usually lasts for one or two days.
- **Design information verification (DIV):** an inspection to verify the correctness and completeness of the design features of a facility relevant to the application of safeguards. The IAEA typically conducts a few DIVs together with annual PIVs.

Under the Additional Protocol the IAEA has the right to conduct verification activities (essentially inspections) known as **complementary access**. A complementary access may have three purposes:

1. assuring the absence of undeclared nuclear material or activities in Australia (Article 4.a.i);
2. resolving any questions or inconsistencies related to the correctness and completeness of Australia's declarations under the Additional Protocol (Article 4.a.ii); or
3. confirming the decommissioned status of a facility (Article 4.a.iii).

[37] See Schedule 3 of the Nuclear Non-Proliferation (Safeguards) Act 1987.
[38] Published in IAEA document INFCIRC/217/Add.1 based on the model in INFCIRC/540 (corrected).
[39] Australia's MBAs for IAEA safeguards are described in Table 3 in Output 1.1.
[40] In previous years RIIs have been referred to as 'short notice random inspections' (SNRIs).

The IAEA has conducted a total of 94 complementary accesses in Australia since 1998.

Article 4.a.i complementary accesses are the most common. Since 1998 the IAEA has conducted only two complementary accesses under Article 4.a.ii, and one under Article 4.a.iii.

Complementary access activities called while IAEA inspectors are already on the Lucas Heights site for other inspections (for example, at ANSTO) can be conducted at any building on-site with two hours' notice. Complementary access activities for locations outside Lucas Heights (for example, universities, uranium mines) require a minimum of 24 hours' notice; however, given the considerable distances in Australia, are often issued with several days' notice. The IAEA typically conducts two to three complementary access activities in Australia each year, including at least one for buildings at Lucas Heights and at least one outside of Lucas Heights.

IAEA Conclusions on Australia's Compliance

The IAEA's conclusions for Australia are provided at two levels: the IAEA's overarching summary of findings and conclusions published in the IAEA's Safeguards Statement for 2022 (see Appendix E) for all States with safeguards agreements with the IAEA, including Australia; and the Statements of Conclusions of inspections in Australia.

The highest-level conclusion the IAEA draws, known as the 'broader conclusion', is in paragraph 1(a) of the Safeguards Statement:

'… the Secretariat found no indication of the diversion of declared nuclear material from peaceful nuclear activities and no indication of undeclared nuclear material or activities. On this basis, the Secretariat concluded that, for these States, all nuclear material remained in peaceful activities.'

Australia is on the list of countries covered by the IAEA's broader conclusion in the Safeguards Statement for 2022. Australia was the first country to receive the 'broader conclusion' in 2000 and has since received it every year.

ASNO officers took a tour of the Westinghouse Fuel Fabrication Facility in Sweden.

The IAEA's Statements of Conclusions related to inspections in Australia are provided in several ways:

- **Article 91(a)** of Australia's Comprehensive Safeguards Agreement: the results of inspections at individual MBAs
- **Article 91(b)** of Australia's Comprehensive Safeguards Agreement: the conclusions the IAEA has drawn from all its verification activities (headquarters analysis and inspections) in Australia for each individual MBA[41]
- statement of results of design information verification activities (DIVs)
- **Article 10.a** of the Additional Protocol: Statement on complementary access activities undertaken
- **Article 10.b** of the Additional Protocol: Statement of results of activities in respect of any questions or inconsistencies the IAEA has raised with Australia
- **Article 10.c** of the Additional Protocol: Statement on the conclusions the IAEA has drawn from all complementary access activities.

[41] Note: under the standard NPT safeguards agreement printed in IAEA document INFCIRC/153 these provisions are in paragraphs 90(a) and 90(b). Australia's Comprehensive Safeguards Agreement has an additional paragraph that is not in INFCIRC/153.

IAEA Conclusions and Findings for Each MBA

MBA: AS-C (research and development laboratories)
Material balance period: 4 June 2021–18 May 2022

Inspection activity	Date(s) of inspection	Inspection location	Statement of results	Date statement provided
Physical Inventory Verification	19–20 May 2022	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory"	22 July 2022
Design Information Verification	19, 20 and 23 May	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results of the DIV were satisfactory"	22 July 2022
91(b) Statement of Conclusions	9 September 2022	"The IAEA has concluded from its verification activities carried out at AS-C during the material balance period from 4 June 2021 to 18 May 2022, and based on the information available to date in connection with such activities, that all declared nuclear material has been accounted for and that there were no indications of the undeclared presence, production or processing of nuclear material."		

MBA: AS-C (research and development laboratories)
Material balance period: 19 May 2022–5 June 2023

Inspection activity	Date(s) of inspection	Inspection location	Statement of results	Date statement provided
Random Interim Inspection of Hot Cells	14 October 2022	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory."	30 November 2022
Design Information Verification including Hot Cell Environmental Sampling	21 October 2022	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results of the DIV were satisfactory."	30 November 2022
Interim Inventory Verification	24-27 October 2022	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory."	5 December 2022
Physical Inventory Verification	6–8 June	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory."	19 July 2023
Design Information Verification	6–8 June 2023	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results of the DIV were satisfactory"	19 July 2023
91(b) Statement of Conclusions (14 August 2023)	"The IAEA has concluded from its verification activities carried out at AS-C during the material balance period from 19 May 2022 to 5 June 2023, and based on the information available to date in connection with such activities, that all declared nuclear material has been accounted for and that there were no indications of the undeclared presence, production or processing of nuclear material."			

MBA: AS-D (vault storage)
Material balance period: 9 June 2021–17 May 2022

Inspection activity	Date(s) of inspection	Inspection location	Statement of results	Date statement provided
Physical Inventory Verification	18 May 2022	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory"	1 July 2022
Design Information Verification	18 May 2022	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results of the DIV were satisfactory"	1 July 2022
91(b) Statement of Conclusions (9 September 2022)	"The IAEA has concluded from its verification activities carried out at AS-D during the material balance period from 9 June 2021 to 17 May 2022, and based on the information available to date in connection with such activities, that all declared nuclear material has been accounted for and that there were no indications of the undeclared presence, production or processing of nuclear material."			

NOTE: Neither a physical inventory verification nor a design information verification was undertaken by the IAEA for MBA AS-D during FY2022–2023.

MBA: AS-E, ASE1 and ASE2 (other locations)
Material balance period: 1 July 2017 to 30 June 2022 (AS-E, ASE1)
2 November 2021 to 30 June 2022 (ASE2)

Inspection activity	Date(s) of inspection	Inspection location	Statement of results	Date statement provided
Physical Inventory Verification	20 October 2022	Lucas Heights	"Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory."	13 January 2023
91(b) Statement of Conclusions (21 February 2023)	**MBA AS-E:** The IAEA has concluded from its verification activities carried out at AS-E during the material balance period from 1 July 2017 to 30 June 2022, and based on the information available to date in connection with such activities, that all declared nuclear material has been accounted for and that there were no indications of the undeclared presence, production or processing of nuclear material. **MBA ASEl:** The IAEA has concluded from its verification activities carried out at ASE1 during the material balance period from 1 July 2017 to 30 June 2022, and based on the information available to date in connection with such activities, that all declared nuclear material has been accounted for and that there were no indications of the undeclared presence, production or processing of nuclear material. **MBA ASE2:** The IAEA has concluded from its verification activities carried out at ASE2 during the material balance period from 2 November 2021 to 30 June 2022, and based on the information available to date in connection with such activities, that all declared nuclear material has been accounted for and that there were no indications of the undeclared presence, production or processing of nuclear material.			

MBA: AS-F (OPAL)
Material balance period: 7 June 2021–16 May 2022

Inspection activity	Date(s) of inspection	Inspection location	Statement of results	Date statement provided
Random Interim Inspection of OPAL Reactor	8 December 2021	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory"	7 February 2022
Physical Inventory Verification	17 May 2022	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory"	7 February 2022
Design Information Verification	17 May 2022	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results of the DIV were satisfactory"	16 August 2022
91(b) Statement of Conclusions (19 September 2022)	"The IAEA has concluded from its verification activities carried out at AS-F during the material balance period from 7 June 2021 to 16 May 2022, and based on the information available to date in connection with such activities, that all declared nuclear material has been accounted for and that there were no indications of the undeclared presence, production or processing of nuclear material."			

MBA: AS-F (OPAL)
Material balance period: 19 May 2022–4 June 2023

Inspection activity	Date(s) of inspection	Inspection location	Statement of results	Date statement provided
Random Interim Inspection of OPAL Reactor	13 October 2022	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory."	1 December 2022
Physical Inventory Verification	5 June 2023	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory."	17 July 2023
Design Information Verification	5 June 2023	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results of the DIV were satisfactory."	17 July 2023
91(b) Statement of Conclusions (14 August 2023)	"The IAEA has concluded from its verification activities carried out at AS-F during the material balance period from 17 May 2022 to 4 June 2023, and based on the information available to date in connection with such activities, that all declared nuclear material has been accounted for and that there were no indications of the undeclared presence, production or processing of nuclear material."			

MBA: AS-H (SyMo)
Material balance period: N/A (nil nuclear material present)

Inspection activity	Date(s) of inspection	Inspection location	Statement of results	Date statement provided
Design Information Verification	2 June 2023	ANSTO	"Based on the activities conducted and the information available to date in connection with such activities, the results of the DIV were satisfactory."	6 July 2023

MBA: AS-I (CSIRO)
Material balance period: 1 July 2018–30 June 2022

Inspection activity	Date(s) of inspection	Inspection location	Statement of results	Date statement provided
Physical Inventory Verification	18 October 2022	Black Mountain	"Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory."	7 February 2023
91(b) Statement of Conclusions (28 February 2023)		"The IAEA has concluded from its verification activities carried out at AS-I during the material balance period from 1 July 2018 to 30 June 2022, and based on the information available to date in connection with such activities, that all declared nuclear material has been accounted for and that there were no indications of the undeclared presence, production or processing of nuclear material."		

MBA: N/A (Defence)
Material balance period: N/A (nil nuclear material present)

Inspection activity	Date(s) of inspection	Inspection location	Statement of results	Date statement provided
Design Information Verification	8 May 2023	Proposed location for Australia's future submarine construction	Not available at time of publication of this Annual Report	

Additional Protocol assessment period:
1 January 2022–31 December 2022

Date of Complementary Access (CA)	Location	10(a) Statement of activities	Date statement provided
10 May 2022	Department of Defence storage	"The IAEA was able to carry out all planned activities during the CA"	28 June 2022
12 May 2022	Olympic Dam mine	"The IAEA was able to carry out all planned activities during the CA"	23 June 2022
25 May 2022	Lucas Heights Science and Technology Centre: Building 3	"The IAEA was able to carry out all planned activities during the CA"	27 July 2022
10(c) Statement of Conclusions (3 May 2023)	The IAEA has concluded from its activities carried out during this period, and based on the information available to date in connection with such activities that access pursuant to Article 4.a.(i) did not indicate the presence of undeclared nuclear material or activities at: • PN194—Department of Defence • PN003—Olympic Dam • PN001—ANSTO		

Additional Protocol assessment period:
1 January 2023–31 December 2023

Date of Complementary Access (CA)	Location	10(a) Statement of activities	Date statement provided
21 March 2023	University of Melbourne	"The IAEA was able to carry out all planned activities during the CA."	15 June 2023
23 March 2023	ANSTO	"The IAEA was able to carry out all planned activities during the CA."	15 June 2023
13 June 2023	Ranger Mine	"The IAEA was able to carry out all planned activities during the CA."	14 July 2023
15 June 2023	CSIRO	"The IAEA was able to carry out all planned activities during the CA."	5 July 2023
10(c) Statement of Conclusions	10(c) Statements of Conclusions are provided in the year following the assessment period		

Appendix E: IAEA Safeguards Statement for 2022[1, 2]

This Statement plus further details on safeguards implementation is available at: www.iaea.org/sites/default/files/23/06/20230612_sir_2022_part_ab.pdf

This statement is copied verbatim from the IAEA's publication, including footnotes.

In 2022, safeguards were applied for 188 States[3,4], with safeguards agreements in force with the Agency. The Secretariat's findings and conclusions for 2022 are reported below with regard to each type of safeguards agreement. These findings and conclusions are based upon an evaluation of all safeguards relevant information available to the Agency in exercising its rights and fulfilling its safeguards obligations for that year[5].

1. One hundred and thirty-four States had both comprehensive safeguards agreements and additional protocols in force:

   (a) For 74 of these States4, the Secretariat found no indication of the diversion of declared nuclear material from peaceful nuclear activities, no indication of undeclared production or processing of nuclear material at declared facilities and LOFs, and no indication of undeclared nuclear material or activities. On this basis, the Secretariat concluded that, for these States, all nuclear material remained in peaceful activities.

   (b) For 60 of these States, the Secretariat found no indication of the diversion of declared nuclear material from peaceful nuclear activities and no indication of undeclared production or processing of nuclear material at declared facilities and LOFs. Evaluations regarding the absence of undeclared nuclear material and activities for each of these States remained ongoing. On this basis, the Secretariat concluded that, for these States, declared nuclear material remained in peaceful activities.

2. Safeguards activities were implemented for 46 States with comprehensive safeguards agreements in force, but without additional protocols in force. For these States, the Secretariat found no indication of the diversion of declared nuclear material from peaceful nuclear activities and no indication of undeclared production or processing of nuclear material at declared facilities and LOFs. On this basis, the Secretariat concluded that, for these States, declared nuclear material remained in peaceful activities.

3. As of the end of 2022, five States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) had yet to bring into force comprehensive safeguards agreements with the Agency as required by Article III of that Treaty. For these States Parties, the Secretariat could not draw any safeguards conclusions.

4. Three States had safeguards agreements based on INFCIRC/66/Rev.2 in force, requiring the application of safeguards to nuclear material, facilities and other items specified in the relevant safeguards agreement. One of these States, India, had an additional protocol in force. For these States, the Secretariat found no indication of the diversion of nuclear material or of the misuse of the facilities or other items to which safeguards had been applied. On this basis, the Secretariat concluded that, for these States, nuclear material, facilities or other items to which safeguards had been applied remained in peaceful activities.

5. Five nuclear-weapon States had voluntary offer agreements and additional protocols in force. Safeguards were implemented with regard to declared nuclear material in selected facilities in all five States. For these States, the Secretariat found no indication of the undeclared withdrawal from safeguards of nuclear material to which safeguards had been applied. On this basis, the Secretariat concluded that, for these States, nuclear material in selected facilities to which safeguards had been applied remained in peaceful activities or had been withdrawn from safeguards as provided for in the agreements.

[1] The designations employed and the presentation of material in this report, including the numbers cited, do not imply the expression of any opinion whatsoever on the part of the Agency or its Member States concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of its frontiers.

[2] The referenced number of States Parties to the NPT is based on the number of instruments of ratification, accession or succession that have been deposited.

[3] These States do not include the Democratic People's Republic of Korea (DPRK), where the Agency did not implement safeguards and, therefore, could not draw any conclusion.

[4] And Taiwan, China.

[5] For States with a comprehensive safeguards agreement (CSA) in force with an operative small quantities protocol (SQP) based on the original standard text, the Agency's ability to draw a credible and soundly-based annual safeguards conclusion is significantly affected. This is due, inter alia, to the fact that the original standard text of the SQP holds in abeyance the requirement for these States to provide to the Agency an initial report on all nuclear material as well as the Agency's right to perform verification activities in these States. In light of such limitations, and given the significant lapse of time since the decision of the Board of Governors in 2005 authorizing the Director General to conclude with each State with an SQP an exchange of letters giving effect to the revised standardized text and the modified criteria, the Agency may no longer be able to draw a safeguards conclusion for such States unless the States concerned respond positively to the repeated calls by the Director General to amend or rescind such SQPs.

Appendix F: Information Publication Scheme Statement

Agencies subject to the Freedom of *Information Act 1982* (FOI Act) are required to publish information for the public as part of the Information Publication Scheme (IPS). This requirement is in Part II of the FOI Act and has replaced the former requirement to publish a section 8 statement in an annual report. Each agency must display on its website a plan showing what information it publishes in accordance with the IPS requirements.

An Agency plan showing what information is published in accordance with IPS requirements is accessible from https://www.dfat.gov.au/about-us/corporate/freedom-of-information

Presentations and Submissions

ASNO produced a range of publications and conducted various presentations to increase community awareness and understanding of ASNO responsibilities and issues for which it has expertise. ASNO also made a number of submissions to Parliamentary and other inquiries.

Presentations include:

Bayer S, Shaw G, and Robertson K, *Twenty-Five Years of the Additional Protocol: Australia's Views and Experiences*, INMM Annual Meeting, 26 July 2023.

Evans L, Bayer S, *Outreach to Locations Outside Facilities in Australia*, US DOE, NNSA, INSEP Regional Technical Workshop: Safeguards Implementation in SQP States, Bangkok, 12–16 September 2022.

Evans L, Bayer S, *Preparation for IAEA Verification Activities in Australia*, US DOE, NNSA, INSEP Regional Technical Workshop: Safeguards Implementation in SQP States, Bangkok, 12–16 September 2022.

Evans L, Bayer S, *Outreach to Locations Outside Facilities in Australia*, US DOE, NNSA, INSEP in partnership with ASNO and APSN: Regional Seminar for Pacific Islands: Strengthening International Nuclear Safeguards – Advancing Regional Security and National Development, Vienna, 24–28 April 2023.

Evans L, Robertson V and Kopac M, *ASNO Permits and Notifications*, OPCW Australia–Malaysia Partnership Program, Kuala Lumpur, 15–19 August 2022.

Evans L, Robertson V and Kopac M, *CWC Trade Discrepancies and Issues*, OPCW Australia-Malaysia Partnership Program, Kuala Lumpur, 15-19 August 2022.

Graham E, *Tracking Nuclear Material Subject to Peaceful Use Agreements*, US DOE, NNSA, NMMSS 2023 Annual Users Training Meeting, New Orleans, 27 June 2023.

Kopac M, *Chemical Risk Assessment*, Workshop on Best Practices in the Development of a Legislative and Regulatory Framework on Chemical Security, Bangkok, Thailand, 19–21 July, 2022.

Kopac K, *National Measures to Control Toxic Chemicals of Security Concern*, Workshop on Best Practices in the Development of a Legislative and Regulatory Framework on Chemical Security, Bangkok, Thailand, 19–21July 2022.

Kopac M and Robertson V, *Australian CWC Implementation of Legislation under Chemical Weapons (Prohibition) Act 1994 and Regulations 1997*, OPCW Australia-Malaysia Partnership Program, Kuala Lumpur, 15-19 August 2022.

Robertson K, *Safeguards in a Nutshell*, Australian National University Department of Nuclear Physics Introduction to Nuclear Science courses, Canberra, Australia, 12 October 2022 and 19 April 2023.

Robertson K, *Radioactive Waste Management* (panel), Nuclear Law Course, Canberra, Australia, 16 May 2023.

Robertson K, Bayer B and Graham E, *Nuclear Fuel Cycle-Related Research and Development under the Additional Protocol: Australian Perspectives*, Institute of Nuclear Materials Management (INMM) and European Safeguards Research & Development Association (ESARDA) Joint Annual Meeting, Vienna, Austria, 23 May2023.

Robertson K, IAEA *Partnerships in Safeguards* (panel), INMM and ESARDA Joint Annual Meeting, Vienna, Austria, 23 May 2023.

Robertson K, *Implementation of Safeguards at the State Level* (roundtable), Joint Meeting of INMM International Safeguards Technical Division and ESARDA Implementation ofSafeguards Working Group, Vienna, Austria, 26 May 2023.

Robertson K, Safeguards Tutorials, University of New South Wales School of Mechanical and Manufacturing Engineering course on Nuclear Safety, Security and Safeguards, Sydney, Australia, 19 and 20July 2023.

Robertson K, *Job Opportunities* at ASNO, Royal Australian Chemical Institute Career Fair, 31 March 2023.

Robertson V, *National Authorities in CWC Implementation* – the Australian Experience, Subregional Forum on National Implementation of the Chemical Weapons Convention for Pacific Island States, Brisbane, Australia, 17–20 October 2022.

Robertson V, *OPCW Australia-Malaysia Partnership Program*, Subregional Forum on National Implementation of the Chemical Weapons Convention for Pacific Island States, Brisbane, Australia, 17–20 October 2022.

Robertson V, *Chemical Regulation in theNational Security Space*, Regulatory Science Network Annual Symposium, Canberra, Australia, 10 November 2022.

Shaw G, *70 Years of Nuclear Stewardship in Australia: Non-Proliferation, Safeguards and Security*, panel event at 66th General Conference of the International Atomic Energy Agency, 28 September 2022.

Glossary

Term	Description
Additional Protocol (AP)	An agreement designed to complement a State's safeguards agreement with the IAEA in order to strengthen the effectiveness and improve the efficiency of the safeguards system. The model text of the Additional Protocol is set out in IAEA document INFCIRC/540 (Corrected).
Asia-Pacific Safeguards Network (APSN)	A professional network that draws upon safeguards expertise in the Asia-Pacific to facilitate the exchange of safeguards information, knowledge and practical experience among Members in order to strengthen safeguards capabilities in the region.
AUKUS	A trilateral enhanced security partnership between Australia, the UK and US. AUKUS aims to build on the three countries' longstanding and ongoing bilateral ties to enable the countries to significantly deepen cooperation on a range of emerging security and defence capabilities.
Australian Nuclear Science and Technology Organisation (ANSTO)	ANSTO is the Australian public research organisation focused on nuclear science and technology with applications in health including radiopharmaceutical production, engineering, materials science, the environment and the nuclear fuel cycle. ANSTO's operations include the OPAL research reactor and ANSTO Nuclear Medicine (ANM).
Australian Obligated Nuclear Material (AONM)	Nuclear material exported from Australia and nuclear material derived therefrom, which is subject to obligations pursuant to Australia's bilateral NCAs.
Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)	The Australian Government's primary authority on radiation protection and nuclear safety. ARPANSA regulates Commonwealth entities that use radiation with the objective of protecting people and the environment.
Australian Safeguards Support Program (ASSP)	ASSP is one of 21 programs established by Member States and the European Commission to assist the IAEA in safeguards research and development and is coordinated by ASNO.
Broader Conclusion (Nuclear)	The IAEA can draw the 'broader conclusion' for a State as a whole that 'all nuclear material remains in peaceful activities'. This is a more fulsome assessment for a State than 'declared nuclear material remain in peaceful activities'.
Central Nervous System-Acting Chemicals (CNSACs)	Toxic (and potentially lethal) chemicals that target the central nervous system.
Chemical Weapon Production Facility (CWPF)	Provisions for dealing with chemical weapon production facilities are addressed in Article V of the CWC.
Chemical Weapons Convention (CWC)	Commonly used name given to the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction.
Complementary Access (CA)	The right of the IAEA, pursuant to the Additional Protocol, for access to a site or location to carry out verification activities.
Comprehensive Nuclear-Test-Ban Treaty (CTBT)	The CTBT bans all nuclear explosions – everywhere, by everyone. While there is almost universal adoption of the Treaty, it will not enter into force until the 44 States specified in Annex 2 have signed and ratified the Treaty.
Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO)	The Vienna-based international organisation established at entry into force of the CTBT to ensure the implementation of its provisions.
Comprehensive Safeguards Agreement (CSA)	Agreement between a State and the IAEA for the application of safeguards to all of the State's current and future nuclear activities (equivalent to 'full scope' safeguards) based on IAEA document INFCIRC/153 (corrected).

Term	Description
Convention on the Physical Protection of Nuclear Material (CPPNM)	CPPNM establishes physical protection measures that must be applied to nuclear material in international transport, as well as measures related to criminal offenses related to nuclear material.
Amended Convention on the Physical Protection of Nuclear Material (A/CPPNM)	The amended CPPNM additionally requires physical protection measures for nuclear facilities and material in domestic use, storage and transport. It also requires States to criminalise malicious acts involving nuclear facilities and material and expands State-to-State cooperation in responding to such acts.
Conversion	Purification of UOC or recycled nuclear material and conversion to a chemical form suitable for isotopic enrichment or fuel fabrication.
CWC-Scheduled Chemicals	Chemicals listed in the Annex on Chemicals to the Chemical Weapons Convention. Some are chemical warfare agents and others are dual-use chemicals that can be used in industry or in the manufacture of chemical warfare agents.
Defence Science and Technology Group (DSTG)	The Australian Government's lead agency responsible for applying science and technology to Defence and national security.
Democratic People's Republic of Korea (DPRK)	Also known as North Korea.
Depleted Uranium (DU)	Uranium with a ^{235}U content less than that found in nature, (for example, the uranium contains less than 0.711% ^{235}U). Depleted uranium is usually the waste product of the uranium enrichment processes.
Direct-Use Material	Nuclear material defined for safeguards purposes as being usable for nuclear explosives without transmutation or further enrichment, for example, plutonium, high enriched uranium (HEU) and ^{233}U.
Discrete Organic Chemical	Any chemical belonging to the class of chemical compounds consisting of all compounds of carbon, except for its oxides, sulphides and metal carbonates, identifiable by chemical name, by structural formula, if known and by Chemical Abstracts Service registry number, if assigned. Long chain polymers are not included in this definition. DOCs are produced at Other Chemical Production Facilities (OCPFs).
Enrichment	A physical or chemical process for increasing the proportion of a particular isotope. Uranium enrichment involves increasing the proportion of ^{235}U from its level in natural uranium, 0.711%. For low enriched uranium (LEU) fuel used in a power reactor the proportion of ^{235}U (the enrichment level) is typically increased to between 3% and 5%.
Euratom	Atomic Energy Agency of the European Union. Euratom's safeguards office, called the Directorate-General of Energy E – Nuclear Safeguards, is responsible for the application of safeguards to all nuclear material in Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden; and to all nuclear material in civil facilities in France.
Facility	(For CWC purposes) a plant, plant site or production/ processing unit. (For safeguards purposes) a reactor, critical facility, conversion plant, fabrication plant, reprocessing plant, isotope separation plant, separate storage location or any location where safeguards-significant amounts of nuclear material are customarily used.
Fissile	Referring to a nuclide capable of undergoing fission by neutrons of any energy, including 'thermal' neutrons (for example, ^{233}U, ^{235}U, ^{239}Pu and ^{241}Pu).

Term	Description
Fissile Material Cut-off Treaty	A proposed international treaty to prohibit production of fissile material for nuclear weapons.
Fission	The splitting of an atomic nucleus into roughly equal parts, often triggered by a bombarding neutron. In a nuclear reactor, a neutron collides with a fissile nuclide (for example, ^{235}U) that then splits, releasing energy and further neutrons. Some of these neutrons go on to collide with other fissile nuclei, setting up a nuclear chain reaction.
Fissionable	Referring to a nuclide capable of undergoing fission by 'fast' neutrons (for example, ^{233}U, ^{235}U, ^{238}U, ^{239}Pu, ^{240}Pu, ^{241}Pu and ^{242}Pu).
Geoscience Australia (GA)	Geoscience Australia is Australia's leading public sector geoscience organisation. GA conducts nuclear monitoring activities on behalf of the Australian Government agreed through a Letter of Understanding between ASNO and GA. GA is also involved in the installation and maintenance of some of the CTBT IMS stations in Australia and its territories.
Heavy Water (D2O)	Water enriched in the 'heavy' hydrogen isotope deuterium (2H) which consists of a proton and a neutron. D2O occurs naturally as about one part in 6,000 of ordinary water. D2O is a very efficient moderator, enabling the use of natural uranium in a nuclear reactor.
High Flux Australian Reactor (HIFAR)	The 10 MWt research reactor located at ANSTO, Lucas Heights. Currently undergoing decommissioning.
High Enriched Uranium (HEU)	Uranium enriched to 20% or more in ^{235}U. Weapons-grade HEU is enriched to over 90% ^{235}U.
Hydroacoustic	The study and application of sound in water. One category of CTBT IMS station monitoring changes in water pressure generated by sound waves in the water.
Indirect-Use Material	Nuclear material that cannot be used for a nuclear explosive without transmutation or further enrichment (for example, depleted uranium, natural uranium, LEU and thorium).
INFCIRC/153 (Corrected)	The model agreement used by the IAEA as a basis for comprehensive safeguards agreements with NNWS Parties to the NPT.
INFCIRC/225 Rev.5 (Corrected)	The IAEA document *Nuclear Security Recommendations on Physical Protection of Nuclear Materials and Nuclear Facilities*. Its recommendations reflect a consensus of views among IAEA Member States on desirable requirements for physical protection measures on nuclear material and facilities; that is, measures taken for their physical security.
INFCIRC/540 (Corrected)	The model text of the IAEA's Additional Protocol.
INFCIRC/66 Rev.2	The model safeguards agreement used by the IAEA since 1965. Essentially, this agreement is facility specific. For NNWS party to the NPT it has been replaced by INFCIRC/153.
Infrasound	Sound in the frequency range of about 0.02 to 4 Hertz. One category of CTBT IMS stations will monitor sound at these frequencies with the aim of detecting explosive events such as a nuclear test explosion at a range up to 5,000 km.
Integrated Safeguards	The optimum combination of all safeguards measures under comprehensive safeguards agreements and the Additional Protocol to achieve maximum effectiveness and efficiency.

Term	Description
International Atomic Energy Agency (IAEA)	The IAEA is the world's centre for cooperation in the nuclear field and seeks to promote the safe, secure and peaceful use of nuclear technologies.
International Data Centre (IDC)	Data gathered by monitoring stations in the CTBT IMS network are compiled, analysed to identify events and archived by the Vienna-based IDC. IDC products giving the data about events are made available to CTBT signatories.
International Monitoring System (IMS)	A network of monitoring stations and analytical laboratories established pursuant to the CTBT which, together with the IDC, gather and analyse data with the aim of detecting any nuclear explosion.
International Partnership of Nuclear Disarmament Verification (IPNDV)	IPNDV is an ongoing initiative of more than 25 countries with and without nuclear weapons. The Partners are identifying challenges associated with nuclear disarmament verification and developing potential approaches and technologies to address those challenges.
Isotopes	Atoms of the same element with the same number of protons, but different numbers of neutrons, for example, ^{235}U (92 protons and 143 neutrons) and ^{238}U (92 protons and 146 neutrons). While different isotopes of the same element behave the same in a chemical reaction, they behave differently in a nuclear reactions.
Light Water	H_2O. Ordinary water.
Light Water Reactor (LWR)	A power reactor which is both moderated and cooled by ordinary (light) water. In this type of reactor, the uranium fuel must be slightly enriched (that is, LEU).
Low Enriched Uranium (LEU)	Low enriched uranium. Uranium enriched to less than 20% ^{235}U. Commonly, LEU used as fuel in light water reactors is enriched to between 3% and 5% ^{235}U.
Material Balance Area (MBA)	A delineation for nuclear accounting purposes as required under comprehensive safeguards agreements. It is a defined and delineated area in or outside of a facility such that: (a) the quantity of nuclear material in each transfer into or out of the MBA can be determined; and (b) The physical inventory of nuclear material in the MBA can be determined, in order that the nuclear material balance can be established for IAEA safeguards purposes.
Material Balance Report (MBR)	A formal report from a national safeguards authority to the IAEA comparing consolidated inventory changes in a given period with the verified inventories at the start and end of that period.
Material Unaccounted For (MUF)	A term used in nuclear materials accountancy to mean the difference between operator records and the verified physical inventory. A certain level of MUF is expected due to measurement processes. MUF does not usually indicate 'missing' material – because it is a difference due to measurement, MUF can have either a negative or a positive value.
Mixed Oxide Fuel (MOX)	Mixed oxide reactor fuel, consisting of a mixture of uranium and plutonium oxides. The plutonium content of fresh MOX fuel for an LWR is typically around 5–7%.
Moderator	A material used to slow fast neutrons to thermal speeds where they can readily be absorbed by ^{235}U or plutonium nuclei and initiate a fission reaction. The most commonly used moderator materials are light water, heavy water or graphite.

Term	Description
Natural Uranium	In nature, uranium consists predominantly of the isotope ^{238}U (approximately 99.3%), with the fissile isotope ^{235}U comprising only 0.711%.
Non-Nuclear-Weapon State(s) (NNWS)	States not recognised by the NPT as having nuclear weapons at 1 January 1967 when the Treaty was negotiated.
Nuclear Material	Any source material or special fissionable material as defined in Article XX of the IAEA Statute (in practice, this means uranium, thorium and plutonium).
Nuclear-Weapon State(s) (NWS)	States recognised by the NPT as having nuclear weapons at 1 January 1967 when the Treaty was negotiated, namely the US, Russia, the UK, France and China.
NUMBAT	Nuclear Material Balances and Tracking – ASNO's custom-built nuclear database used to fulfil reporting requirements under Australia's safeguards agreements with the IAEA, track Australian AONM overseas and maintain a register of permit holders, as required under the *Nuclear Non-Proliferation (Safeguards) Act 1987*.
Old Chemical Weapons (OCW)	Defined under the CWC as: • chemical weapons produced before 1925; or • chemical weapons produced between 1925 and 1946 that have deteriorated to such extent that they can no longer be used as chemical weapons.
On-Site Inspection (OSI)	A short-notice, challenge-type inspection provided for in the CTBT as a means for investigating concerns about non-compliance with the prohibition on nuclear explosions.
Open Pool Australian Light-Water Reactor (OPAL)	The 20 MWt research reactor located at ANSTO, Lucas Heights, reached full power on 3 November 2006 and was officially opened on 20 April 2007.
Organisation for the Prohibition of Chemical Weapons (OPCW)	OPCW is an intergovernmental organisation and the implementing body for the CWC based in The Hague, Netherlands. It oversees the global endeavour for the permanent and verifiable elimination of chemical weapons.
Other Chemical Production Facility (OCPF)	Defined under the CWC as all plant sites that: • produced by synthesis during the previous calendar year more than 200 tonnes of unscheduled discrete organic chemicals; or • comprised one or more plants which produced by synthesis during the previous calendar year more than 30 tonnes of an unscheduled discrete organic chemical containing the elements phosphorus, sulphur or fluorine.
Physical Inventory Listing (PIL)	A formal report from a national safeguards authority to the IAEA on nuclear materials inventories at a given time (generally the end of a Material Balance Report period).
Production	(For CWC purposes) the formation of a chemical through chemical reaction. Production of chemicals specified by the CWC is declarable, even if produced as intermediates and irrespective of whether or not they are isolated. (For safeguards purposes) Nuclear Production is the generation of special fissionable material through irradiation of fertile material in a reactor.
Provisional Technical Secretariat (PTS)	The PTS assists the CTBTO Preparatory Commission in the establishment of a global verification regime to monitor compliance with the CTBT.
^{239}Pu	An isotope of plutonium with atomic mass 239 (94 protons and 145 neutrons). ^{239}Pu is the fissile isotope of plutonium most suitable for nuclear weapons.

Term	Description
Radionuclide	An isotope with an unstable nucleus that disintegrates and emits energy in the process. Radionuclides may occur naturally, but they can also be artificially produced and are often called radioisotopes. One category of CTBT IMS stations is used to detect radionuclide particles in the air. Other IMS stations are equipped with radionuclide noble gas technology to detect the abundance of the noble gas xenon in the air.
Reprocessing	Processing of spent nuclear fuel to separate uranium and plutonium from highly radioactive fission products.
Safeguards Inspector	For domestic purposes, a person declared under section 57 of the Safeguards Act to undertake inspections to ensure compliance with provisions of the Act and to assist IAEA inspectors in the conduct of IAEA inspections and complementary access in Australia.
Seismic	Referring to the movements of the earth and its crust that can be generated by, among other things, earthquakes, explosions and large impacts (for example, meteors). The seismic component of the CTBT's IMS is a network of 50 primary stations and 120 auxiliary stations. Analysis of seismic waves can be used to distinguish between earthquakes and explosive events.
Small Quantities Protocol (SQP)	A protocol to a State's safeguards agreement with the IAEA, for States with small quantities of nuclear material and no nuclear facilities. The protocol holds in abeyance most of the provisions of the State's safeguards agreement.
Source Material	Uranium containing the mixture of isotopes occurring in nature; uranium depleted in the isotope ^{235}U; thorium; or any of the foregoing in the form of metal, alloy, chemical compound or concentrates.
Special Fissionable Material (SFM)	^{239}Pu; ^{233}U; uranium enriched in the isotopes 235 or 233; any material containing one or more of the foregoing.
Standing Advisory Group on Safeguard Implementation (SAGSI)	An international group of experts appointed by, and advising, the IAEA Director General on safeguards implementation matters.
Treaty on the Non-Proliferation of Nuclear Weapons (NPT)	The Treaty on the Non-Proliferation of Nuclear Weapons, commonly referred to as the NPT, is an international treaty with the objectives of preventing the spread of nuclear weapons and weapons technology, promoting cooperation in the peaceful uses of nuclear energy and to further the goal of nuclear disarmament.
^{232}Th	The only naturally occurring isotope of thorium, having an atomic mass of 232 (90 protons and 142 neutrons).
^{233}U	An isotope of uranium containing 233 nucleons, usually produced through neutron irradiation of ^{232}Th.
^{235}U	An isotope of uranium containing 235 nucleons (92 protons and 143 neutrons) which occurs as 0.711% of natural uranium.
^{238}U	An isotope of uranium containing 238 nucleons (92 protons and 146 neutrons) which occurs as about 99.3% of natural uranium.
Uranium ore concentrate (UOC)	A commercial product of a uranium mining and milling operation usually containing a high proportion (greater than 90%) of uranium oxide.
Weapons of Mass Destruction (WMD)	Refers to nuclear, chemical, biological and occasionally radiological weapons.

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