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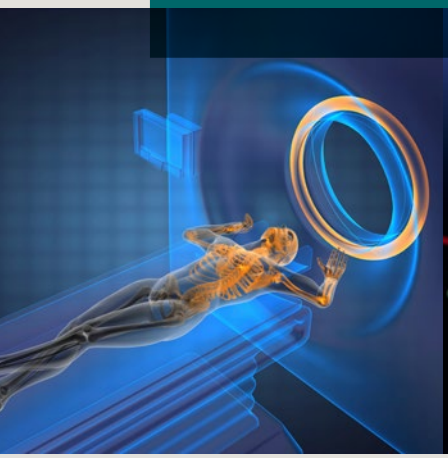
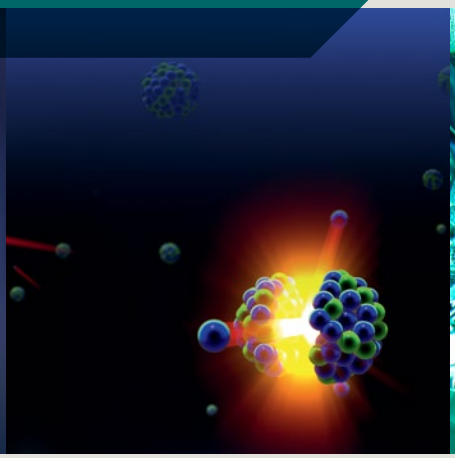
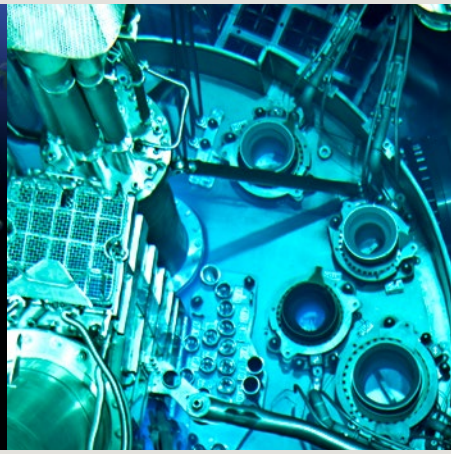
ANNUAL REPORT

2014–2015







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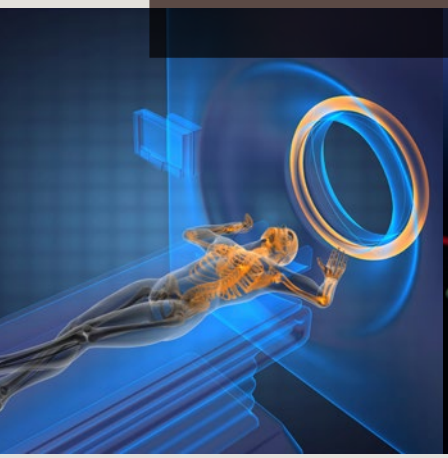

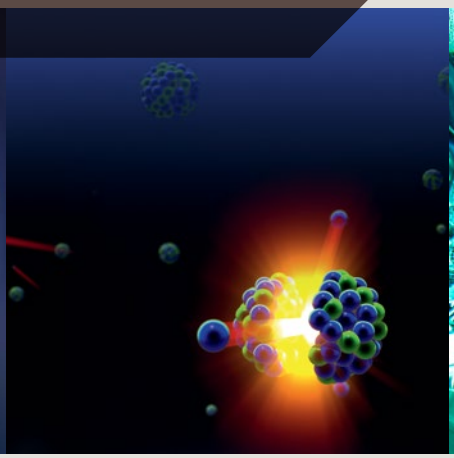

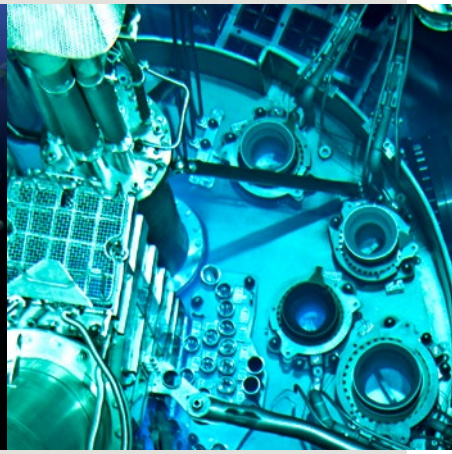

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Photo 1: Medical Imaging

Photo 2: Atomic fission. Image courtesy of the Australian Nuclear Science and Technology Organisation

Photo 3: Australia's OPAL research reactor pool. Image courtesy of the Australian Nuclear Science and Technology Organisation.

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Australian Government

Australian Safeguards and Non-Proliferation Office

20 October 2015

The Hon Julie Bishop
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 2015. 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 with activities in anticipation of the entry into force of the Comprehensive Nuclear-Test-Ban Treaty. 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 measures against the proliferation of 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

Dr Robert Floyd
Director General

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:

- report by the Director General ASNO on key developments in 2014–15 and a preview of the year ahead
- summary of current major issues
- functional overview of ASNO, including its operating environment and outcomes – outputs structure – the first outcome demonstrates accountability to Government; the second outlines public outreach and education
- report on ASNO's performance during 2014–15
- key features of ASNO's corporate governance and the processes by which ASNO is directed, administered and held accountable.

Because 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.

A checklist of information included against annual report requirements is set out in the List of Requirements (page 113).

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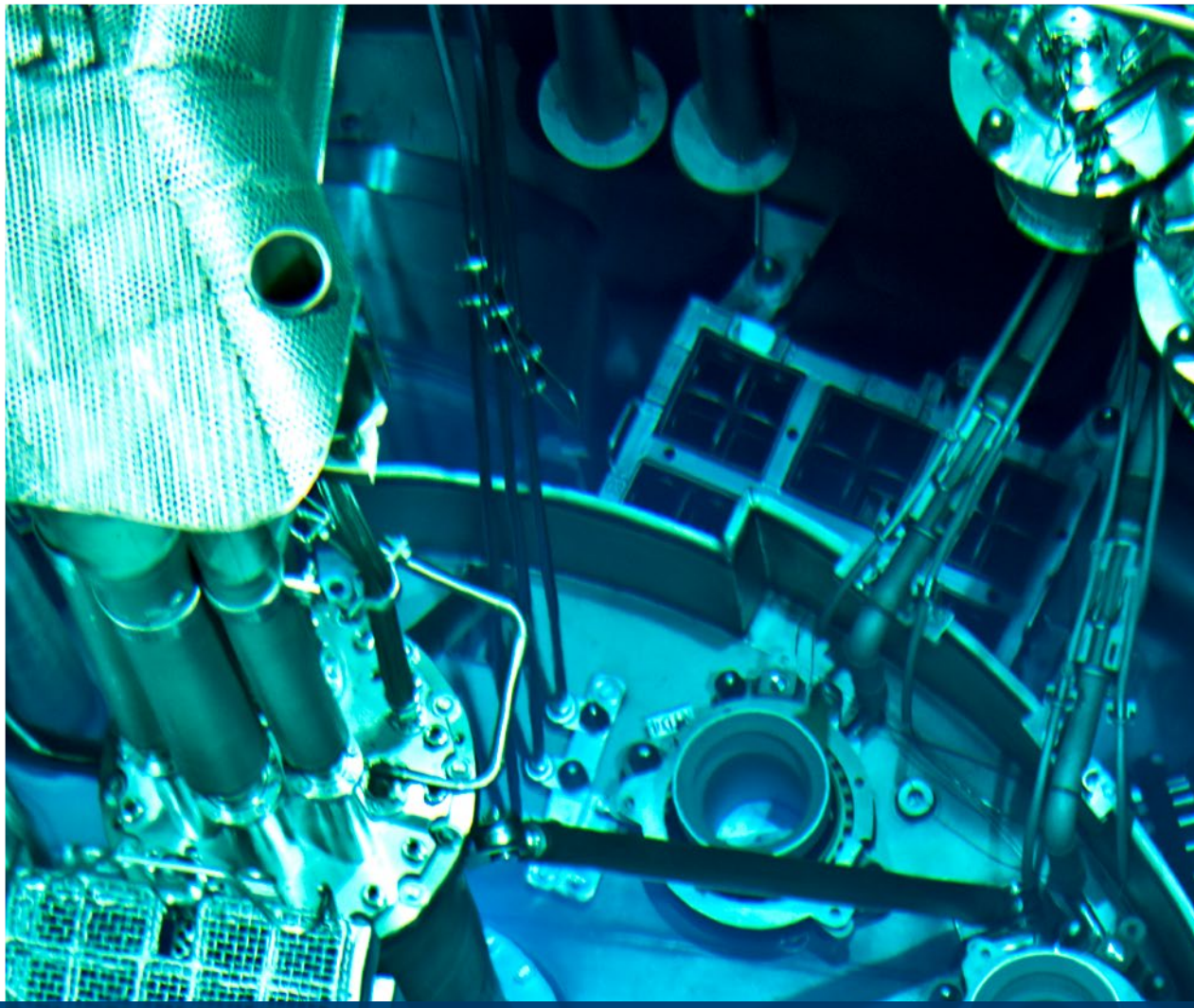


DIRECTOR GENERAL'S REPORT

1

SECTION

Director General's Report

Australia's Foreign Minister Julie Bishop with the International Atomic Energy Agency Director General Yukiya Amano.

The Year in Review

Dr Robert Floyd, Director General ASNO

Nuclear Non-Proliferation and Safeguards Developments

International Atomic Energy Agency Safeguards

Steady progress continues to be made at the practical implementation level with improving the effectiveness and efficiency of IAEA safeguards and adherence to IAEA safeguards instruments.

In the reporting period, three more countries brought the IAEA's Additional Protocol into force, Cambodia, Djibouti and India, taking the number of Additional Protocol adherents to 127. The Additional Protocol gives the IAEA greater access to information and locations in a state, and is firmly established as part of the NPT safeguards standard. With the more expansive verification toolkit under the Additional Protocol the IAEA can reach the point where it can draw what is known as the broader conclusion on safeguards compliance, namely that not only is all the declared nuclear material accounted for in a state, but also that there is no indication of undeclared nuclear material or activities. For states without an Additional Protocol the best compliance conclusion the IAEA can draw is a qualified one that only relates to declared nuclear material and activities.

Currently, of the 63 non-nuclear-weapon state parties to the NPT with significant nuclear activities 51 have the Additional Protocol in force, and of these 40 have the broader conclusion. As of the end of 2014 the IAEA was able to draw the broader conclusion for 65 states, up from 63 in 2013, so progress is being made. Furthermore, Iran has recently agreed to provisionally implement the Additional Protocol under the Joint Comprehensive Plan of Action. The IAEA's examination of the nuclear activities in the remaining Additional Protocol states will hopefully also lead to the broader conclusion over the next few years. However, for the states without an additional protocol, particularly those with significant nuclear activities, the IAEA will continue to draw qualified compliance conclusions.

Regarding comprehensive safeguards agreements (the agreements all non-nuclear-weapon state parties to the NPT are obliged to conclude) one country brought its agreement into force during the period, Djibouti, but there still remain eleven countries[1] that have not yet done so. None of these countries have nuclear facilities, but it is important to entrench the normative value of IAEA safeguards by having all countries establish a comprehensive safeguards agreement. In Australia's region, the Federated States of Micronesia signed their comprehensive safeguards agreement on 1 June 2015, another positive step towards universality.

At the September 2014 IAEA General Conference an important achievement was the adoption by consensus for the second year running of the resolution on 'Strengthening the Effectiveness and Improving the Efficiency of the Safeguards System and Application of the Model Additional Protocol' (known as the Safeguards Resolution). ASNO played a significant role in the negotiation of this resolution. The IAEA Director General had

1 Benin, Cabo Verde, Equitorial Guinea, Eritrea, Guinea, Guinea-Bissau, Liberia, Sao Tome and Pincipe, Somalia, Timor Leste, Federated States of Micronesia.

issued a supplementary report[2] on what is known as the State-level concept (see page 64 of this report, and pages 13 and 64 of the 2013–14 Annual Report) only a few weeks prior, so debate on the State-level concept was still very fresh during the negotiations of the Resolution. Achieving a Resolution by consensus was a challenge. Debate on the State-level concept and how it should or should not be characterised in the Resolution continued, but it was ultimately possible to conclude language in the resolution that satisfied all parties. A critical factor that assisted in achieving consensus was the assurances on the scope and legal basis of the State-level concept that the IAEA DG gave at the September 2014 Board of Governors meeting. These were not new assurances, but having the IAEA DG reiterate them was important for some States.

The IAEA Secretariat expended considerable effort throughout 2014 preparing several briefings on the State-level concept, preparing a very comprehensive report[2] for the Board of Governors, and consulting with individual states. Most states appear now to be mostly satisfied with the IAEA DG's assurances on the scope of the State-level concept. With the extensive consultations of 2013 and 2014 over, the IAEA Secretariat is now focusing on developing individual State-level approaches under the State-level concept in consultation with each state. As each of these are completed, the IAEA should be able to more effectively direct its verification resources to where they are most relevant to circumstances in each states, leading to greater efficiencies in how it manages its important verification mandate.

Regional Developments

A highlight for regional developments in the reporting period was the hosting by the Myanmar Ministry of Science and Technology of the 5th annual meeting in September 2014 of the Asia-Pacific Safeguards Network (APSN). Myanmar joined APSN formally in early 2014 and volunteered to host the annual meeting in the same year. This is just another example of the enhanced engagement of Myanmar with the international community on non-proliferation issues in recent years. The meeting was very ably hosted and arranged by the Ministry of Science and Technology and was attended by around 30 participants from eleven countries in the Asia-Pacific region, as well as representatives from the IAEA. The position of Chair of APSN had been held by the Director General of ASNO since 2010 – two terms under APSN's Statement of Principles. With the expiration of the second term the Japanese Ministry of Foreign Affairs offered, with unanimous agreement from all APSN members, to take over the position.

Dr Robert Floyd, DG ASNO chairing 5th Annual Meeting of APSN, Myanmar, September 2014.

Domestic Developments

During the reporting period, the IAEA conducted five design information verification inspections, three routine inventory inspections and one random interim inspection in Australia. It also undertook two complementary access visits in accordance with Australia's Additional Protocol, one at buildings at ANSTO, and one at the Four Mile uranium mine. The IAEA used the results from these inspections, plus its evaluation of Australia's reports and other safeguards-relevant information, to draw its compliance conclusions for Australia. The Secretariat reported 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, and therefore concluded that all nuclear material in Australia remained in peaceful activities (the "broader conclusion"). The IAEA has been drawing the broader conclusion with respect to Australia since

2 Supplementary Document to the *Report on The Conceptualization and Development of Safeguards Implementation at the State Level* (GOV/2014/41).

2000. The details of the IAEA's conclusions on Australia are in Appendix D, and its overall statement of conclusions for all states is in Appendix E.

One of the design information verification activities the IAEA conducted was at the site where ANSTO's Synroc waste immobilisation facility will be constructed. This was the first such inspection for what will become a new facility for safeguards purposes in Australia. Progress on the construction of the new molybdenum-99 production plant at the ANSTO's Lucas Heights site was well advanced at the end of the reporting period. ASNO and ANSTO are in on-going discussions with the IAEA on how safeguards will be applied to the nuclear material that will move through this plant.

During the period ANSTO completed construction of the new interim storage facility that will hold Australian radioactive waste generated by several decades of nuclear medicine production and scientific research at ANSTO.

The University of Western Australia's (UWA) Centre for Microscopy, Characterisation and Analysis is Australia's latest contributor to the IAEA's Network of Analytical Laboratories (NWAL) during the period. The IAEA uses the Network for the analysis of environmental samples and destructive assay samples taken during inspections. This analysis from nuclear sites around the world represents a powerful tool for detecting undeclared activities, and the ongoing work at UWA is a significant contribution to this important verification work. Since the UWA's participation in the NWAL began in 2012, it has been involved in the analysis of 50 environmental samples for the IAEA.

Bilateral Safeguards Developments

Australia and India signed a nuclear cooperation agreement (NCA) on 5 September 2014. The NCA was tabled in Parliament on 28 October 2014 and referred to the Joint Standing Committee on Treaties (JSCOT) for consideration. ASNO appeared before two of the four public hearings held by JSCOT. The Committee is expected to present its report in September 2015.

Five negotiating rounds were held during the year between Australia and India on the Administrative Arrangement for the NCA. Negotiations were led for Australia by ASNO. Negotiators worked constructively with the aim of concluding an administrative arrangement as soon as possible, consistent with Australia's requirements for robust safeguards and accountability.

Exports of Australian uranium to India can only commence after Australia and India have concluded and brought the proposed nuclear cooperation agreement into force and Australia and India have an agreed administrative arrangement in place.

In September 2014, the Government announced a range of sanctions on trade with Russia. One such measure was to ban the export of Australian uranium to Russia for Russian domestic use and stockpiling.

As noted in ASNO's previous annual report, the Agreement between Australia and the United Arab Emirates was brought into force on 14 April 2014. On 27 November 2014, the Government tabled its response to the report from JSCOT on the nuclear cooperation agreement. In JSCOT's report tabled on 18 March 2014, they recommended binding treaty action be taken. In light of the strong IAEA oversight and cooperation with the UAE, the Government made the decision to bring the Agreement into force on 14 April 2014.

One negotiating round was held during the year between Australia and the UAE on the administrative arrangement. With the nuclear cooperation agreement in force, finalisation of the administrative arrangement is all that remains to be completed before exports of Australian uranium to the UAE could commence. Negotiators are working towards concluding the administrative arrangement as soon as possible.

In December 2014, Prime Minister Abbott and Ukrainian President Poroshenko discussed the possibility of Australian uranium supply to Ukraine. ASNO is currently working through processes in order to commence negotiations on a nuclear cooperation agreement with Ukraine.

Nuclear Security

In June 2015, ASNO completed a major review of ANSTO's security arrangements and issued key findings and required actions for ANSTO and ASNO to take.

Australia continued its strong contribution to the Nuclear Security Summit process by co-coordinating with Hungary a working group of summit participating states. The working group's objective was to draft an action plan to take forward the work relevant to the IAEA. This action plan will seek to support the IAEA's central role in nuclear security and seek to ensure that momentum on the IAEA's work in this area is maintained beyond the final summit in 2016.

Participants at the CTBTO Integrated Field Exercise in Jordan, Nov-Dec 2014. Photo courtesy of CTBTO.

Comprehensive Nuclear-Test-Ban Treaty Developments

In the twenty years since the Comprehensive Nuclear-Test-Ban Treaty (CTBT) was negotiated, support for that treaty and its objectives has continued to build. The norm against nuclear testing has strengthened notwithstanding the fact that eight key ratifications of the treaty remain outstanding. Efforts to promote those outstanding ratifications are now a regular feature of the diplomatic calendar, and initiatives such as the Group of Eminent Persons, set up by the CTBTO, are looking at new ways to seek progress.

Close to 90 percent of International Monitoring System facilities have been established, including 20 of the 21 that Australia will host. A key strategic goal in the development of the treaty's International Data Centre was also reached, making it ready for full-scale testing.

The on-site inspection element of the CTBT's verification system achieved a major goal with the conduct of a six-week field exercise. The 2014 Integrated Field Exercise demonstrated significant development in the CTBTO's capacity to conduct the on-the-ground search for evidence of a clandestine nuclear explosion. Most of the inspection methods and technologies allowed for by the CTBT were put to the test in response to a carefully designed scenario, and played out in a search area of 1 000 square kilometres in the Dead Sea area of Jordan in November-December 2014. The scenario engaged up to 300 experts at various times, in several teams. ASNO's Malcolm Coxhead had a major role in the exercise as he led the team representing the interests of the fictional inspected State of Maridia.

Chemical Weapons Convention Developments

The Nobel Peace Prize winning Organisation for the Prohibition of Chemical Weapons' (OPCW) has made a significant contribution to chemical weapons disarmament and non-proliferation over the past 18 years since entry into force of the Chemical Weapons Convention (CWC).

Myanmar's ratification of the CWC on 7 August 2015 brought the total number of states parties to 191, with only five countries yet to join: Angola, Egypt, Israel (signed but not yet ratified), North Korea and South Sudan.

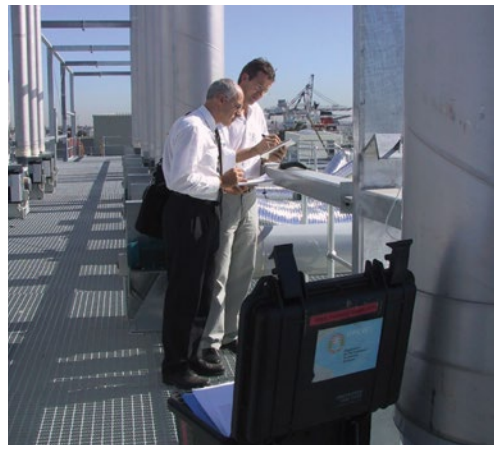
The OPCW continued its chemical disarmament work having verified, since its establishment, the destruction of more than 72 000 metric tonnes of chemical agent, amounting to 90% of all declared chemical weapons stockpiles. Two hundred and sixty five chemical weapons-related sites have been inspected by the OPCW since 1997 to monitor destruction of chemical weapons and their production and storage facilities. The remaining chemical weapons in Libya, Russia and the United States are expected to be destroyed by their planned completion dates of 2016, 2020 and 2023, respectively.

The on-going civil war in Syria continued to impact heavily on the OPCW's work and that of the United Nations in their efforts to remove forever the threat of chemical weapons. Syria's chemical weapons program was largely dismantled under international oversight in accordance with United Nations Security Council Resolution 2118 (2013). However a few chemical weapons production facilities and chemical weapons precursors remain to be destroyed by the end of 2015 and Syria has yet to address some gaps in its CWC declaration.

In order to provide confidence to the international community that no new chemical weapons have emerged, the OPCW has undertaken about 3 000 routine inspections at 2 024 industrial sites since April 1997. Nearly 5,000 declared chemical facilities are subject to inspection by the OPCW. Australia has hosted 47 inspections at declared chemical or defence facilities since 1997, with two having occurred in the reporting year. All inspections reports confirmed Australia's declared information and the absence of undeclared CWC-Scheduled chemicals and/or their production.

21 April 2015 marked the 100-year anniversary of the first large scale use of chemical weapons which took place during World War I near Ypres, Belgium (refer to Current Topics page 24). However, chemical weapons (in particular chlorine) continued to be used in Syria throughout the reporting period, despite a century of struggle against these heinous weapons.

As the threat from non-state actors seeking to acquire and use chemical weapons increases and the destruction of declared chemical weapons stockpiles draws closer to an end, the OPCW has been working to ensure that it adapts and continues to be relevant. Progress has been made to help ensure that the OPCW retains its expertise on the military side to verify chemical weapons destruction through adoption of a decision on the rehiring of former OPCW inspectors and in developing an IT management system for ensuring the retention of knowledge. A restructure of the OPCW has also been discussed which aims to meet the demands of the future with a predictable shift in focus to preventing the re-emergence of chemical weapons, whilst ensuring more efficient and effective operation within limited resources. Other considerations for the future of the OPCW include the increasing globalisation of the chemical industry and advances in science, technology and communications.



OPCW Inspectors at a chemical production facility in Australia.

Other Non-Proliferation and Disarmament Developments

Fissile Material Cut-off Treaty

There is widespread support among States for establishing a binding international prohibition on the production of fissile material for use in nuclear weapons. Such a Fissile Material Cut-Off Treaty (FMCT) would promote non-proliferation and establish part of the framework for verifying future nuclear disarmament.

With the Conference on Disarmament not yet able to agree to negotiate an FMCT, a Group of Governmental Experts (GGE) established under a UN mandate has undertaken a detailed assessment during 2014 and 2015 of elements of a future treaty. Australia participated in the GGE, with expert input from ASNO. The Current Topics article (page 22) of this report examines the outcomes of the GGE, which should serve as a valuable aid for future negotiators of a treaty.

International Partnership for Nuclear Disarmament Verification (IPNDV)

Future treaty frameworks for nuclear disarmament will need to be underpinned by effective verification. Techniques for conducting such verification can build on existing mechanisms such as IAEA safeguards, but new and unique approaches and technologies will be needed also. Information about the design of nuclear weapons is highly sensitive in terms of proliferation risk, and for the security interests of the states that possess them.

In late 2014, the United States announced the International Partnership for Nuclear Disarmament Verification (IPNDV) to bring together both nuclear and non-nuclear weapon states under a cooperative framework to further understand and find solutions to the complex challenges involved in the verification of nuclear disarmament. The IPNDV will build on low-key technical work carried out by some of the nuclear weapon states and through the UK-Norway Initiative on nuclear disarmament verification.

Australia is nominating experts from ASNO and ANSTO to participate in the IPNDV working groups. DG ASNO has been invited to co-chair one of the three Working Groups being established to carry work forward.

The Year Ahead

ASNO will seek to finalise the administrative arrangements with India and the United Arab Emirates and commence negotiations with Ukraine on a nuclear cooperation agreement.

ASNO will continue to manage Australia's network of bilateral nuclear cooperation (safeguards) agreements, including the detailed scrutiny of the transfer and use of Australian Obligated Nuclear Material (AONM) around the world.

The following developments in the international security environment are likely to impact on ASNO's work during 2015–16:

- ASNO will lead the support to Australia's delegation to the final Nuclear Security Summit in Washington DC in March 2016 and for intersessional meetings of summit sherpas.

- Domestically, ASNO will complete its major review of permits issued to ANSTO and will also review security arrangements with respect to the shipping of uranium ore concentrates through areas where the risk of piracy is high.
- In addressing the challenges posed by the international security environment, ASNO will continue to provide specialist analysis and policy support to the Australian Government in the areas of non-proliferation and disarmament.
- ASNO will continue its outreach program to build operational capability in the areas of safeguards and nuclear security and non-proliferation treaty implementation (such as the CTBT and CWC), including through active support of and participation in the Asia-Pacific Safeguards Network (APSN).
- ASNO will continue to provide input into the debate in the IAEA Board of Governors and General Conference on safeguards and security developments.

One major focus domestically in the year ahead will be bringing ASNO's regulatory approaches across all sections in ASNO in line with the *Government's Regulator Performance Framework and the Commonwealth Risk Management Policy* (see more details on page 89). Another significant endeavour will be working with the Department's Information Management and Technology Division on completing the nuclear and chemical database and on-line web portal projects. Approximately one third of permits for the possession and transport of nuclear material will expire during the period, including ANSTO's permits. This will present a timely opportunity, in light of the Government's regulator performance and risk management policies, to review and update the conditions and structures of ASNO's permits.

ASNO will collaborate with the OPCW and other States Parties to promote the objectives of the CWC, including by sharing Australia's experience implementing the CWC with regional counterparts. ASNO will support OPCW efforts to promote universal adherence to the CWC including support to new States Parties, as required.

ASNO will continue to monitor CWC-related developments in Syria including the implementation of:

- United Nations Security Council Resolution (UNSCR) 2118, which required the verification and destruction of Syria's chemical weapons program;
- the OPCW fact-finding mission's investigations into chlorine attacks in Syria;
- the OPCW's Declaration Assessment Team's efforts to examine gaps in Syria's initial declaration; and
- the Joint Investigative Mechanism established under the UNSCR 2235 to determine responsibility for the use of chemical weapons in Syria.

ASNO will support the OPCW's efforts to prevent the re-emergence of chemical weapons by promoting discussion within the OPCW on central nervous system-acting chemicals in law enforcement.

The work of the International Partnership for Nuclear Disarmament Verification (IPNDV) will begin in earnest in November 2015 at a plenary meeting of participants in Oslo, Norway. Three working groups are planned to meet several times during 2016 and 2017 to discuss and develop thinking based on terms of reference to be agreed. DG ASNO will co-chair Working Group 2, which will explore potential new inspection activities and techniques that could effectively verify compliance with future agreements.

CURRENT TOPICS

2

SECTION

Current Topics

CTBTO Integrated Field Exercise 2014: an international project

For six weeks in November-December 2014, the CTBTO conducted the largest ever trial of a multilateral arms-control inspection. The Integrated Field Exercise (IFE14), conducted mainly in the Dead Sea region of Jordan, simulated the search for evidence of a nuclear explosion in violation of the CTBT. The exercise engaged more than 300 experts and 150 tonnes of equipment, and was the culmination a series of build-up exercises in 2012 and 2013. Beyond the very extensive preparations for IFE14 made by the CTBTO, many countries lent strong practical support, without which the development of this arm of CTBT verification could not have made the same progress.

The requirement in the CTBT that it must be ratified by 44 named countries for it to come into force has often been cited as an "Achilles heel" for the treaty. Had the entry-into-force formula been closer to that set for the Chemical Weapons Convention (65 ratifications by any countries) it is more than likely that the CTBT would now be in force. Notwithstanding this difficulty (or perhaps even because of it), the desire of many countries to urge progress to bring the CTBT into force has grown stronger over the years. The biennial "Article XIV" conference of treaty signatories is a dedicated mechanism to promote entry into force. Expressions of political support for the CTBT in NPT conferences and other multilateral meetings are also valuable.

The requirement in the CTBT that its verification infrastructure is capable of meeting treaty requirement by the time of entry into force provides a further and very practical way for countries to demonstrate support for the treaty. The central focus of this since 1997 has been the build-up and provisional operation of the International Monitoring System (IMS) and International Data Centre. IFE14 has helped to give priority to establishing the third arm of CTBT verification: on-site inspection (OSI).

The purpose of OSI under the CTBT is to clarify whether a nuclear explosion has taken place, and to gather additional facts if necessary to identify a violator. It would likely be triggered following detection by IMS stations of seismic and/or radioactive evidence of a possible nuclear explosion. A capability for the CTBTO to conduct OSI requires specialised equipment, trained inspectors, well-developed procedures and logistical capacity. Putting that capability to a realistic test requires a credible scenario simulating a possible underground nuclear explosion. None of this is simple.

The scenario for IFE14 was developed over two years by a team from nine countries and the CTBTO. The contribution of experts with experience from the former explosive nuclear testing programme of a number of the NPT Nuclear Weapon States was crucial. Locations offered by the exercise host (Jordan) were prepared to mimic artefacts of a nuclear weapon test site and mechanisms were developed to simulate radioactivity and other phenomena of a weapon test. The sites were of course designed also to hide these features as a violator of the treaty may do. The sites were within a 1 000 square kilometre area specified for conduct of the "inspection" – the largest area that the CTBT allows.

The CTBT allows for up to 40 inspectors on-site, but more need to be trained and ready. Because the CTBTO will not have a standing inspectorate in the same way as the IAEA or OPCW, most inspector candidates will be nominated by CTBTO States. For IFE14, around 120 technical experts completed a detailed program of training as well as "build-up" exercises to prepare over more than two years. Some of these were CTBTO staff, but most were made available by CTBT signatory states. IFE14 also required a team of around 35 experts to represent the fictitious inspected state of Maridia[1]. Other teams were needed also to manage and control the exercise and to monitor and evaluate its conduct. Jordan, as the host state, provided important logistical support, as well as excellent support for the wellbeing and security of all exercise participants.

Part of the equipment needed to carry out an OSI has been purchased by the CTBTO,

1 The "Maridian" team was led by ASNO's Malcolm Coxhead

or donated to it. But much of the specialised equipment systems used at IFE14 were provided as a loan to the CTBTO. Equipment for analysis of environmental samples, radionuclide particulates and noble gases was made available by China, the United Kingdom and the United States. Analytical platforms for aerial search were provided by Italy, the Czech Republic, Hungary and Canada. In all, ten countries and the European Union provided equipment and contributions valued at more than $10 million.

Hosting of IFE14 by Jordan brought a useful new focus on CTBT for countries in the Middle East. Egypt, Iran and Israel are three of the final eight countries whose ratification of the CTBT is required to bring the treaty into force. The first part of IFE14 follow-up meetings, to review and analyse the exercise, was hosted by Israel in April 2015.

The combined work of the CTBTO and treaty signatories to bring IFE14 about has led to a significant advance in the readiness of the OSI part of the verification system. This is particularly evident when compared to outcomes from the previous integrated field exercise in 2008, in Kazakhstan. IFE14 credibly demonstrated the ability of an OSI team to search a complex inspection area to identify locations of a possible nuclear test, and to apply techniques at those sites providing evidence on whether a nuclear explosion has occurred.

More remains to be done however. The CTBTO will build the lessons of IFE14 into its standing preparations for an OSI, through the design of equipment and procedures, and through the training of future inspectors. Techniques such as resonance seismometry and drilling for radioactive samples were not applied during IFE14 and need to be developed. A next major exercise could make sense in several years. We can hope that by that time the entry into force of the CTBT is also with us.

The CTBTO Integrated Field Exercise conducted mainly in the Dead Sea region of Jordan over six weeks in Nov-Dec 2014 – includes inspected-state Team Leader, Malcolm Coxhead. Photo courtesy of CTBTO.

Promoting the FMCT: Group of Governmental Experts

An effectively verifiable treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices, a Fissile Material Cut-Off Treaty (FMCT), has the potential to deliver substantial benefits for the security of all States, furthering the twin goals of nuclear disarmament and nuclear

non-proliferation. The term "fissile material" refers to kinds of nuclear material that are capable of being used in a nuclear weapon. The practical effect of a treaty should be to cap the availability of fissile material for use in weapons and thus the size of arsenals.

The Conference on Disarmament (CD) remains unable to break the diplomatic impasse preventing agreement on a programme of work, including beginning negotiations on an FMCT. However a Group of Governmental Experts (GGE), working under a United Nations mandate, has been able to demonstrate that, given an appropriate level of political will, negotiation of an FMCT is a practical and achievable goal for the international community. The group, very ably chaired by Canadian Permanent Representative Elissa Golberg, was not mandated to negotiate, but explored many aspects of a future treaty and identified useful signposts that could guide future negotiators toward agreement. The GGE met for four two-week sessions in 2014 and 2015. Its report, which reflects the most comprehensive intergovernmental discussion of an FMCT undertaken to date, can be found at *http://www.un.org/ga/search/view_doc.asp?symbol=A/70/81*.

As a leading exporter of uranium, Australia has long been a strong and active advocate for measures to ensure that nuclear material supplied for use in civil nuclear activities is not diverted for use in nuclear weapons. IAEA safeguards already play a key role, but these would be strengthened by an effectively verifiable FCMT. Australia was represented on the GGE by Australia's Permanent Representative to the CD (Ambassador Peter Woolcott followed by Ambassador John Quinn). ASNO's Malcolm Coxhead provided expert support throughout.

The GGE canvassed in detail the objectives of a treaty and the commitments that should form part of it. Experts agreed that a treaty should establish a legally binding, non-discriminatory, multilateral and internationally and effectively verifiable ban on the production of fissile material for nuclear weapons or other nuclear explosive devices. As a minimum, this would require the declaration and verification of activities producing fissile material, as well as of the use of fissile material at facilities downstream in the nuclear fuel cycle. The impact of these new commitments would be felt primarily in states that now operate nuclear facilities outside safeguards (i.e. those with nuclear weapons).

Exactly how fissile material and the process of its production are defined will affect both the effectiveness and the practicability of an FMCT. GGE experts discussed four possible models.

A. A definition based on the IAEA term "unirradiated direct-use material" focusing on separated plutonium containing less than 80% Pu-238, and highly enriched uranium (containing 20% or more of the isotope uranium-235 and/or uranium-233) would best account for those materials suited for use in nuclear weapons, and focus verification squarely on enrichment, reprocessing and downstream facilities.

B. A broader definition based on Article XX of the IAEA statute would bridge the gap between safeguards applied in NPT Non-Nuclear Weapon States Parties and Nuclear Weapon States, but would add significant cost.

C. A definition that addressed material currently used in nuclear weapons was supported by a few experts. However, this would not cover all material that has been or could be used in nuclear weapons.

D. Finally, a specific definition based on an isotopic composition between options a) and c) was put forward by a few experts who argued that this could avoid complications regarding use of highly enriched uranium and plutonium in non-explosive military activities (such as naval reactors).

A further factor affecting the "coverage" of FMCT verification would be the need for assurance that there is no undeclared production of fissile material, including at undeclared locations. Many GGE experts recognised the need for mechanisms in an FMCT that are similar to those in the IAEA's Additional Protocol. For NPT Non-Nuclear Weapon States, adherence to an Additional Protocol would likely meet this need.

While the NPT does not prohibit the use of nuclear material for non-explosive military purposes such as naval propulsion, it is likely

that an FMCT would allow use of fissile material for such purposes. The GGE reaffirmed that such activities with fissile material must be subject to verification. However special verification arrangements would be needed to protect sensitive information.

The clearest area of difference among states over a future FMCT relates to its scope. In particular, there is still no agreement as to whether and how stocks of fissile material produced prior to its entry into force (EIF) may be made subject to treaty commitments. Making all fissile material subject to a ban on use in weapons was recognised by GGE experts as beyond the scope of an FMCT. The GGE discussed the merits of bringing pre-EIF civil-use stocks under a treaty, as well as stocks for military non-explosive use and those that a state may decide are no longer to be used in weapons. Each of the nuclear weapon possessor states has interests to protect in discussions on stocks, and verification of a treaty that includes stocks would bring new verification challenges. However, the GGE discussion helpfully elaborated the different kinds of stocks that may be relevant to a treaty, and explored implications of their inclusion under a treaty.

In-depth discussion of the legal and institutional arrangements needed for a treaty by the GGE proved constructive. There was strong (although not unanimous) support for the IAEA to serve as the verification agency for a treaty. The possibility that the IAEA Board of Governors may have a role was proposed. However many experts felt that a FMCT governance mechanism should be separate. Many thought that models used for the CWC or the CTBT for an Executive Council and Conference of States Parties may be useful, although with a "lighter" role for the Conference.

The GGE took the view that a treaty would be non-discriminatory if its obligations were applied equally to all States Parties. Most experts recognised nevertheless that the means (e.g. tools and techniques) by which these obligations are verified may vary according to the facilities located in any State Party. With this in mind, the verification standard for a treaty would likely be implemented through agreements between each country and a verification agency, much as the IAEA now operates.

Although participation in the GGE was by experts rather than states, most experts worked from what are likely to be national positions in a future negotiation. The GGE therefore offered a (so-far) unique opportunity to hear and influence the views of a useful cross section of CD member states. In addition to rehearsing Australia's thinking on the shape of a future treaty, we were able to explore ways in which Australia can most usefully try to build consensus on a treaty. We promoted the principle that verification arrangements for a treaty should reflect the risk that certain nuclear activities might pose to the objectives of a treaty, and offered ideas for effective verification where sensitive information is present. We also promoted the inclusion in a treaty of confidence building measures that would help to promote further disarmament steps.

Australian infantry wearing Small Box Respirators, Ypres, September 1917 [Australian War Memorial E00825].

A Century of Struggle Against Chemical Weapons

John Singer Sargent's 1919 painting "Gassed" held in the Imperial War Museum, London.

The first large scale use of chemical weapons occurred in Ypres Belgium on 21 April 1915. Chlorine gas seeped into the trenches quickly affecting 10 000 soldiers. On the solemn occasion of this 100-year anniversary, it is timely to examine the evolution of chemical weapons over the past century, particularly acknowledging the Chemical Weapons Convention (CWC) in creating an international norm against chemical weapons and Australia's role in its negotiation. Complimentary to international treaties banning chemical weapons, this article also notes Australia's efforts to strengthen export controls on materials, equipment and technology that could be used to make chemical weapons.

An estimated 124 200 tonnes of toxic chemicals were used on soldiers by both sides over the course of the First World War (WWI) (1915–1918) resulting in 90 000 deaths and more than 1 000 000 casualties. The horror of those attacks led to the 1925 Geneva Protocol[2] that prohibited the use in war of asphyxiating, poisonous or other gases, all analogous liquids, materials or devices as well as bacteriological methods of warfare, in the hope that this prohibition would stop these weapons from ever being used again.

As the Protocol did not ban the agent production and stockpiling of chemical weapons, there were no incentives to prevent a CW arms race fuelled by the rapid expansion of industrial chemistry in the 19th and early 20th century that made mass production of chemicals possible. While the chemical warfare (CW) agents used in WWI were primarily chlorine, phosgene, sulfur mustard (blister agent) and hydrogen cyanide (blood agent) their toxicities were much lower than the G-series nerve agents – sarin, soman and tabun – which were discovered later in Germany in the 1930s when researching new insecticides. It was not until the 1950s that the V-series of nerve agents were discovered in the United Kingdom. The V-agents are more persistent and are more toxic than the G-agents.

In spite of international efforts to prevent the use of chemical weapons, these weapons were used on a large scale in a number of conflicts during the 20th century, including in Morocco (1922–1927), Abyssinia (1935–1936), China (1938–45) and Iran (1983–88).

During the Second World War (WWII) several countries possessed chemical weapons including nerve agents. It was for fear of retaliation-in-kind that these weapons were not actually used on the European battlefields, even though they were available for use. A number of countries including Australia also decided it was necessary to seek allies' assistance in gaining CW agents in order to deter others using chemical weapons against them. In Australia's case, stockpiles of US and UK manufactured chemical weapons were held until the end of WWII but never used in conflict.

2 Protocol for the Prohibition of the Use of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare. Geneva, 17 June 1925. This was, in effect, a 'no first use' agreement, as many States reserved the right to 'retaliate in kind' if they were attacked with CW.

For protective purposes, small quantities of the CW agents were used in field trials as well as Australia's defence laboratories for the development of detection, protection and decontamination measures.

In March 1988, following the conclusion of the Iraq-Iran war, Saddam Hussein's regime was responsible for the first large scale use of sarin nerve agent in an attack on the Kurdish civilian population of Halabja killing more than 5 000 people. Chemical weapons have also been used on a small scale by non-state actors, with the most notorious of these being the sarin nerve agent attack in a Tokyo Subway (in March 1995) by the Aum Shinrikyo religious cult, killing 12 civilians and injuring more than 1 000 others.

It was not until the entry into force of the Chemical Weapons Convention on 29 April 1997 that the prohibition of the production, stockpiling and use of chemical weapons was finally brought into effect, following more than two decades of negotiations in Geneva. Australia was recognised for its very active contribution to both the negotiation of the CWC, perhaps most notably during the 'end-game' in 1992, and also during the establishment of the Organisation for the Prohibition of Chemical Weapons (OPCW) between 1993 and 1997. Membership of the CWC is almost universal (with 191 States Parties).[3] Countries yet to join the CWC are: Angola, Egypt, Israel (signed but not ratified), North Korea and South Sudan.

Since 1997, 72 524 metric tonnes of chemical weapons stockpiles have been declared to the OPCW. Ninety percent of this stockpile has already been destroyed under OPCW oversight. It is anticipated that the remaining declared stockpiles of chemical weapons in Libya, Russia and the United States will be destroyed by their respective planned completion dates of 2016, 2020 and 2023.

In August 2013, when reports emerged of sarin nerve agent attacks in Syria, the OPCW was faced with an unprecedented challenge in responding given that Syria was in a state of civil war and was not a member of the CWC. Significantly Syria agreed to join the CWC in September 2013 and to dismantle its chemical weapons program. Another positive outcome was the strong cooperation that commenced thereafter between the OPCW, the United Nations and The World Health Organisation in sharing a common purpose under the OPCW-UN Joint Mission (2013–2014) that eventually confirmed nerve agent had been used against civilians in Syria. The mission also commendably facilitated the removal of Syria's declared CW agents and precursor chemicals under dangerous and difficult circumstances.

At the end of the reporting period almost all of Syria's declared chemical stockpile (1 300 metric tonnes) had been destroyed, mostly in OPCW approved facilities by assisting States Parties. With the destruction of the declared chemicals, chemical weapon production and storage facilities, and mixing and filling equipment, Syria's CW program is largely dismantled. A small quantity of chemical precursors to nerve agent (currently stored in US facilities) and some underground structures that had been used to store chemical weapons should be destroyed by the end of September 2015. However, there are ongoing concerns about gaps and inconsistencies with Syria's CWC declarations.

Despite the progress made towards eliminating Syria's chemical weapons program, it is of great concern to all CWC States Parties that there have been a number of subsequent chemical weapon attacks in Syria using chlorine and other toxic industrial chemicals. The UN-supported OPCW fact finding missions tasked with investigating alleged use of chlorine in Syria, have confirmed such use. Based on these findings, Australia's Foreign Minister Bishop has attributed responsibility for the chlorine attacks to the Syrian regime.

Given the continuing use of chemical weapons in Syria, Australia welcomed the adoption on 7 August 2015 of United Nations Security Council Resolution (UNSCR) 2235 (2015), establishing a joint UN-OPCW investigative mechanism to identify those responsible for chemical weapons use in Syria. Coincidentally, later in August, following the adoption of UNSCR 2235, US officials were quoted in media reports saying that Daesh (also known as ISIL) most likely used sulphur mustard in attacks against civilians and Kurdish forces in Iraq and Syria.

Australia is actively engaged in international efforts to prevent the supply of chemicals,

3 Myanmar ratified the CWC on 7 August 2015 making it the 191st State Party.

equipment and technology to destinations of concern by both state and non-state actors. For example, Australia was instrumental in the establishment of the Australia Group in 1985 during the Iran-Iraq war, with participating countries working together to harmonise their export controls and thereby help prevent CW precursors, biological agents and toxins as well as their dual-use production equipment from getting into the wrong hands.

Forty-one countries plus the European Union now participate in the Australia Group (AG) and attend annual meetings usually held in Paris with many other countries voluntarily adopting the AG export control lists. The 2015 plenary meeting was held in Perth on 1–5 June, to mark the 30th Anniversary of the Australia Group. In her address to participants, Foreign Minister Bishop stressed the importance and continuing relevance of export controls to our collective efforts to prevent the spread of chemical and biological weapons and their programs, especially to non-state actors.

Australia continues to promote export controls as complimentary to, and assisting States Parties in meeting their international legal obligations under the CWC, the Biological Weapons Convention and the UNSCR 1540 (2004).

Foreign Minister Bishop met with Dr Robert Mathews, co-recipient of the OPCW – The Hague Award, following her address to the Australia Group on the occasion of its 30th Anniversary, Perth, 1–5 June 2015.

Preventing the re-emergence of chemical weapons: Australia's efforts to address the potential misuse of toxic chemicals that target the Central Nervous System in law enforcement scenarios

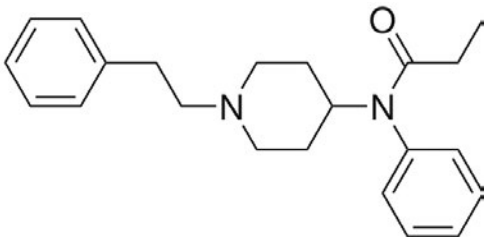
The object and purpose of the Chemical Weapons Convention (CWC) is to eliminate all chemical weapons and to prevent their re-emergence. Ninety percent of declared chemical weapons have now been destroyed under international verification. Since 1997 more than 2024 out of about 5 000 declared chemical industry plant sites and 27 defence laboratories have been monitored (several times) through routine on-site inspections to reduce the risk of re-emergence of chemical weapons.

Despite these achievements by the Organisation for the Prohibition of Chemical Weapons (OPCW) in cooperation with States Parties, Australia remains concerned that the production, stockpiling and use of toxic chemicals for 'law enforcement, including

domestic riot control purposes,' which is permitted under the provisions of the CWC, could be used as justification for the covert development of chemical weapons.

Australia is working to facilitate discussions to address any risk to the object and purpose of the Convention posed by the potential development for 'law enforcement purposes' of chemicals which act on the central nervous system (CNS), including anaesthetics, sedatives and analgesics. Australia refers to these as "CNS-acting chemicals", although other terms such as "incapacitating chemical agents", or ICAs, have also been used in the same context. In Australia's view, the term 'ICAs' is not an appropriate term for these types of chemicals, many of which are highly toxic.[4]

A well-known example of the use of CNS-acting chemicals to end a hostage crisis occurred in a Moscow Theatre in 2002. The chemicals released into the theatre constituted a mixture of aerosolised fentanyls – powerful synthetic opiate analgesics similar to, but more potent than, morphine. The resolution of this crisis came at a significant cost because the release of fentanyls within a confined space resulted in the death of 129 out of about 850 hostages, alongside terrorist targets.



2D Structure of Fentanyl

Fentanyl derivatives have legitimate medical uses, including as anaesthetics, which are administered to each patient under strict medical supervision. However, the above hostage example demonstrates that it is not possible to control the release of an aerosolised CNS-acting chemical in such a way so that each exposed individual receives an "incapacitating" dose. Some survivors of the Moscow Theatre siege reportedly suffer from long-term health effects resulting from their exposure to these chemicals.

As the effects of exposure to aerosolised fentanyls are not "temporary", and indeed can cause many fatalities, this class of toxic chemicals are clearly not covered by the CWC's definition of 'riot control agents' (RCAs) and any comparison between RCAs and CNS-acting chemicals is both inappropriate and erroneous.

Australia issued a national paper for the 19th Session of the CWC Conference of the States Parties held from 1–5 December 2014 and chaired a side event to promote discussion and awareness-raising among delegations and non-government organisations. In its paper, Australia confirmed that it is not developing, producing, stockpiling or intending to weaponise or use any CNS-acting chemicals such as anaesthetics, sedatives or analgesics for law enforcement purposes.

Australia is continuing to work with a number of other CWC States Parties as co-sponsors of a joint paper for the 20th Session of the Conference of the States Parties to the CWC. The paper calls for further voluntary statements by States Parties outlining their national positions on the use of aerosolised CNS-acting chemicals in law enforcement. It is also hoped that the joint paper will promote discussion within the OPCW with the objective of developing concrete recommendations to address this issue in a way that would significantly advance one of CWC's primary goals: to prevent the re-emergence of chemical weapons.

4 Some analogues of fentanyl have lethal doses (LD50 values) comparable to the nerve agent, VX. Also refer to the current topics "A Century of Struggle Against Chemical Weapons".

Australia's Uranium Production and Exports

Statistics related to Australia's exports of Uranium Ore Concentrates (UOC) are listed in Table 1 below.

Geoscience Australia estimates Australia's Reasonably Assured Resources (RAR) of uranium recoverable at costs of less than US$130 per kilogram uranium to be 1 174 000 tonnes uranium.[5] This represents around 32% of world resources in this category. In addition, Australia has an Inferred Resource (IR) of uranium recoverable at less than US$130/kg U of 532 000 tonnes, giving a combined estimate of Australia's uranium reserves of 1 706 100 tonnes uranium, or 29% of the world's uranium reserves.[6] In 2014, the Olympic Dam was the world's third largest (6% of world uranium production) uranium producer.[7] Overall, Australia is the third largest uranium producer after Kazakhstan and Canada.[8]

Worldwide, uranium mining provided about 90% of the 2014 global nuclear power industry requirements, which is up from 85% in 2013.[9] The balance was met by secondary sources, such as recycled uranium and plutonium from used fuel (as mixed oxide fuel – MOX), re-enriched uranium tails, down-blending weapon grade nuclear material, civil stockpiles. While the global installed and operating capacity of nuclear power continues to steadily grow, with a net increase capacity of 9.6 GWe in the last year, improvements in reactor productivity and higher capacity factors have dampened the corresponding demand for uranium as less uranium are required per kWh output. This means that in the future, the

Table 1: UOC export and nuclear electricity statistics

Item	Data
UOC Exports	
Total Australian UOC exports 2014–15	5 515 tonnes
Value Australian UOC exports	A$532 million
Australian exports as % world uranium requirements(1)	~7.0%
No. of reactors (GWe) these exports could power(2)	~26
Power generated by these exports	~162 TWh
Expressed as percentage of total Australian electricity production(3)	~65.1%

(1) Based on 2014 world requirements of 78,875 tonnes UOC from the World Nuclear Association's *World Nuclear Power Reactors & Uranium Requirements* (31 July 2015) – http://www.world-nuclear.org/info/Facts-and-Figures/World-Nuclear-Power-Reactors-and-Uranium-Requirements/.

(2) Based on a comparison of GWe of nuclear electricity capacity and uranium required, for countries eligible to use AONM from the *World Nuclear Association's World Nuclear Power Reactors & Uranium Requirements* (31 July 2015) – http://www.world-nuclear.org/info/Facts-and-Figures/World-Nuclear-Power-Reactors-and-Uranium-Requirements/.

(3) Based on Australia's electricity generation in 2012–13 of 249 TWh from the Bureau of Resources and Energy Economics, *2014 Australian Energy Update (July 2014)* – http://www.industry.gov.au/Office-of-the-Chief-Economist/Publications/Pages/Australian-energy-statistics.aspx.

5 From Geoscience Australia, Australia's Identified Mineral Resources 2013, August 2015, http://www.australianminesatlas.gov.au/aimr/commodity/uranium.html.

6 From OECD Nuclear Energy Agency and International Atomic Energy Agency in 'Uranium 2014: Resources, Production and Demand', https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf

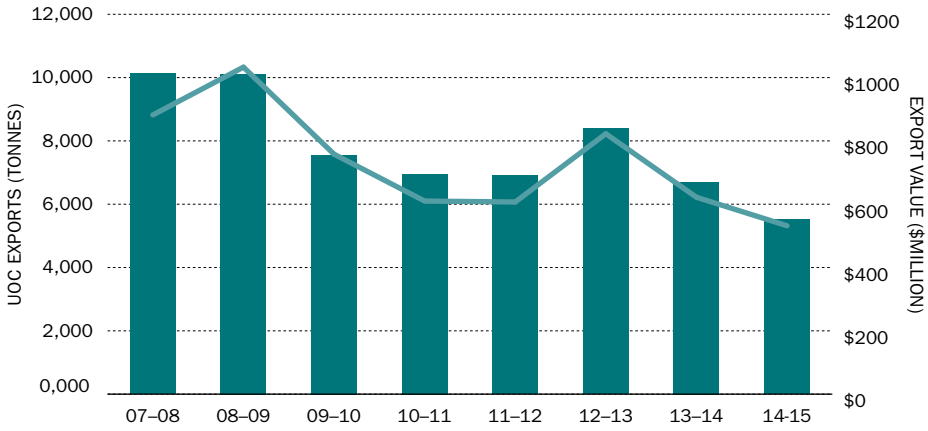
7 Australian production compared with data on global uranium producers from the World Nuclear Association's World Uranium Mining (June 2015) – http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Mining-of-Uranium/Uranium-Mining-Overview/.

8 As Australia's identified uranium reserves has not changed significantly in the last 40 years, variation in these figures over time is largely due to changes in the cost of mining moving deposits into different cost categories, and exploration and exploitation of uranium reverse internationally.

9 From World Nuclear Association's Uranium Markets (February 2015) – http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Uranium-Resources/Uranium-Markets/.

global demand of uranium will increase more slowly than the net capacity of the global nuclear power sector. In the longer term, new technologies for recycling nuclear material and the potential use of thorium as a nuclear fuel will probably continue this trend, although all of these processes will require some uranium. Further, as more countries consider nuclear power as a means of addressing their energy deficits in an environmental aware setting, the future demand for uranium will steadily grow.

Figure 1: Quantity and value of Australian UOC exports



	07–08	08–09	09–10	10–11	11–12	12–13	13–14	14-15
UOC Exports (tonnes)	10,140	10,114	7,555	6,950	6,918	8,391	6,515	5,515
Value (A$ million)	$882	$1,033	$758	$610	$607	$823	$823	$532

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 Nuclear Non-Proliferation Treaty (NPT),[10] have an Additional Protocol in force and are within Australia's network of bilateral nuclear cooperation agreements. These nuclear cooperation agreements are designed to ensure that IAEA safeguards and appropriate nuclear security are applied, as well as a number of 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 through the use of that uranium.

All Australia's nuclear cooperation agreements 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 non-nuclear-weapon states, 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 (i.e. non-military) purposes.

10 On 17 October 2012, the Australian Government announced that it would exempt India from its policy allowing supply of Australian uranium only to those States which are Parties to the NPT.

The principal conditions for the use of AONM set out in Australia's nuclear cooperation agreements 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 must be sought for transfers to third parties, enrichment to 20% or more in the isotope ^{235}U and reprocessing;[11]
- 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 nuclear material in the country concerned;
- detailed administrative arrangements are applied between ASNO and its counterpart organisation, setting out the procedures to apply in accounting for AONM;
- regular consultations on the operation of the agreement are undertaken; and
- provision is made for the removal of AONM in the event of a breach of the agreement.

Australia currently has 23 nuclear safeguards agreements in force, covering 41 countries plus Taiwan (see Appendix B)[12].

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, 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 and nuclear consumption, and nuclear production;
- knowledge of the fuel cycle in each country;
- regular reconciliation and bilateral visits to counterparts;
- regular liaison with counterpart organisations and with industry; and
- IAEA safeguards activities and IAEA conclusions on each country.

Australia's uranium transhipment security policy

For countries with which Australia does not have a bilateral safeguards agreement in force, but through which Australian uranium ore concentrates (UOC) are transhipped, there must be arrangements in place with such 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 adopted the IAEA's Additional Protocol on strengthened safeguards
- and acts in accordance with these agreements;

then arrangements on appropriate security can be set out in an instrument with less than treaty status.[13] Any such arrangement of this kind would be subject to risk assessment of port security.

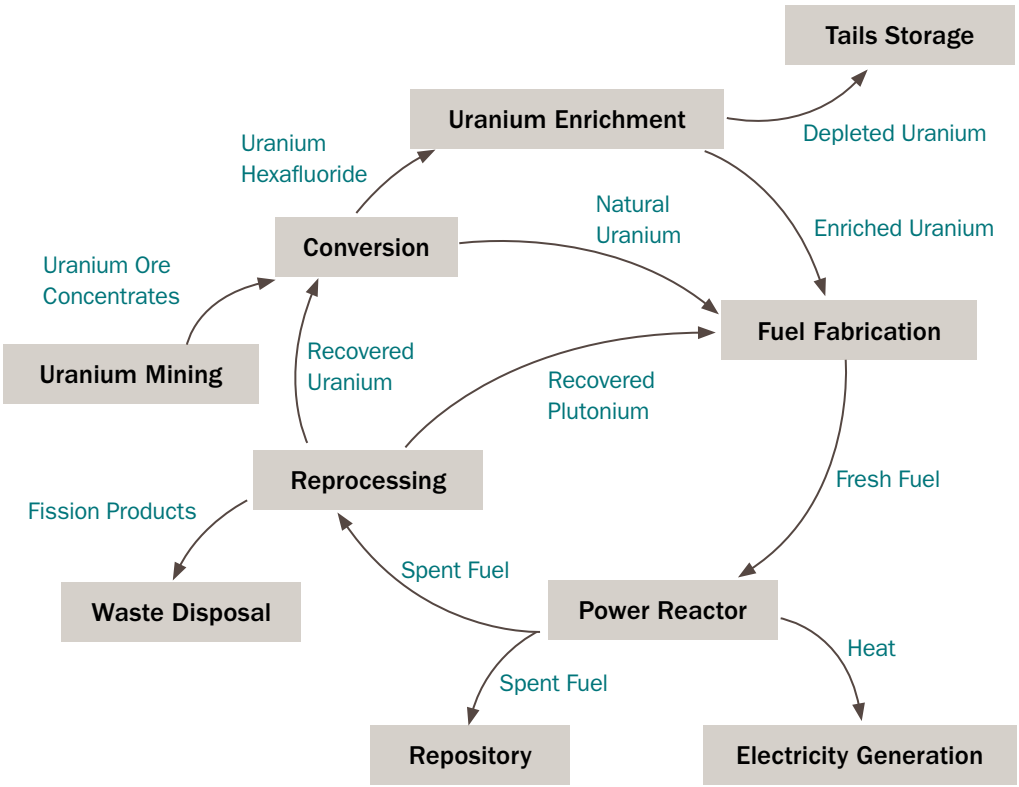
For states that do not meet the above requirements, treaty-level arrangements on appropriate security may instead be required.

11 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.

12 Twenty-eight of the countries making up this total are European Union member states.

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

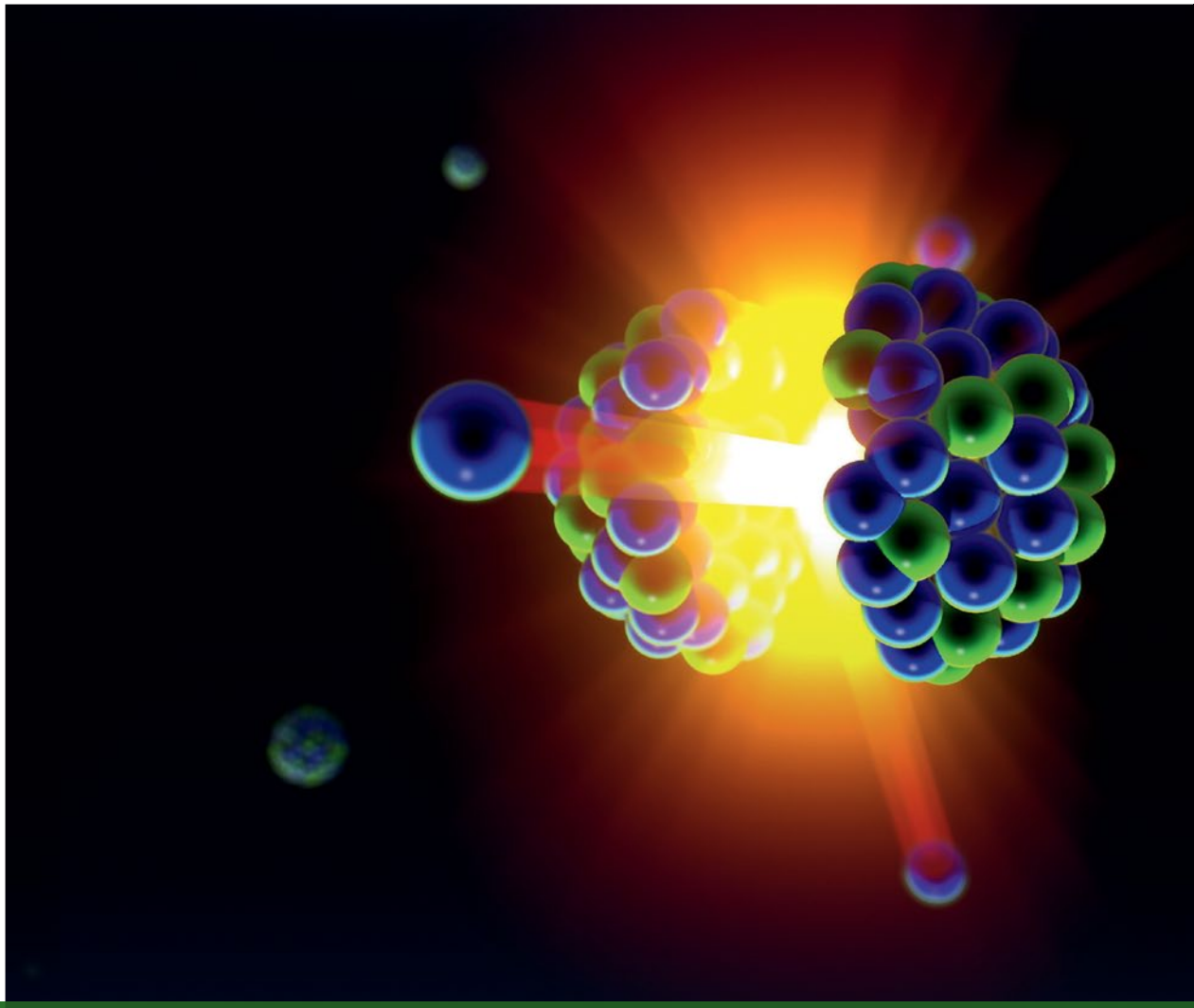
Figure 2: Civil Nuclear Fuel Cycle



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 the 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 United Kingdom.

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 is able to ensure its exports do not contribute to military applications by applying safeguards obligations to the overall **quantity** of material it exports. 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 (e.g. 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.

ASNO officers at the Hamaoka Nuclear Power Plant in Japan. The plant had been defueled and undergoing maintenance during the nationwide operational suspensions of all nuclear plants.



OVERVIEW OF ASNO

3

SECTION

Overview of ASNO

Goal

The goal of ASNO is to enhance Australian and international security through activities which contribute to effective regimes against the proliferation of nuclear and chemical weapons.

Functions

The principal focus of ASNO's work is on international and domestic action to prevent the proliferation of nuclear and chemical weapons. Thus, ASNO's work relates directly to international and national security. ASNO performs domestic regulatory functions to ensure that Australia is in compliance with treaty commitments and that the public is protected through the application of high standards of safeguards and physical protection to nuclear materials and facilities. ASNO also works to strengthen the operation and effectiveness of relevant treaty regimes through the application of specialist knowledge to complex policy problems in technical areas, including treaty verification and compliance.

The *Non-Proliferation Legislation Amendment Act 2003* enabled the offices of the national authority for safeguards, the national authority for the Chemical Weapons Convention (CWC) and the national authority for the Comprehensive Nuclear-Test-Ban Treaty (CTBT) to be formally consolidated under a common title, named the Australian Safeguards and Non-Proliferation Office (ASNO). The legislation also enabled the titles of each of the directors of the three national authorities to be combined as the Director General ASNO.

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 and considered to be the United Nations' most successful multilateral treaty. The NPT has become almost universal, with 190 State Parties. India, Israel, Pakistan and South Sudan have never joined the NPT and DPRK (North Korea) announced its withdrawal from the NPT in 2003.

Under the NPT, non-nuclear-weapon states (NNWS) agree not to receive, manufacture or acquire nuclear weapons. The five nuclear-weapons states (NWS) agree not to transfer nuclear weapons or other nuclear explosive devices, and not in any way assist, encourage or induce an NNWS to acquire nuclear weapons.

The *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 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;
- the Convention on the Physical Protection of Nuclear Material (CPPNM); and
- 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 their possession and transport. Communication of information

contained in sensitive nuclear technology is also controlled through the grant of authorities.

The functions of the ASNO and Director General ASNO 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 nuclear cooperation agreements with other countries and Euratom;
- operating Australia's bilateral nuclear cooperation agreements and monitor compliance with the provisions of these agreements;
- undertaking, coordinating and facilitating research and development in relation to safeguards; and
- advising the Minister for Foreign Affairs on matters relating to the international nuclear non-proliferation regime and the international safeguards system.

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 requires a substantial program of preparation in advance of the Treaty's entry into force.

To make the necessary preparations, a Preparatory Commission (PrepCom) was established in 1997, made up of CTBT States Signatories and supported by a Provisional Technical Secretariat. The tasks of the PrepCom include the establishment of an International Monitoring System (IMS) comprising 337 facilities around the world and an International Data Centre in Vienna. The PrepCom must also develop detailed procedures for the operation of these facilities and for the conduct of on-site inspections where 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.

ASNO makes a strong contribution on behalf of Australia to the overall work of the PrepCom to develop the CTBT verification regime. ASNO also assists DFAT with efforts to encourage ratification of the CTBT by countries that have not yet done so.

Key CTBT 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 establishment and 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 PrepCom and its working groups; and
- participating in development and implementation of Australian policy relevant to the CTBT.

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 CTBT Organization to facilitate cooperation in relation to monitoring stations under Australian control.

Article IV of the Treaty obliges States Parties to allow CTBT inspectors to inspect any place within their jurisdiction or control in an on-site inspection. The CTBT Act provides comprehensive powers for inspection arrangements, including the right for inspectors to gather information, to collect and remove samples, and to apply a range of monitoring and sensing techniques over a designated area. Access to locations by inspectors is by consent of the occupier of any premises, or by warrant issued by a magistrate.

The CTBT Act was assented to on 2 July 1998, but was not able to enter into effect, absent the entry into force of the CTBT, until amended by the *Non-Proliferation Legislation Amendment Act 2003*. On 11 June 2004, sections 3 to 9, 48 to 50, 62 to 65, 68 to 72, 74, 75 and 78; and Schedule 1 to the CTBT Act came into effect following proclamation by the Governor-General. The proclaimed provisions were to:

- create the offence of causing a nuclear weapons test explosion, or any other nuclear explosion; and
- provide a framework for the establishment and operation of IMS facilities in Australia, and a legal basis for the functioning of Australia's CTBT National Authority.

Chemical Weapons Convention Functions

The CWC prohibits the development, production, acquisition, stockpiling, retention, transfer and use of chemical weapons. Its verification regime is based on declaration by States Parties of facilities and activities dealing with particular chemicals, and on confirmation of compliance through on-site inspections.

ASNO is the focal point in Australia for 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.

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 has the right to conduct compliance inspections of relevant facilities in Australia, but such powers are exercised only in exceptional circumstances. 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 in the formulation of verification policy and by providing practical implementation assistance and advice.

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 required to be declared to the OPCW;
- 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; and
- 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. Division 1 of Part 7 of the CWP Act (establishing Australia's national authority for the CWC, and the position of its Director), and sections 95, 96, 97, 99, 102, 103 and 104 were proclaimed on 15 February 1995. Other provisions of the CWP Act which expressly relied on the CWC came into effect on 29 April 1997 when the CWC entered into force. The final parts of the CWP Act, dealing with routine compliance inspections of Other Chemical Production Facilities, came into effect on 17 August 2000.

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 challenge 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; and
- 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 provided for in 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 in Australia to carry out inspections.

The text of the CWC is reproduced in the Schedule to the CWP Act. The manner in which any powers are exercised under the CWP Act must be consistent with, and have regard to, Australia's obligations under the CWC.

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, providing the final trigger for its entry into force. The treaty has 13 full members: Australia, Cook Islands, Fiji, Kiribati, Nauru, New Zealand, Niue, Papua New Guinea, Solomon Islands, Tonga, Tuvalu, Vanuatu, and Samoa.

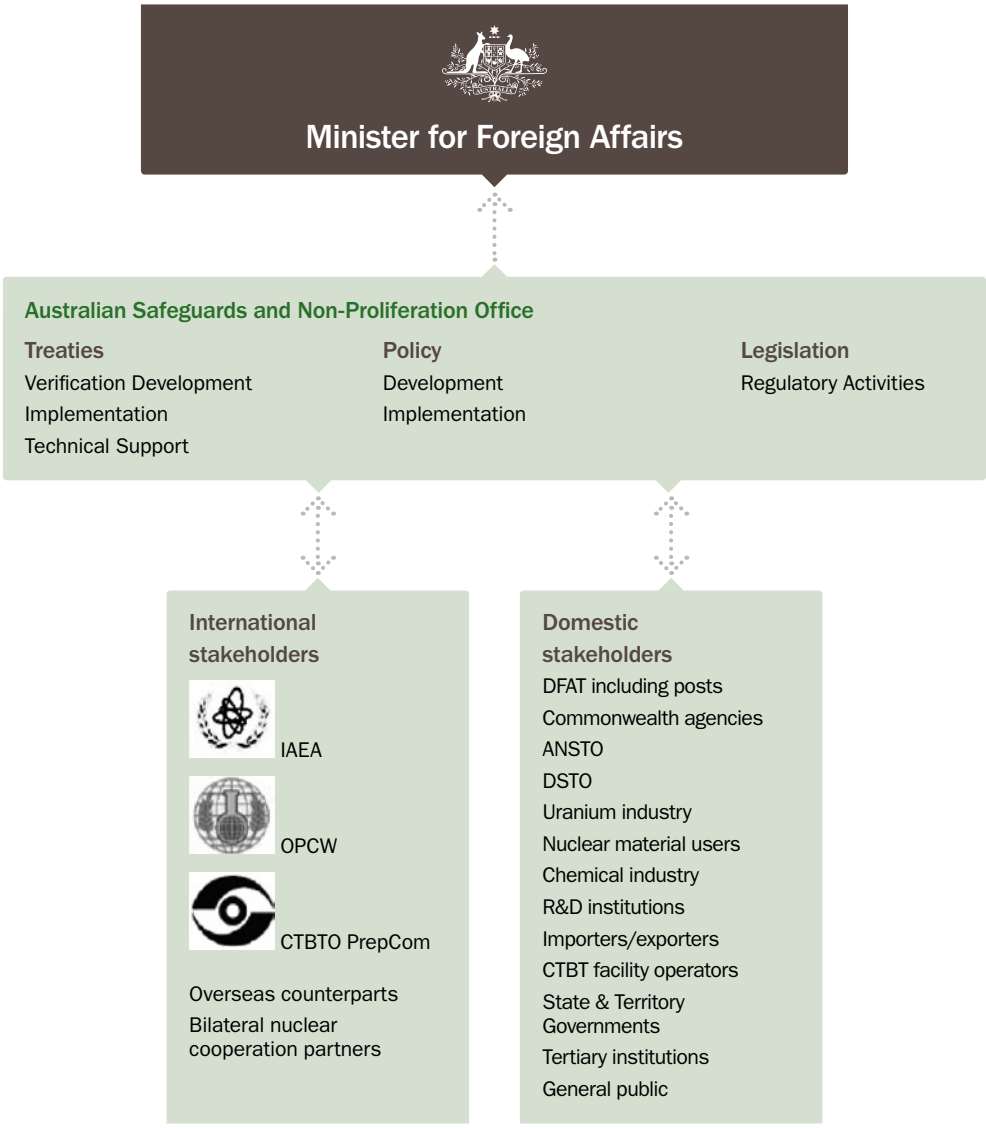
The SPNFZ Treaty has three protocols. Under Protocol 1 the US, UK and France, are required to apply the basic provisions of the Treaty to their respective territories in the zone established by the Treaty. Under Protocol 2, the US, France, UK, Russia and China agree not to use or threaten to use nuclear 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 the only NWS yet to ratify the SPNFZ Treaty protocols; however, these were submitted to the US Senate on 2 May 2011 for advice and consent as part of the process prior to ratification.

South Pacific Nuclear Free Zone Treaty Act 1986

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

Operating Environment

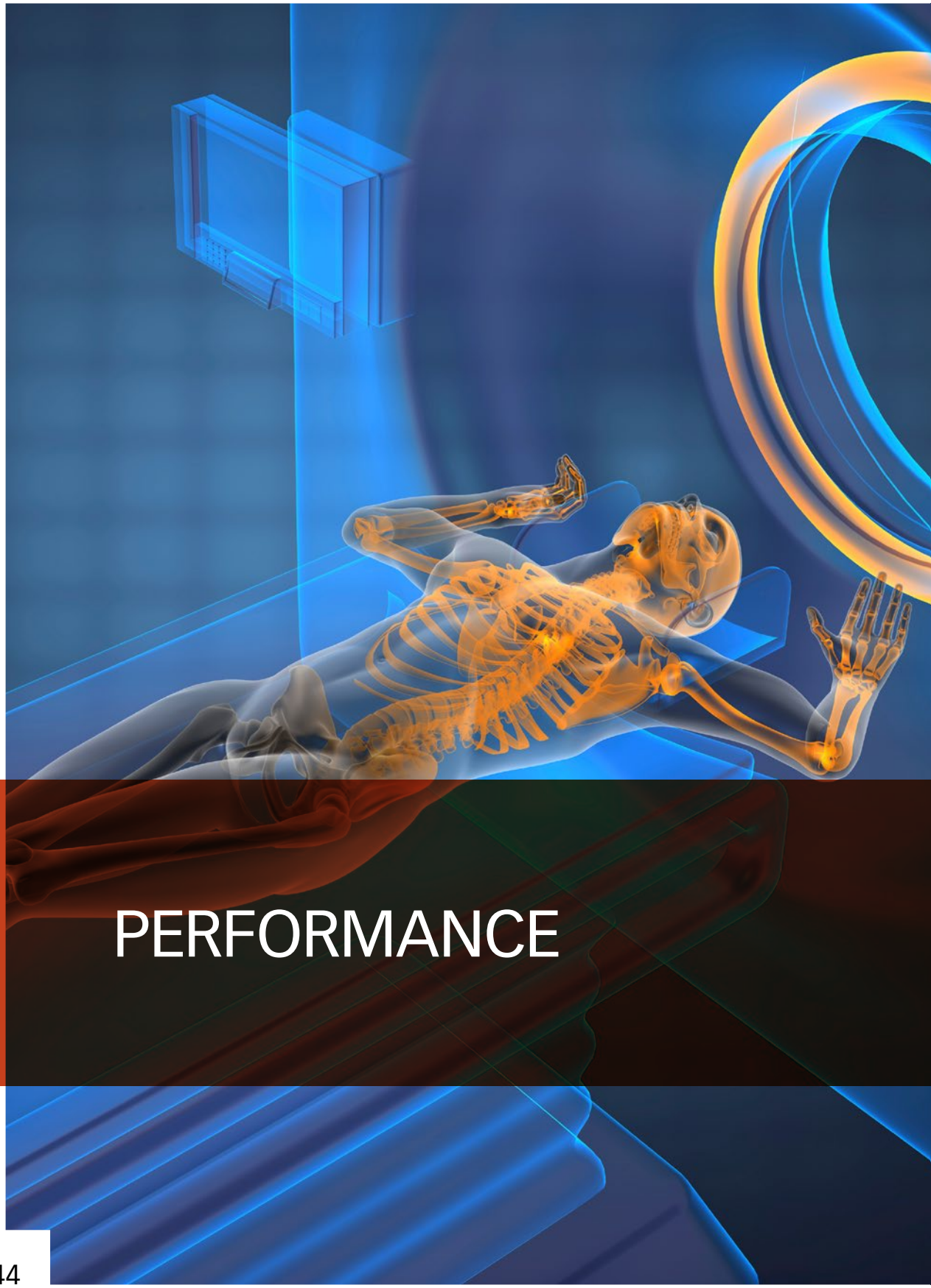
Figure 3: ASNO's Operating Environment



Outcomes and Outputs Structure

Figure 4: 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 and facilities
	Output 1.2	Protection of Australia's nuclear facilities, nuclear material and nuclear items against unauthorised access and sabotage, including Australia's uranium supplied overseas
	Output 1.3	Nuclear material and associated items exported from Australia under bilateral agreements remain in exclusively peaceful use
	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 Convention
	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 regimes
	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



PERFORMANCE

4

SECTION

Performance

Output 1.1: National Safeguards System

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

Performance Measures

- Australia's obligations are met under Australia's safeguards agreement with the IAEA.
- Australia's system of safeguards permits and authorities is administered in a timely and effective manner.
- Australian uranium at mines and in transit is accounted for properly.

Performance Assessment

International Obligations

Reporting Obligations under the Australia–IAEA Comprehensive Safeguards Agreement

ASNO met all of Australia's obligations during the reporting period for the submission of declarations and notifications on nuclear materials, facilities and activities, as required by Australia's safeguards agreement with the IAEA.

For each material balance area (summarised in Table 2), ASNO reported to the IAEA changes (e.g. acquisitions, transfers, imports/exports) to Australia's nuclear material inventory on a monthly basis and provided consolidated inventory reports on an annual basis. These reports are summarised in Tables 3 and 4 below. The high number of reports in Tables 3 and 4 attributed to 'other locations' relates primarily to holdings of uranium and thorium based chemical salts, mainly held by universities, and depleted uranium shielding held by industrial radiographers. ASNO also reported on other nuclear-related activities and locations on an annual basis in declarations under the Additional Protocol (summarised in Table 7). As required, ASNO provides updates to Design Information Questionnaires when there were changes of safeguards significance to features or systems in the facilities listed in Table 2–3.

Table 2: Material Balance Areas (MBAs) in Australia for IAEA safeguards purposes

Location	Material Balance Area (MBA)	Facility
Lucas Heights	AS-A	HIFAR reactor
Lucas Heights	AS-C	Research and Development Laboratories
Lucas Heights	AS-D	Vault Storage
Elsewhere	AS-E	Other locations in Australia (e.g. universities, industrial radiography companies, hospitals)
Elsewhere	ASE1	Other locations in Australia (e.g. universities, industrial radiography companies, hospitals)
Lucas Heights	AS-F	OPAL reactor
Lucas Heights	AS-H	Synroc Waste Immobilisation Plant(1)

(1) The Synroc Waste Immobilisation became a facility for safeguards purposes in the reporting period upon the submission to the IAEA of the first design information questionnaire on this plant. As of the end of the reporting period, construction had not yet commenced.

Table 3: ASNO Reports (line entries) to the IAEA, 2009–15, by Facility

Facility	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15
ANSTO research laboratories	607	989	1 291	1 040	990	1 242
HIFAR (defuelled 2007)	8	0	0	3	0	0
ANSTO vault storage	22	26	126	337	198	470
OPAL reactor	196	381	496	338	475	377
Other locations	2 948	2 940	2 879	3 310	3 777	3 680
TOTAL	**3 781**	**4 336**	**4 792**	**5 028**	**5 440**	**5 769**

Table 4: ASNO Reports (line entries) to the IAEA, 2009–15, by Data Type

Type of Data	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15
Inventory Change Report	459	838	1 084	1 015	1 133	1 290
Physical Inventory Listing	1 584	1 541	1 551	1 694	1 856	1 942
Material Balance Report	136	132	143	187	154	161
Concise Note	1 623	1 825	2 014	2 138	2 297	2 368

Table 5 is a summary of total quantities of nuclear material by category in Australia. The small quantity (2.7 kg) of high enriched uranium in various locations around Australia such as ANSTO and some universities is retained and used for a variety of purposes primarily due to the utility of the particular chemical, physical and isotopic characteristics. The uses include: R&D related to nuclear non-proliferation activities; validating the commercial application of ANSTO's Synroc waste immobilisation technology; nuclear forensics for identifying illicit nuclear materials; and nuclear materials chemistry work.

Table 5: Nuclear Material in Australia at 30 June 2015.

Category	Quantity	Intended End-use
Source Material		
Uranium Ore Concentrates (UOC)	1 001 tonnes	Export for energy use pursuant to bilateral agreements
	6 tonnes	Storage
Natural Uranium (other than UOC)	4 504 kg	Research and shielding
Depleted Uranium	20 886 kg	Research and shielding
Thorium Ore Residues	59 000 kg	Storage/disposal
Thorium (other than Thorium Ore Residues)	1 927 kg	Research, industry
Special Fissionable Material		
^{235}U – low enriched	190 689 grams	Research, radioisotope production, storage
^{235}U – high enriched	2 742 grams	Research, storage
^{233}U	4 grams	Research
Plutonium (other than ^{238}Pu)	1 213 grams	Research, neutron sources

Nuclear Research and Development

ASNO ensured that all IAEA requirements were met during the reporting period with respect to formal reporting (under the Additional Protocol) of nuclear research and development in Australia, and ensured that any associated technology remained in exclusively peaceful use and did not contribute to any proliferation activity.

Table 6: Associated Items in Australia at 30 June 2015

Category	Quantity	Intended End-use
Associated Material		
Deuterium and heavy water	28.7 tonnes	Research, reactors
Nuclear grade graphite	83.4 tonnes	R&D and storage
Associated Equipment		
HIFAR(1)	1	Reactor
HIFAR coarse control arms (unused)	5	Reactor components
HIFAR safety rods	3	Reactor components
HIFAR fuel charging and discharging machines	2	Reactor components
OPAL reactor(2)	1	Reactor
OPAL control rods	13	Reactor components
OPAL control rod drives	6	Reactor components

(1) The ANSTO Board decided to cease operation of HIFAR in January 2007. The reactor was de-fuelled in May 2007. It is awaiting decommissioning.

(2) Includes, inter alia, the reactor reflector vessel and core grid

Dr Jodie Evans on the speakers' panel at the 22nd Women in Nuclear Global Annual Conference 20–25 October in Sydney, Australia.

Reporting Obligations under the Australia–IAEA Additional Protocol

Australia has an exemplary record relating to the adoption of, and reporting associated with the IAEA's Additional Protocol (AP). The AP serves to strengthen the effectiveness and improve the efficiency of the international safeguards system as a contribution to global nuclear non-proliferation objectives. In 1997 Australia became the first country to bring the AP into force. ASNO prepares and provides annual declarations under a range of AP categories; as well as quarterly declarations on relevant exports. Table 7 lists the number of declarations Australia has made under each category.

Table 7: Number of Declarations made under the Additional Protocol

Type of Declaration under Article 2.a and 2.b of the Additional Protocol	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15
2.a.i – Government funded, authorised or controlled nuclear fuel cycle-related research and development activities not involving nuclear material	1	-	1	2	2	2
2.a.ii – OPAL operational schedules	1	1	1	1	-	1
2.a.iii – General description of each building on each site, e.g. ANSTO, universities	178	160	158	189	175	154
2.a.iv – manufacturing or construction of specified nuclear related equipment	-	-	1	-	1	1
2.a.v – Location, operational status and production capacity of uranium or thorium mines or concentration plants	4	4	4	4	4	4
2.a.vi – Information on source material that is not of a composition or purity that requires full IAEA safeguards requirements.	5	5	6	6	7	7
2.a.vii – Information on nuclear material exempted from safeguards	7	-	-	-	6	6
2.a.viii –Information related to the further processing of intermediate or high-level waste containing plutonium	-	-	-	-	-	-
2.a.ix – Exports or imports of nuclear-related equipment listed in Annex II of the Additional Protocol	3	-	-	-	-	-
2.a.x – General 10-year plans related to nuclear fuel cycle activities	2	2	3	5	3	3
2.b.i –Nuclear fuel cycle-related research and development activities not involving nuclear material and not funded, authorised or controlled by the Government	1	1	1	1	1	1

Safeguards Developments in Australia

The Australian Nuclear Science and Technology Organisation (ANSTO) has three major infrastructure projects progressing. The ANSTO Nuclear Medicine (ANM) project includes a new nuclear medicine manufacturing facility and represents a $168.8 million investment by the Australian Government. The project which will enable Australia to help meet world demand for the most common radionuclide used in nuclear medicine, Molybdenum-99. The ANM project will allow Australia to secure

continued supplies of nuclear medicines for the domestic market, and the ability to contribute significantly to international demand. The new building is taking shape. The majority of the excavation work has been finalised with more than 1 900 m^3 of concrete poured and greater than 350 tonnes of steel reinforcement in place. The ANM will allow Australia to continue to produce nuclear medicine using low-enriched uranium (LEU). Compared with high-enriched uranium, LEU has a lower safeguards risk and thus contributes to regional nuclear security goals.

In December 2014 the Minister for Foreign Affairs granted a Permit to Establish Facility to ANSTO for its new Synroc Waste Immobilisation Plant. The facility is sited on the Lucas Heights campus and is in the early stages of construction. Once construction is complete and the building ready for commissioning, the new Synroc plant will operate under ANSTO's existing permit for the possession of nuclear material. Synroc is an Australian invention that immobilises radioactive waste in a durable solid rock-like material. The Synroc plant will be collocated with the new ANM facility. Co-location of the two facilities will enable waste from medicine production to be efficiently managed. Synroc will only be applied to waste generated from ANSTO, and the treated waste will be sent to the national radioactive waste management facility once it has been sited and built. The Synroc process can also be applied to the immobilization of a wide range of other legacy radioactive wastes that cannot be economically or technically disposed of using current baseline technologies. The process enables the waste package to effectively lock up the radioactive waste as it decays, significantly reducing the long-term environmental risk. Synroc also offers the benefit of a 75 to 99 % reduction in volume through the unique Hot Isostatic Pressing technology. The Synroc plant has been designated a new Material Balance Area by the IAEA and, as such, received an initial Design Information Verification inspection in 2015.

Construction of the ANSTO Interim Waste Store (IWS) facility is complete and is in a testing phase. The IWS will be used for housing Intermediate Level Solid Waste (ILSW) returned from France following the reprocessing of HIFAR spent fuel. In the 1990s and 2000s, Australian spent nuclear fuel that enabled the generation of medicine production and environmental, minerals and health research at ANSTO was exported to France for reprocessing to make it suitable for permanent storage. In accordance with international best practice, Australia has a responsibility to deal with its by-products. The waste will be managed at ANSTO until the national facility is built, at which point it will transferred to that new facility. It is intended that the new building at Lucas Heights will then be repurposed for work associated with medicine production (subject to regulatory approval).

Permits and Authorities System

ASNO continued to operate Australia's State System of Accounting for and Control of Nuclear Material in accordance with Australia's safeguards agreement with the IAEA and national legislation.

Table 8: Status of Safeguards Permits and Authorities at 30 June 2015

Permit or Authority	Current Total	Granted	Varied	Revoked	Expired
Possess nuclear material	107	8	8	3	0
Possess associated items	14	0	4	0	0
Transport nuclear material	21	1	1	0	1
Transport associated items	0	0	0	0	0
Establish a facility	1	1	0	0	1
Decommission a facility	1	0	0	0	0
Communicate information contained in associated technology	10	0	3	0	0
TOTAL	**154**	**10**	**16**	**3**	**2**

Notice of all permit changes was published in the Australia Government Gazette as required by subsection 20(1) of the *Nuclear Non-Proliferation (Safeguards) Act 1987* (Safeguards Act). Nine permits were granted to organisations that possess or transport nuclear material and one permit was granted to establish a Synroc Waste Immobilisation facility to treat intermediate level waste (refer to Safeguards Developments in Australia). In the past year, 16 permits were varied as a result of changes to organisational details and approved locations. Two permits were revoked due to organisational restructures resulting in the companies no longer holding nuclear material. One permit was revoked as the nuclear material held does not exceed the threshold of 10 kg element weight of uranium or thorium referred to in subsection 9(c) and Regulation 3 of the Safeguards Act.

ASNO Inspections

Designated ASNO inspectors always accompany IAEA inspectors during their verification activities in Australia. This ensures that inspections are effectively facilitated, promoting successful conclusions. While the IAEA fulfils its distinct mandate by conducting structured inspections and drawing definitive conclusions, ASNO inspectors are able to make broader observations regarding processes and systems that permit holders have in place to implement good safeguards practices. ASNO inspectors also use the site visits as an opportunity to discuss current regulatory requirements and possible changes that may relevant to each permit holder, as well as effective safeguards methods. Inspections allow for direct communication with the permit holders and answer questions about opportunities to streamline the compliance processes.

In addition to accompanying IAEA inspections ASNO conducted one inspection of a permit-holder location during the reporting period. ASNO staff also met with the permit holder to discuss requirements under the Safeguards Act, including material control and reporting obligations. ASNO found no indication of unauthorised access to, or use of, nuclear materials or nuclear items during the inspections. Recommendations and best practice standards were identified and discussed.

IAEA Inspections

During the reporting period the IAEA exercised its right to conduct inspections under Australia's Comprehensive Safeguards Agreement and the Additional Protocol. Details on all inspections are provided in Table 9. Details on the IAEA's findings from inspections are in Appendix D. The IAEA successfully completed its regime of inspections within Australia, visiting ASNTO and a uranium mine. ASNO officers facilitated access to the sites chosen for inspection and accompanied the Agency inspectors during all of their activities. The inspection objectives were fulfilled and ASNO, in close cooperation with the organisations affected, ensured that all of Australia's IAEA obligations were met.

The IAEA inspections at ANSTO included Physical Inventory Verifications (PIV) covering OPAL, the Research & Development areas and the Storage areas at ANSTO. Those three material balance areas also had Design Information Verification (DIV) inspections under the Comprehensive Safeguards Agreement and one Complementary Access visit under the Additional Protocol.

The shut-down HIFAR reactor is in the process of decommissioning and is on a four-year inspection cycle. In 2015 the IAEA conducted a DIV at the HIFAR facility. This enabled the inspectors to verify the status of the facility. The HIFAR decommissioning technicians were able to show the Agency and ASNO inspectors that all fuel has been removed from the core. The technicians lowered a camera into the core via an access portal enabling direct vision.

On a separate occasion the IAEA conducted a Random Interim Inspection at OPAL. With the standard three-hour notice, they gained access to the facility and conducted their verification activities. Following the successful inspection of the OPAL reactor, the Agency inspectors provided a notice, under the Additional Protocol, that they intended conduct a Complementary Access activity at other locations within OPAL and buildings within the Research and Development area. Those inspections went ahead and were also successful.

Under the Additional Protocol ASNO keeps the IAEA informed of new infrastructure projects. One such project at the ANSTO Lucas Heights

site is the Synroc Waste Immobilisation Plant. When constructed the Synroc plant will be a new facility for safeguards purposes. The IAEA conducted its first inspection of the site where the Synroc plant will be constructed. The Agency conducted a Design Inventory Verification inspection to verify that the construction matched the design plans provided to the IAEA.

In accordance with the Additional Protocol, the IAEA exercised its Complementary Access rights by visiting the Beverley and Four Mile Mines. Heavy rainfall at the mine site caused a delay in the inspection; however, it was re-scheduled a week later. The Agency inspections were satisfied with the operations they viewed.

Table 9: IAEA Safeguards Inspections 2014–15

Date	Facility	Material balance area	Type
21 November 2014	OPAL Reactor	AS-F	Random Interim Inspection
	OPAL Reactor, ANSTO research laboratories	AS-F, AS-C	Complementary Access
15 April 2015	ANSTO	AS-H	Design Information Verification Inspection
20–21 April 2015	ANSTO	AS-C	Physical Inventory Verification Inspection
			Design Information Verification Inspection
22 April 2015	ANSTO	AS-D	Physical Inventory Verification Inspection
			Design Information Verification Inspection
23 April 2015	ANSTO	AS-F	Physical Inventory Verification Inspection
			Design Information Verification Inspection
24 April 2015	ANSTO	AS-A	Design Information Verification Inspection
28 April 2015	Beverley and Four Mile Uranium Mines	AS-E	Complementary Access

The IAEA reports the outcomes of safeguards inspections and complementary access in Australia under the Comprehensive Safeguards Agreement and the Additional Protocol (see Appendix D).

During the reporting period, some small inventory differences were reported to the IAEA. Details are provided in Table 10. These were primarily due to re-measurement of batches at locations outside of ANSTO (e.g. universities). In particular, the inventory differences of 2.89 kg in natural uranium and -2.84 kg in depleted uranium are as a result of corrections to the element category for some batches. The plutonium difference of -0.09 g is as a result of two batches incorrectly reported in 2014 as natural uranium. There were no inventory differences at the Lucas Heights facilities.

Detailed descriptions on inventory differences have been provided to the IAEA for the period.

IAEA and ASNO inspectors at ANSTO and Four Mile uranium mine during the PIV, DIV and CA inspections April, 2015.

Table 10: Inventory Differences Recorded during 2014–15

Material Balance Area	Difference between Book and Physical Inventory	Comment
HIFAR (defuelled) MOATA Reactor (defuelled) ANSTO research laboratories ANSTO vault storage OPAL reactor Silex laboratories	none	Book inventory equalled the Physical Inventory
Other locations (MBA AS-E)	2.89 kg Natural uranium	Rounding, re-measurements of batches and correction of element of nuclear material.
	-2.84 kg Depleted uranium	
	0.74 kg Thorium	
	-0.07 g Plutonium	
Other locations (MBA ASE1)	0.56 kg Natural uranium	Rounding, re-measurements of batches and correction of element of nuclear material.
	0.03 kg Depleted uranium	
	0.46 kg Thorium	
	-0.09 g Plutonium	

Output 1.2: Nuclear security

Protection of Australia's nuclear facilities, nuclear material and nuclear items against unauthorised access and sabotage, including Australia's uranium supplied overseas.

Performance Measures

- Security of nuclear material, technology and facilities meets Australia's obligations under the Convention on the Physical Protection of Nuclear Material (CPPNM), the International Convention for the Suppression of Acts of Nuclear Terrorism and bilateral nuclear cooperation agreements, as well as being in accordance with IAEA guidelines.
- Internationally agreed standards for the security of nuclear material are applied to all AONM.
- Proactive and professional contributions are made to the development and effective implementation of nuclear security worldwide.

Performance Assessment

International and Bilateral Obligations

ASNO's inspections of permit holders established that security arrangements at Australian nuclear facilities were in accordance with Australia's obligations under the CPPNM and relevant bilateral nuclear cooperation agreements, as well as being in accordance with IAEA recommendations. ASNO also met Australia's international shipment notification obligations under the CPPNM by notifying relevant parties of the transhipment of uranium ore concentrates exported from Australia.

ASNO continued cooperation with the United States Regulatory Commission and Department of Energy on revising classification arrangements under the Australia/US nuclear cooperation agreement on SILEX technology.

Exports of Australian Uranium

Reporting by conversion facilities, safeguards authorities and shipping agencies confirmed that all AONM exported from Australia safely reached its destination. Security procedures are applied to Australian uranium exports including checking of the physical condition of the containers and verifying the integrity of the containers. Seals and locks are checked at each port of unloading or transhipment to detect any breaches of integrity.

Nuclear Security at Uranium Mines

On 30 October 2014, ASNO conducted an inspection at the Ranger uranium mine, evaluating security plans and procedures against ASNO's permit requirements and verifying that recommendations arising from the previous inspection had been addressed. The inspection included a review of the security upgrades to the mine lease perimeter, vehicle control measures, the on-site laboratory, sample handling procedures and security arrangements at the processing plant.

On 23 June 2015, ASNO conducted an inspection at the Olympic Dam uranium mine. The purpose of the inspection was to verify that the requirements of their Permit to Possess Nuclear Material are met and that the performance of physical protection and material accountancy systems are adequate. As part of the inspection ASNO reviewed changes to transport arrangements, security measures in the uranium production plant, computer security and contracted security arrangements.

Containers loaded with UOC await departure at Ranger uranium mine.

Nuclear Security at Lucas Heights

On 26 June 2015, Director General, ASNO issued key findings and required actions arising from a periodic security review of the OPAL reactor and the results of the IPPAS mission conducted in November 2013. These findings are consistent with, and in addition to, CEO ARPANSA's Statement of Reasons of 31 March 2015, addressing the periodic security review corresponding to ARPANSA's legislative responsibilities. ARPANSA and ASNO have begun work on establishing joint criteria for the next periodic safety and security review that will start in November 2019.

ASNO also continued working with ANSTO and ARPANSA on security arrangements for ANSTO's nuclear medicine manufacturing plant. As part of a review of all of ANSTO's permits granted under the Safeguards Act, ASNO is reviewing nuclear security requirements taking into account contemporary practice, the latest IAEA guidance and the outcome of the above-mentioned security review.

Silex Enrichment Technology

On 24 July 2014, Silex Systems Limited announced that their US partner, GE-Hitachi Global Laser Enrichment, was reducing the funding and pace of SILEX commercialisation activities due to adverse market conditions. Research activities continue at the Silex Systems Limited Lucas Heights site, although at a reduced level. Silex Systems Limited continues to hold a Permit to Possess Associated Technology with ASNO and regulatory activities are essentially unchanged.

In May 2015, the US Nuclear Regulatory Commission (NRC) visited ASNO to discuss updates to the Administrative Security Arrangements (ASA) to the Australia-US cooperation agreement on SILEX technology. The update is the first substantive change to the ASA since it was first negotiated in 2000 and was done to incorporate changes in Australia's and USA's domestic arrangements for the protection of classified information and to recognise contemporary communications practices.

IPPAS Missions

International Physical Protection Advisory Service (IPPAS) missions comprise a team of international experts who assess a state's system of physical protection (nuclear security), compare it with international best practices, make recommendations for improvements and identify good practices. In recent years, IPPAS missions have been increasingly recognised globally as a valuable tool in improving national security regimes. Australia hosted an IPPAS

mission in November 2013. During the reporting period Australia supported IPPAS missions in Indonesia and Jordan by providing experts to these mission teams.

AusIMM – Outreach to Industry

As part of ASNO's outreach and engagement activities, ASNO presented at the AusIMM International Uranium Conference in Adelaide on 9–10 June 2015. The presentation, entitled "Uranium transport security and maritime piracy", covered ASNO's regulation of the transport of UOC by sea to overseas destinations, with an emphasis on the risk of piracy. The AusIMM uranium conference was an excellent opportunity to engage with the uranium industry and prospective uranium miners who do not yet have a formal regulatory relationship with ASNO.

Nuclear Security Visit to USA

On 5–7 May, two ASNO officers accompanied by an officer from ANSTO visited the Y12 National Security Complex and the Honeywell uranium conversion facility as part of a bilateral nuclear security visit under the Australia-USA nuclear cooperation agreement. ASNO is grateful for the professionalism and openness demonstrated during the visit and the lessons learned will benefit regulation of nuclear security in Australia.

ASNO visit to Honeywell conversion facility.

Nuclear Security Summits

The fourth and final nuclear security summit will take place in Washington DC on 31 March and 1 April 2016. In the lead-up to the 2016 summit, five action plans have been drafted covering the activities of the IAEA, United Nations, Global Initiative to Combat Nuclear Terrorism and the Global Partnership against the Spread of Weapons and Materials of Mass Destruction. Australia and Hungary were co-coordinators of the group drafting the IAEA action plan. Two meetings were held to develop

the IAEA action plan: the first at the Hungarian mission in Vienna and the second hosted by ASNO in Canberra in April, at which 19 summit states attended.

ASNO attended intersessional meetings of summit Sherpas in USA, Thailand and Lithuania. The meeting in Vilnius, Lithuania included a scenario-based exercise and policy discussion. A similar policy discussion took place at The Hague nuclear security summit and is set to also feature at the 2016 Washington summit.

Support for Regional Nuclear Security Activities

ASNO attended an IAEA-hosted Regional Workshop on Familiarizing Member States in Asia with Integrated Nuclear Security Support Plans (INSSP) in Yogyakarta, Indonesia from 19–21 August 2014. The IAEA describes an INSSP as the mechanism that enables the IAEA, the State concerned and any donors financing the work to plan and coordinate activities from both a technical and a financial point of view, optimising the use of resources and avoiding duplication. At the workshop, ASNO presented on "Australia's Assistance for Nuclear Security in Asia" and facilitated discussion among Southeast Asia and Pacific Island states on the development on INSSPs.

From 8–12 June 2015 the Zambian Radiation Protection Authority hosted an IAEA regional workshop on security practices for uranium ore concentrates, I*AEA Regional Workshop on Security in Practice for the Uranium Ore Concentrate Industry, Including during Transport*. The workshop was held in Livingstone, Zambia, and was attended by representatives from a wide range of African states with uranium mining or transport interests.[1] Dr Craig Everton (Director, IAEA Safeguards Section) attended to present on Australia's practices and facilitate working group activities.

The main purpose of the workshop was to introduce and discuss the IAEA's upcoming technical document on *Nuclear Security in the Uranium Extraction Industries*. It was apparent from the workshop that significant improvements have been made in African states in recent years in the security framework for the mining and transport of uranium ore concentrates, in some cases driven by mining companies themselves. Significantly, some mining companies have begun adopting the technical document, ahead of its publication. The Nuclear Regulatory Network of the Southern African Development Community (SADC NRN) is using this technical document as part of its work on a protocol on nuclear and radiation safety and security for use by the fifteen Southern African countries that make up this community in line with the signed Memorandum of Cooperative Agreement (MCA).

IAEA Nuclear Security Guidance Committee and the Nuclear Security Series

ASNO attended the sixth and seventh meetings of the IAEA's Nuclear Security Guidance Committee (NSGC) held during 10–14 November 2014 and 22–26 June 2015, both held in Vienna and attended by some 50 member states.

The seventh meeting was also the first meeting of the NSGC's second three-year term. Director, Nuclear Security Section continued as Australia's member to the NSGC. Recommendations arising from a review of the NSGC's first term were largely set aside. It is expected that the second term of the NSGC will be more productive having solidified its terms of reference and working practices and moved on from protracted debates prevalent in the first term. Increased attention to safety/security interfaces and the development of recommendations for computer security are likely to feature in coming meetings.

1 African representation included: Benin, Botswana, Central African Republic, Congo DR, Malawi, Mali, Mauritania, Namibia, Niger, South Africa, Tanzania, Zambia. The workshop was also attended by representative from the European Commission, Canada, the Danish Institute of International Studies, France, US Department of Energy and the IAEA.

Key Nuclear Security Regimes:

Convention on the Physical Protection of Nuclear Material (CPPNM):

The CPPNM is the only legally binding international instrument in the area of physical protection of nuclear material. It establishes measures related to the prevention, detection, and punishment of offences related to nuclear material. The CPPNM was amended in 2005 to make it legally binding for States Parties to protect nuclear facilities and to protect nuclear materials domestically as well as in international transport. Australia played a lead role in that revision process. As of 30 June 2015, 84 states had ratified the amended CPPNM, requiring 16 further ratifications for the Amendment to enter into force at that date.

International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT):

This Convention entered into force in July 2007, and requires, inter alia, all State Parties 'to make every effort to adopt appropriate measures to ensure the protection of radioactive materials'. Australia ratified the Convention on 16 March 2012.

United Nations Security Council Resolution (UNSCR) 1540:

The resolution was adopted in April 2004, establishing binding obligations on all UN member states under Chapter VII of the UN Charter to criminalise the proliferation of WMD and enforce effective measures against the proliferation of WMD, their means of delivery and related materials. In April 2011 UNSCR 1977 extended the mandate of UNSCR 1540 by 10 years until 2021.

Global Initiative to Combat Nuclear Terrorism: (GICNT):

The GICNT is a key forum for multilateral cooperation launched by the United States and Russia in 2006. Australia is a partner of the GICNT which as of 30 June 2015 has 86 partner nations and five observers (UNODC, UNICRI, IAEA, EU, and Interpol). The principles of the GICNT aim to encourage international cooperation and commitment to securing nuclear materials while improving enforcement and interdiction mechanisms to counter terrorists procuring or using radioactive or nuclear materials.

Output 1.3: Bilateral Safeguards

Nuclear material and associated items exported from Australia under bilateral agreements remain in exclusively peaceful use.

Performance Measures

- AONM is accounted for in accordance with the procedures and standards prescribed under relevant bilateral agreements.
- Implementing arrangements for the bilateral agreements are reviewed and revised as necessary to ensure their continuing effectiveness.

Performance Assessment

Australian Obligated Nuclear Material

On the basis of reports from bilateral treaty partners, other information and analysis, ASNO concluded that all AONM is satisfactorily accounted for. Details are provided in Table 11. Based on ASNO's analysis of reports and other information from counterparts on AONM located overseas, ASNO concludes that no AONM was used for non-peaceful purposes in 2014.

Table 11: Summary of net accumulated AONM by category, quantity and location at 31 December 2014[1]

Category	Location	Tonnes[2]
Depleted Uranium	Canada, China, European Union, Japan, Republic of Korea, Russia, United States,	119 861
Natural Uranium	Canada, China, European Union, Japan, Republic of Korea, Taiwan, United States	28 081
Uranium in Enrichment Plants	European Union, Japan, United States	22 828
Low Enriched Uranium[3]	Canada, China, European Union, Japan, Mexico, Republic of Korea, Switzerland, Taiwan, United States	16 696
Irradiated Plutonium[4]	Canada, China, European Union, Japan, Mexico, Republic of Korea, Switzerland, Taiwan, United States	168
Separated Plutonium[5]	European Union, Japan	2.3
TOTAL		**187 636**

(1) Figures are based on yearly reports to ASNO in accordance with Australia's bilateral agreements and other information held by ASNO.

(2) All quantities are given as tonnes weight of the element uranium, plutonium or thorium. The isotope weight of 235U is 0.711% of the element weight for natural uranium and from 1 to 5% for low enriched uranium.

(3) An estimated 80–90% of Australian obligated low enriched uranium is in the form of spent reactor fuel.

(4) Almost all Australian-obligated plutonium is irradiated, i.e. contained in irradiated power reactor fuel or plutonium reloaded in a power reactor following reprocessing.

(5) 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.

The end-use for all AONM is for the production of electric power in civil nuclear reactors and for related research and development. AONM cannot be used for any military purpose.

Table 12: Supply of Australian uranium by region during 2014

Region	Tonnes UOC (U_3O_8)	% of Total
Asia	767.7	13.6
Europe	443.4	7.8
North America	4 457.5	78.6
TOTAL	**5 688.6**	**100.0**

Table 13: Summary of AONM Transfers during 2014[1]

Fuel Cycle Stage	Destination	U (tonnes)
Conversion	Canada	650
	China	651
	European Union[2]	643
	United States[3]	3 428
Enrichment	European Union	1 431
Fuel Fabrication	Republic of Korea	35
	United States	124
	European Union	27

(1) Figures are for transfers completed between jurisdictions from 1 January to 31 December 2014. Figures do not include transfers of AONM made within the fuel cycle of a state (or of Euratom), return of heels (residual UF6 remaining in cylinders after emptying), or damaged product.

(2) Includes transfers from Cameco Corp (Blind River, Canada) to Springfields Fuels, Ltd (United Kingdom).

(3) Includes transfers from Cameco Corp (Blind River, Canada) to Uranium One (USA).

The shipper's weight for each UOC consignment is entered on ASNO's record of AONM. These weights, subject to amendment by measured Shipper/Receiver Differences, are the basic source date for ASNO's system of accounting for AONM in the international nuclear fuel cycle. ASNO notifies each export to the safeguards authorities in relevant countries. In every case, those safeguards authorities confirmed to ASNO receipt of the shipment. ASNO also notified the IAEA of each export to non-nuclear weapon states pursuant to Article 35(a) of Australia's safeguards agreement as well as to nuclear-weapon states under the IAEA's Voluntary Reporting Scheme. Receiving countries similarly reported receipts to the IAEA.

Bilateral Agreements

Reporting

Reports from ASNO's counterpart organisations were received in a timely fashion and in the agreed format, which enabled analysis and reconciliation with ASNO's records. Figures provided in Table 12 and Table 13 are based on ASNO's analysis of all available information at the time of publication.

Australia-India Nuclear Cooperation Agreement

Australia and India signed a nuclear cooperation agreement on 5 September 2014.

The nuclear cooperation agreement was tabled in Parliament on 28 October 2014 and referred to the Joint Standing Committee on Treaties (JSCOT) for consideration. JSCOT held four public hearings in 2015 (9 February, 12 February, 18 May and 15 June). Two of the hearings were for the general public and non-government organisations, and two hearings were for government officials. JSCOT is expected to present its report in September 2015.

Five negotiating rounds were held during the year between Australia and India on the administrative arrangement. Negotiations were led for Australia by the Australian

Safeguards and Non-Proliferation Office. Negotiators worked constructively with the aim of concluding an administrative arrangement as soon as possible, consistent with Australia's requirements for robust safeguards and accountability.

Exports of Australian uranium to India can only commence after Australia and India have concluded and brought the proposed nuclear cooperation agreement into force and Australia and India have an agreed administrative arrangement in place.

Australia-United Arab Emirates Nuclear Cooperation Agreement

As noted in ASNO's previous annual report, the Agreement between Australia and the United Arab Emirates was brought into force on 14 April 2014. On 27 November 2014, the Government tabled its response to the report from JSCOT on the nuclear cooperation agreement. In its report tabled on 18 March 2014, JSCOT recommended binding treaty action be taken subject to three other recommendations addressing IAEA oversight, IAEA funding and nuclear safety. In light of the strong IAEA oversight and cooperation with the UAE, the Government made the decision to bring the Agreement into force on 14 April 2014.

One negotiating round was held during the year between Australian and the UAE on the administrative arrangement. Negotiators worked constructively with the aim of concluding an administrative arrangement as soon as possible, consistent with Australia's requirements for robust safeguards and accountability. Exports of Australian uranium to the UAE can only commence after Australia and the UAE have an agreed administrative arrangement in place.

Australia-Russia Nuclear Cooperation

In September 2014, the Government announced a range of sanctions on trade with Russia. One such measure was to ban the export of Australian uranium to Russia for Russian domestic use and stockpiling.

Australia-Ukraine Nuclear Cooperation

In December 2014, Prime Minister Abbott and Ukrainian President Poroshenko discussed the possibility of Australian uranium supply to Ukraine. ASNO is currently working through processes in order to commence negotiations on an Agreement with Ukraine.

Multilateral Meeting on Nuclear Cooperation Agreements

In January 2015, Australia participated in a meeting with Canada, Euratom, Japan and the US on bilateral nuclear cooperation agreements. This was the first occasion Japan had attended the discussions, which has occurred annually since January 2008. The group has developed a "document of common understandings" with regards to administration of obligation accounting and transfers of nuclear and non-nuclear material, equipment, components or technology pursuant to bilateral nuclear cooperation agreements. The document describes the content of "administrative arrangements" that outline the practical application of nuclear cooperation agreements.

Output 1.4: 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 the Department of Foreign Affairs and Trade (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 took an active role in the review, development and effective implementation of international safeguards during the reporting period, through engagement with the IAEA at both management and operational levels, as well as through other international safeguards fora. This work enables ASNO to cultivate and maintain specialist knowledge on developments and emerging issues in safeguards. Maintaining specialist knowledge supports ASNO's monitoring and administration of Australia's various bilateral nuclear cooperation agreements, and supports policy advice to Government developments in IAEA safeguards and other international non-proliferation issues.

Some of the fora where ASNO engaged during the reporting period on safeguards issues included the IAEA Director General's Standing Advisory Group on Safeguards Implementation (SAGSI), technical meetings on IAEA safeguards projects, and various conferences and workshops. ASNO joined the Australian delegation to the IAEA Board of Governors and General Conference meetings in September 2014. At the General Conference ASNO contributed actively to the negotiations of the Safeguards Resolution ("*Strengthening the Effectiveness and Improving the Efficiency of Agency Safeguards*") to the successful outcome of a resolution agreed by consensus.

ASNO assesses that the IAEA safeguards system continues to effectively fulfil its objective of verifying that states uphold their respective non-proliferation commitments. As with any complex multi-faceted compliance system there are some on-going challenges with safeguards implementation. These issues include: inadequately developed State Systems of Accountancy and Control (SSAC); insufficient authority; independence of regulatory authorities; and, resources and technical capabilities. These are not new issues, and the

degree to which these are a concern should be assessed in the specific context of each state and considering how these issues affect the IAEA's overall compliance conclusions and the international community's confidence in compliance conclusions.

Most of these issues would relate to implementation performance and regulatory capacity of states rather than deliberate efforts to disrupt or impede IAEA safeguards work. It is important that the IAEA remains vigilant in addressing these issues and in providing training and promoting better practice, and for the international community to assist in these important endeavours. There is a strong role both individually and collectively for states to assist in raising awareness and promoting better practice. The IAEA continues to work directly with individual states to address specific issues, but it is also expanding its set of public guidance materials for states and doing outreach and awareness-raising through international workshops and meetings.

To the extent possible within budget constraints, ASNO continues to support these important efforts by working with the IAEA and with regional and international counterparts, principally the Asia-Pacific Safeguards Network (APSN). ASNO has also contributed to support these efforts through Director General ASNO's chairmanship of SAGSI, the involvement of other ASNO staff in technical review committees for detailed guidelines on safeguards implementation practices, and giving papers on safeguards implementation at international conferences and workshops.

Australia is a participant country of the International Framework for Nuclear Energy Cooperation (IFNEC) and, through ASNO, has worked closely with participant countries, to ensure that IFNEC serves Australia's policy objectives of ensuring that countries that choose to pursue nuclear energy do so with the highest standards of safety, security and non-proliferation.

IFNEC is a forum for cooperation on the use of nuclear energy for peaceful purposes that is efficient, safe and secure and does not aid proliferation. IFNEC currently has 33 participant countries, 31 observer countries and four observer organisations (IAEA, Generation IV International Forum, Euratom and the Organisation for Economic Co-Operation and Development – Nuclear Energy Agency). IFNEC was formed in June 2010 as a successor to the Global Nuclear Energy Partnership (GNEP). The evolution from GNEP to IFNEC has put greater focus on promoting non-proliferation and nuclear security and safety objectives.

Over the past year IFNEC has focussed discussions on various topics including model regulatory frameworks for states considering entry into the nuclear power arena, small modular reactor developments and internationalisation of the fuel cycle.

Since 2007, Australia has been represented at IFNEC by Director General ASNO or Assistant Secretary ASNO. Most recently, Australia was represented by Assistant Secretary ASNO Dr John Kalish at IFNEC's Executive Committee and Steering Group Meetings in Seoul, ROK, October 2014 and at the Infrastructure Development Working Group and Steering Group Meetings in Paris, June 2015.

Contribution to DFAT policy development

ASNO has provided key contributions to policy developments and diplomatic activities by providing analysis and advice on safeguards and non-proliferation issues. ASNO's close and supportive working relationship with the Australian Mission in Vienna continues, particularly with the Ambassador in the role of Australian Governor on the IAEA Board of Governors. ASNO plays a major role in providing the Mission with specialist advice on multilateral and country-specific issues, equipping the Mission to advance Australia's interests in maintaining strong non-proliferation and safeguards architecture. ASNO also provides advice on IAEA reports and current safeguards issues such as Iran and the DPRK.

The Safeguards Resolution and State-level concept

The debate on the State-level concept (SLC, discussed on page 64 of the 2013–14 Annual Report and pages 73–74 of the 2012–13 Annual Report) somewhat subsided during the reporting period following the tabling by the IAEA Director General of a supplementary

explanatory document[2] with greater detail, and the assurance the IAEA DG gave at the September 2014 Board of Governor's meeting on the scope of the SLC. The IAEA DG provided assurances, inter alia, that the SLC will not entail the introduction of any additional rights or obligations on member state or the IAEA and will apply strictly within the scope of each state's IAEA safeguards agreement. These assurances are somewhat obvious and do not conflict with how the IAEA conducts its business in verifying compliance, but it was important for several states to have these points re-stated.

The supplementary document and the IAEA DG's assurances were well received by most Member States and went a long way to improving understanding of the purpose of the SLC and placating the concerns some had held. This is manifested in the Safeguards Resolution (GC(58)/RES/14) agreed by consensus at the September 2014 General Conference. Unlike the Safeguards Resolutions at the 2013 and 2012 General Conferences, the 2014 resolution did not include a call on the IAEA DG to provide a specific report on the SLC. The two reports the IAEA DG has issued on the SLC and the extensive set of technical briefings the IAEA Secretariat conducted in early 2014 were very helpful in building understanding and acceptance of the SLC, but the effort required utilised significant resources. These resources will now be freed up for the Secretariat to develop individual State-level approaches in consultation with each state, which should result in a more effective targeting of resources to where these are most effective and relevant to technically-plausible pathways for diverting nuclear material.

IAEA Standing Advisory Group on Safeguards Implementation

Dr Robert Floyd, Director General ASNO, currently chairs the IAEA's Standing Advisory Group on Safeguards Implementation (SAGSI). Dr Floyd's appointment started with the 77th series of SAGSI meetings in the first half of 2013. SAGSI provides recommendations to the IAEA Director General on vital safeguards issues. The Group currently comprises 17 international experts from numerous Member States.[3] The members serve on the group in a personal capacity and not as representatives of government or organisation. Each expert is invited to serve a three-year term, with the possibility of renewal. The Secretariat includes IAEA Deputy Director General for Safeguards and Director, Division of Concepts and Planning.

SAGSI has two series of meetings each year, with each series usually comprising a working group meeting and a plenary meeting. During each series of meetings, SAGSI examines and provides advice on a list of safeguards implementation topics set by the IAEA DG. Core topics examined include the evolution of safeguards implementation (including the State Level Concept), safeguards planning and management, safeguards evaluation and reporting, safeguards infrastructure as well as other topical issues such as safeguards relevant information analysis and handling.

Australian Safeguards Support Program

Representatives including Dr Martin Lyons on the IAEA Member State Support Programme technical committee to develop Safeguards Implementation Practices Guides, Vienna, Austria, November 2014.

It is in the interests of both Australia and the IAEA to cooperate to facilitate the practical implementation of safeguards. Nuclear safeguards is a continual state of development however the resources available to the IAEA are not sufficient to allow all necessary safeguards research and development programs to be conducted 'in-house'. Many nations support the IAEA's work by contributing to support program activities in

2 *Supplementary Document to the Report on the Conceptualization and Development of Safeguards Implementation at the State Level* (GOV/2014/41)

3 Algeria, Argentina, Australia, Brazil, Canada, China, Cuba, France, Germany, India, Indonesia, Japan, Republic of Korea, Russia, South Africa, USA and UK.

a cost-effective way. Currently there are 21 member state support programs assisting the IAEA develop its concepts. The Australian Safeguards Support Program (ASSP) assists the Agency with its examination of equipment and procedures needed to meet new challenges. The ASSP comprises collaborative work with ASNO, ASNO's counterparts and expert groups on a number of safeguards projects agreed with the IAEA. ASNO is the national manager for the ASSP, coordinating activities with other Australian agencies as well as undertaking several tasks internally. Current projects are outlined below.

Safeguards Approaches

Topical Guidance on Safeguards Implementation: the IAEA assists member states by publishing guidance aimed at enhancing understanding of the safeguards obligations of both States and the IAEA and at improving their cooperation in safeguards implementation. A variety of safeguards approaches are implemented globally, owing to differences in size and complexity of States' nuclear programmes and their regulatory framework. For that reason the IAEA are developing numerous Safeguards Implementation Practices (SIP) Guides to assist developing States by sharing experiences and good practices as well as the lessons learned by both States and the IAEA, acquired over the many decades of safeguards implementation. The SIP Guide provides information which States may find useful in implementing their safeguards agreements with the IAEA.

ASNO is contributing to the drafting and reviewing of SIP guides as a member of the group tasked by the IAEA with completing the documents. Dr Craig Everton and Dr Martin Lyons are the Australian representatives on the IAEA SIP team. One Guide they have contributed to has already been finalised, 'Establishing and Maintaining a State System of Accounting and Control'. Another Guide is due to be published later in 2015, 'Provision of Information to the IAEA'. Two other SIP Guides are in progress,' Facilitating IAEA Verification Activities' and 'Collaborative Approaches to Safeguards Implementation'.

The SIP project has now reached a second stage with the development of outreach material and planning workshops. Dr Everton and Dr Lyons are contributing to resource material in the form of presentations, exercises and training modules to be used in a series of training events. The workshops will gather together safeguard practitioners to work through exercises and share expertise to solve safeguards problems. They also provide important opportunities for interaction between IAEA experts and state safeguards practitioners from nations with a various sized nuclear industries. The result is the creation of a lasting network of peers for future reference and assistance.

Information Management Tasks

ASNO is assisting with coordination between the IAEA and ANSTO on a project developing a procedure for the forensic analysis of uranium ore concentrate samples. In cooperation with research institutions in other countries the project examines trace element content, particularly the rare earth element profile, to help identify the origin of a uranium ore concentrate samples. The process separates the uranium matrix from uranium sample dissolutions to improve the detection limits for trace impurity elements. The separation of uranium progeny (in particular thorium and protactinium) from uranium during the concentration process is being investigated in the context of isotope radiochronometry for age determination of unknown uranium samples.

Analytical Services Tasks

Analytical services for environmental sampling: A key element of the safeguards system is the physical inspection of nuclear facilities by IAEA inspectors. States declare in considerable technical detail the types and quantities of nuclear material they possess. Among other verification measures, IAEA inspectors may take nuclear material samples from various points of the nuclear fuel cycle and collect environmental samples by swiping surfaces at various locations during the conduct of a verification activity.

In carrying out this work, the IAEA laboratories coordinate and cooperate with a wider Network of Analytical Laboratories (NWAL), comprising an additional 18 laboratories located in nine different IAEA Member States. The Environmental Sample Laboratory located at Seibersdorf, Austria receives and screens

all swipe samples but then shares the analytical workload with its NWAL partners. Approximately 600 samples of nuclear material and over 400 environmental swipe samples are received and analysed by the Safeguards Analytical Laboratories each year.

The University of Western Australia's Centre for Microscopy, Characterisation and Analysis is an internationally recognised core facility for electron, ion and light imaging and microanalysis and is part IAEA's analysis network. The Centre provides an extensive range of microscopy and microanalysis instrumentation, and offers a wide variety of sample preparation techniques. On short notice, the Centre receives environmental samples from the IAEA's Seibersdorf laboratory and conducts blind analysis following standardised protocols. Results of the analyses performed are subsequently reported to the IAEA in accordance with the standard format for data reporting. Using this method, no party within Australia is able to identify the original location of the sample. During the reporting period, 23 samples were analysed.

ANSTO's accelerator mass spectrometry system, in particular its high sensitivity for analysis of minor actinides, is a resource also utilised by the IAEA's analytical services network.

Equipment Development Tasks

The IAEA Division of Technical and Scientific Services is responsible for providing support to the design, development, testing, calibration, installation and maintenance of safeguards equipment; performance and contamination monitoring of equipment; and inspection logistics. Their 'Future Horizon' program is an IAEA initiative to identify and deploy cutting-edge techniques and methods that could be of direct benefit the work of safeguards, or readily adapted for safeguards implementation. As part of this initiative, CSIRO has been working with the IAEA to explore the utility of the Zebedee 3D handheld mapping tool. Following a number of technical evaluation workshop and successful demonstrations of the device the IAEA has taken a further interest in the device and its possible application in safeguards. It has recognised the potential value Zebedee offers for some safeguards verification work. Field trials using the tool were conducted in 2015.

Australia contributed €600 000 to the IAEA's Renovation of the Nuclear Applications Laboratories (ReNuAL) project during 2014–15. The eight IAEA nuclear applications laboratories at Seibersdorf have not had a major overhaul since their establishment in 1962. The ReNuAL project's goal is to bring the laboratories up to a modern, efficient fit-for-purpose standard. The ReNuAL project commenced in 1 January 2014 with a targeted budget of €31 million and a completion date of December 2017.

Cooperation with other States Parties

ASNO has close and long-standing relationships with nuclear safeguards and security agencies and practitioners in several countries in and outside the region with nuclear power plants, or have plans for nuclear power. During the reporting period ASNO actively worked to maintain and reinforce these relationships through both high-level and operational-level discussions and also through projects under the Asia-Pacific Safeguards Network.

In October 2014 the IAEA Department of Safeguards held its twelfth symposium on international safeguards, with the 2014 theme being "Linking Strategy, Implementation and People". These safeguards symposia are held approximately once every four years and bring together safeguards specialists from a broad range of member states and the IAEA to discuss how approaches, systems and technologies can improve the way safeguards are implemented. Australia delivered six presentations at the Symposium, by representatives from the Australian National University, Curtin University, University of Western Australia, the Belfer Center at the Harvard Kennedy School, and ASNO. ASNO also co-chaired one session of the Symposium on assuring quality in safeguards findings. The Symposium was a useful forum to promote the work of the Asia-Pacific Safeguards Network (APSN), with a few presentations from various members covering the work of APSN and an information booth on APSN.

DG Amano and DDG Varjoranta visiting the APSN booth at the 2014 IAEA Safeguards Symposium.

Visitors at the APSN booth at the 2014 IAEA Safeguards Symposium International Outreach.

ASNO continued its international outreach activities to assist countries in the region with the fulfilment of their non-proliferation safeguards and physical protection obligations. Assistance and training have been provided to professionals in a range of countries over the past 12 months including:

- 'Australia's Regulatory Perspective – Security and Export Controls on Uranium Production, Transport and Export for Conventional and Non-Conventional Resources', presentation at the IAEA Regional Workshop on Implementing Prudent Management Practices for Uranium Ore Concentrates, Livingstone, Zambia, June 2015.
- 'Accountability and Transparency: Essential Underpinnings of Quality Safeguards' and 'Implementation Practices in the Asia-Pacific Related to Establishing Safeguards Infrastructure', presentations and papers at the 2014 IAEA Safeguards Symposium, Vienna, October 2014.
- 'Physical Protection of Uranium Ore Concentrates In Australia: Maintaining appropriate security standards through the highs and lows', Friends of Responsible Uranium Mining (FoRUM) side event at the 2014 IAEA General Conference.

An initiative that has made a major contribution to ASNO's ongoing efforts to improve and strengthen the non-proliferation regime in the Asia-Pacific region is the Asia-Pacific Safeguards Network (APSN). The objective of APSN, established in 2009, is to improve the quality, effectiveness and efficiency of safeguards implementation in the Asia-Pacific

region, which has provided ASNO with an opportunity to enhance its cooperation and build regulatory relationships in areas such as training, professional development and the sharing of experiences.

The 5th annual meeting of APSN was held 1–5 September 2014 in Nay Pyi Taw, Myanmar. The meeting was very ably hosted and arranged by the Myanmar Department of Atomic Energy, in the Ministry of Science and Technology. The meeting was attended by around 30 participants from Australia, Cambodia, Indonesia, Japan, Republic of Korea, Lao PDR, Malaysia, Myanmar, Philippines, USA, Vietnam, as well as representative from the IAEA as observers. Cambodia attended for the first time. This was the last annual meeting with DG ASNO as Chair of APSN. The position of Chair of APSN had been held by the DG ASNO since 2010 (two terms in accordance with the APSN Statement of Principles) and with the expiration of the second term it was time to pass the responsibility on to another APSN member. All members agreed unanimously to welcome Japan as the new Chair and Secretariat of APSN for the 2014–2016 term. The position of Chair is now held by the Director General of Disarmament, Non-Proliferation and Science in the Ministry of Foreign Affairs.

Delegates at the 5th Asia-Pacific Safeguards Network Annual Meeting, Nay Pyi Taw, Myanmar, September 2014.

Output 1.5: CWC Implementation

Regulation and reporting of Australian chemical activities in accordance with the Chemical Weapons Convention (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, involving the chemical industry, research and trade
- Contribute to strengthening CWC verification and implementation, including through cooperation with the Organisation for the Prohibition of Chemical Weapons (OPCW) and with CWC States Par ties
- Contribute to enhancing regional CWC implementation through targeted outreach

Performance Assessment

Meeting CWC Obligations

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

- Article VI declaration of imports and exports of CWC-Scheduled chemicals and of the 37 facilities with CWC-relevant chemical production, processing or consumption activities during 2014 (declared in March 2015).
- Article VI declaration of anticipated activities at seven CWC-Scheduled chemical facilities during 2015 (declared in September and October 2014).
- Article X, paragraph 4, declaration of Australia's national programs for protection against chemical weapons (declared in April 2015).
- responses to OPCW Third Person Notes including routine clarification of the operational status of chemical plants and mismatch of trade data between Australia's declaration and those of other CWC States Parties.
- routine responses to OPCW notifications and amendments/corrections to inspector details and deletions or additions to the OPCW inspectorate.

Since 1997, the OPCW has conducted 47 Article VI routine inspections at declared chemical plants and a defence protective purposes laboratory in Australia in accordance with the provisions of the CWC. In the current reporting period, ASNO has facilitated two routine OPCW inspections: one at Australia's Schedule 1 facility for protective purposes in Victoria and another at a declared 'Other Chemical Production Facility' located in Queensland. Each inspection proceeded smoothly and received excellent support and cooperation from government and industry, respectively. The OPCW inspection team verified Australia's declarations as well as the absence of undeclared CWC-Scheduled chemical production, in accordance with the inspection mandates.

ASNO and OPCW inspectors with site representatives during a routine OPCW inspection in February 2015 at a declared chemical plant site in Queensland.

ASNO's inaugural secure online portal was released in January 2015 following two years of preparation that included transitioning the chemical database from Microsoft Access to a Sharepoint platform. Online reporting by facility and import permit holders in accordance with their statutory obligations assisted ASNO in preparing Australia's major declaration of past chemical activities to the OPCW.

ASNO in conjunction with the Information Management and Technology Division provided substantial technical support and guidance to stakeholders in using the online reporting system. While there were a few technical hurdles, ASNO remains committed to ensuring that the system operates as efficiently and effectively as possible into the future by building upon the lessons learned and encouraging ongoing feedback from portal users.

Legislation and Regulation

The permit systems under the *Chemical Weapons (Prohibition) Act 1994* (CWP Act) and Regulation 5J of the Customs (Prohibited Imports) Regulations 1956, continued to operate well. In 2014–15, one permit was issued for an import of small quantities of Schedule 1 chemicals for protective purposes and 62 permits issued for imports of Schedule 2 and 3 chemicals. Table 14 provides statistics for facility permits issued during the reporting period (1 July 2014 to 30 June 2015).

Table 14: Permits for CWC-Scheduled Chemical Facilities

CWC-Scheduled Chemicals	CWP Act 1994	Permit Type	Permits at 30 June 2015(1)	New Permits 2014–15	Re-Issued Permits 2014–15	Permits Cancelled(2) 2014–15
Schedule 1	s19(4)	Production (Protective)	1	0	0	0
	s19(5)	Production (Research)	9	0	3	0
	s19(6)	Consumption	10	0	1	0
Schedule 2	s18(1)	Processing	10	1	1	2
Schedule 3	s18(1)	Production	3	0	0	0

(1) Permit numbers include new, existing and renewed permits.

(2) Permits were cancelled due to company mergers and site relocations.

Cooperation with the OPCW and CWC States Parties

ASNO continued to provide ongoing technical advice and contributed to policy development in preparation for OPCW Executive Council meetings, industry cluster meetings and informal consultations in The Hague including: Australia's views on the OPCW mid- to long-term staffing plans.

Consistent with the objectives of Article X (Assistance and Protection against Chemical Weapons), the OPCW hosted a one-day symposium on "Bridging International Gaps in Chemical Security" held on 26 November 2014 in The Hague. The symposium provided a forum for discussion among States Parties on how to reduce the risk of non-State actors obtaining toxic chemicals for prohibited purposes. ASNO promoted Australia's leading work on enhancing chemical security highlighting the partnerships between industry and government in the development and introduction of a voluntary National Code of Practice for explosives precursors and other chemicals of security concern.

Directly following this meeting ASNO participated in the 16th Annual Meeting of National Authorities of CWC States Parties held in The Hague from 27–30 November 2014. ASNO coordinated in advance the agenda for a break-out session to discuss practical CWC implementation issues for National Authorities belonging to the Western Europe and Other States (WEOG) – of which Australia is a member. The main benefit of this meeting was realised in the sharing of experiences, in promoting greater cooperation among technical experts at the working level, and in generating ideas and recommendations for further consideration by the OPCW and States Parties.

Together with representatives from Department of Foreign Affairs and Trade, Defence Science and Technology Group (formerly DSTO) and Australia's embassy in The Hague, ASNO also attended the 19th Conference of the States Parties from 1–5 December 2014. ASNO contributed to the development of a national paper (C-19/NAT.1) on the use of chemicals which act on the central nervous system (CNS) in law enforcement which was discussed during a side-event in the margins of the Conference, chaired by Dr Robert Floyd, DG ASNO (see also current topics article page 27).

Ambassador Neil Mules addressing the 19th Session of the Conference of the States Parties to the Chemical Weapons Convention, 1 December 2014.

Australia's statement by Ambassador Neil Mules congratulated States Parties and the OPCW on their efforts to dismantle Syria's chemical weapon programme, highlighted concerns about on-going use of toxic chemicals as weapons in Syria and raised further attention to Australia's efforts in regards to preventing the re-emergence of chemical weapons through its national paper on CNS-acting chemicals.

Key outcomes from the Conference were its approval of the OPCW's 2015 Programme and Budget; a decision to allow the re-hiring of inspectors at the OPCW; and the implementation of an Enterprise-Resource-Planning System and Establishment of a special fund for this purpose.

Following receipt of the 2013 Nobel Peace Prize, the OPCW in partnership with the City of The Hague, established an annual award to honour outstanding achievements in advancing the goal of full and effective implementation of the CWC and global chemical non-proliferation and disarmament. Australia's nomination of Defence scientist Dr Robert Mathews was successful due to his outstanding contribution for over 30 years in pursuit of disarmament and non-proliferation of chemical and biological weapons. Among his achievements, Dr Mathews made significant contributions in the negotiation, development, establishment, implementation and promotion of the CWC and to the OPCW and its Preparatory commission, including serving two terms on the OPCW's Scientific Advisory Board (2004 to 2011) and chairing a temporary working group on the convergence of chemistry and biology.

The inaugural OPCW-The Hague Award was shared between Australia's Dr Robert Mathews and the Finnish Institute for Verification of the Chemical Weapons Convention (VERIFIN) and presented in the margins of the 19th Session of the Conference of the States Parties (see photos on the following page).

The inaugural OPCW-The Hague Award was awarded to Dr Robert Mathews (second from the right) and VERIFIN[4] (accepted by the Director Paula Vanninen) at the 19th OPCW Conference of the States Parties in The Hague on 1 December 2014.

The Hague Award medallion.

4 VERIFIN is the Finnish Institute for Verification of the Chemical Weapons Convention in the Department of Chemistry at the University of Helsinki.

In accepting this award, Dr Mathews acknowledged the collective efforts of a team of Australian officials, including many from the Department of Foreign Affairs and Trade (DFAT). Accordingly, Dr Mathews donated his share of the prize money (EUR45,000) to the OPCW's Voluntary Trust Fund for the Victims of Chemical Weapons for the development of a medical practitioner's manual in the treatment of patients affected by chemical weapons.

From 1–5 June, ASNO participated in the 30th Anniversary Australia Group Meeting held in Perth. The meeting aimed to further strengthen participating countries' export controls to prevent dual-use chemical and biological materials, equipment and technology from being used in the development of chemical and biological weapons by state or non-state actors (see current topics article page 27).

On 26 June 2015, DFAT Secretary Peter Varghese met with the Director-General of the OPCW, Ahmet Üzümcü whilst visiting The Netherlands. They discussed a range of chemical weapons-related issues, including the chemical weapons attacks in Syria, the OPCW's Fact-Finding Missions investigating alleged CW use, future directions of the OPCW including on non-state actors and CNS-acting chemicals and the destruction of Libya's and Iraq's remaining CW material.

Domestic Outreach

To assist ASNO in meeting its CWC reporting obligations and to ensure compliance with CWC-relevant legislation, ASNO continued to strengthen engagement with its constituency.

ASNO clarified the CWC's requirements and regulations regarding the import of Schedule 2/3 chemicals to permit holders in Perth in June 2015. ASNO also discussed the CWC and regulatory requirements for producers of Schedule 3 Chemicals during an on-site visit to a chemical facility in Western Australia. Discussions focussed on promoting greater awareness of the CWC, regulatory obligations and preparing declared sites for OPCW inspections. ASNO took the opportunity to demonstrate how to use the new secure online portal.

ASNO continued its close cooperation on CWC implementation issues with the Plastics and Chemicals Industries Association, The Royal Australian Chemical Institute, as well as other Government agencies including the Defence Export Control Office, The Department of Immigration and Border Protection and the Attorney General's Department.

Suspected chemical or biological weapons, whether conventional or improvised, can be safely confirmed and neutralised through the use of specialist equipment.

Output 1.6: CTBT Implementation

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

Performance Measures

- Australia's obligations under the Comprehensive Nuclear-Test-Ban Treaty (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 CTBT Organization (CTBTO) Preparatory Commission
- Contribute to Australia's CTBT outreach efforts

Performance Assessment

International Obligations

Of the 21 facilities that Australia will host for the CTBT International Monitoring System (IMS), 20 are in place and certified as operating to CTBTO technical specifications.

The final facility to be established, an infrasound monitoring station at Davis Station, Australian Antarctic Territory, is planned for installation over 2015 to 2018. Following Geoscience Australia's submission to the CTBTO on the technical and financial proposal to establish the station in the last reporting period, a contract for this was concluded late 2014.

Legal and Administrative Measures

ASNO administers funding for Geoscience Australia to carry out nuclear test monitoring through its network of seismic stations. This arrangement, set out in a Letter of Understanding between Geoscience Australia and ASNO that is reviewed each year. ASNO is satisfied that Geoscience Australia has met its requirements under the Letter of Understanding during the reporting period. ASNO and Geoscience Australia again reviewed the arrangement in 2015, concluding that current arrangements remain adequate for Australia's requirements.

The operation of a National Data Centre (NDC) to verify an in-force CTBT will require additional activities. ASNO, ARPANSA and Geoscience Australia, together with the Department of Defence, continue to hold the question of Australia's future NDC requirements under review.

Nuclear-Test-Ban Verification

While around 89% of CTBT IMS stations are now in place worldwide, detailed preparatory work is continuing to bring the IMS and International Data Centre to a good level of readiness. ASNO coordinates Australia's contribution to the CTBTO's work in this area, working with technical specialists from Geoscience Australia and ARPANSA.

When the CTBT enters into force, it will provide for on-site inspections (OSI) to determine whether a nuclear explosion has taken place in a particular area. ASNO's Malcolm Coxhead, as the Task Leader for the elaboration of an Operational Manual on the conduct of OSI, continued to chair discussions on this subject at the CTBTO Preparatory Commission's technical working group. To ensure that it will be ready to meet the significant logistical, technical and political challenges an OSI would present, the CTBTO conducted a major field test of its OSI capability in late 2014 in Jordan (Integrated Field Exercise 2014 – IFE14).

The exercise successfully demonstrated the application of techniques to locate and characterise a simulated clandestine nuclear test. Coxhead played the role of senior representative of the fictitious inspected State Party during IFE14. An article at page 21 in the Current Topics section of this report provides further information on the exercise.

CTBT Ministerial Meetings to promote entry into force

In the years between the Article XIV Conferences, Foreign Ministers of CTBT Member States particularly dedicated to entry into force of the CTBT meet on the margins of the UN General Assembly in New York in September. The aim of these meetings is to sustain and generate further political momentum as well as public attention for the entry into force of the Treaty. At the Seventh CTBT Ministerial meeting around 30 foreign ministers and representatives from over 90 countries met on 26 September 2014 to renew a joint call for the entry into force of the CTBT. To that end, the Joint Ministerial Statement issued at the meeting was endorsed by a record 105 states.

In opening the meeting, UN Secretary-General Ban Ki-moon called upon the eight Annex 2 States to ratify the CTBT without further delay, underscoring his strong personal commitment to the Treaty and referring to the fact that he previously served as Chairman to the CTBTO's executive body and during his term as Secretary-General had not missed a single CTBT Ministerial Meeting.

ASNO's Malcom Coxhead receives the inspector's report at the end of CTBTO IFE14, in Jordan. Photo Courtesy of CTBTO.

CTBT: Science and Technology 2015

Experts from Geoscience Australia and ASNO participated in a CTBTO hosted conference entitled CTBT: Science and Technology 2015 (SnT2015), which was the fifth in a series of conferences that help establish interactions and partnerships between the scientific and technological community and the CTBTO. Scientists made 83 oral presentations and 230 poster presentations at the conference to 850 conference participants consisting principally of scientists, with attendance also by diplomats, scientific representatives to the CTBTO's policy-making organs, representatives of civil society and the media – making SnT2015 is the largest such conference to date.

The conference goals were: promote the wider scientific application of data that are used for test-ban verification; enhance the exchange of knowledge and ideas between the CTBTO and

the broader scientific community; and enlarge the scientific community engaged in test-ban monitoring. The conference also served to capitalise on scientific and technological innovations for verifying CTBT compliance.

Australia's scientific contribution to the conference included a poster by Geoscience Australia on the potential benefits to IMS performance if existing seismic arrays would be fitted with 3-component seismic instruments and another poster covering the imaging of crustal structure of South East Asia from seismic noise, co-authored by experts from the Australian National University and the Meteorological, Climatological and Geophysical Agency of Indonesia.

Consistent with principles set out in the CTBT, activities associated with the development of CTBT verification are funded primarily from the contributions of States Signatories. This includes training of people involved with the work of the Treaty, and participation in CTBTO workshops. ASNO coordinates the involvement of Australians in this training and during the reporting period, six Australians participated in these activities.

Outreach

A fundamental requirement for an effective CTBT will be the ability of States Parties to form sound technical judgements about the nature of events detected by the IMS. Australia continues to work with and alongside the CTBTO to promote relevant technical capacity.

Between 16 and 20 February 2015, ARPANSA, in cooperation with the CTBTO, hosted the Workshop for Radionuclide Laboratories. A total of 32 participants from thirteen countries attended the workshop, representing 13 of the 16 laboratories in the network. In addition, representatives from the CTBTO and five different equipment suppliers attended.

Output 1.7: Other Non-Proliferation Regimes

Contribution to the development and strengthening of other weapons of mass destruction non-proliferation regimes.

Performance Measures

- Provide support and assistance to Australia's Permanent Mission to the Conference on Disarmament (CD) in Geneva in their efforts to advance Australia's non-proliferation and disarmament objectives, in particular, on seeking to commence the negotiation of an internationally verifiable Fissile Material Cut-off Treaty (FMCT)
- 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 by providing advice and input for briefing and papers prepared by DFAT, such as papers Australia co-authors with likeminded countries to help shape the NPT PrepCom process.

Fissile Material Cut-off Treaty

ASNO continued during the year to provide expert advice in support of Australia's efforts to build confidence and momentum in the Conference on Disarmament towards the commencement of negotiations on a treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices (a Fissile Material Cut-Off Treaty – FMCT). An FMCT is one of the key building blocks towards a world free of nuclear weapons, and Australia is an active contributor to efforts to achieve such a treaty. ASNO's expertise in verification of non-proliferation instruments is central to Australia's effort.

The work of a Group of Governmental Experts (GGE) convened by UN Secretary-General to make recommendations on possible aspects that could contribute to (but not negotiate) a treaty has reinvigorated efforts to promote an FMCT. The GGE issued its report on 7 May 2015. The article at page 22 in the Current Topics section of this report provides further information on the GGE and its outcomes. ASNO provided expert support for Australia's representative on the GGE (Ambassador John Quinn) and worked closely with Australia's mission in Geneva and DFAT's International Security Division to prepare briefing, both for the GGE and for related discussions in the margins of the CD.

International Partnership for Nuclear Disarmament Verifications

Future steps in nuclear disarmament will pose significant verification challenges. Success in addressing these future challenges will require the development and application of new technologies or concepts, and all states have an interest in the success of these efforts. On 4 December 2014, Under Secretary of State for Arms Control and International Security Rose Gottemoeller announced a new initiative to enhance security and stability in the effort to reduce and eliminate nuclear weapons – the International Partnership for Nuclear Disarmament Verification (IPNDV). The Partnership's inaugural meeting was held 19–20 March in Washington, D.C., with a broadly representative group of the NWS (US, UK, France and Russia) and twenty-three

NNWS participating, including Australia represented by DG ASNO, Assistant Secretary, ACB and staff from the Australian missions in Washington and New York. An informal follow-up meeting in the margins of the NPT RevCon included AS ASNO, John Kalish.

The IPNDV brings together both nuclear and non-nuclear weapon states under a cooperative framework to further understand and find solutions to the complex challenges involved in the verification of nuclear disarmament. Such engagement will strengthen existing work towards the goals of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT).

The IPNDV will consider verification challenges across the nuclear weapons lifecycle – including material production and control, warhead production, deployment, storage, dismantlement, and disposition. It will build on lessons learned from efforts such as the US-UK Technical Cooperation Program, the UK-Norway Initiative and the US-Russia-IAEA trilateral initiate.

ASNO plans to participate in two of the three working groups being set up under the IPNDV. Shortly outside the reporting period, DG ASNO was nominated as co-chair of the working group that will consider the development of on-site inspection mechanisms for verifying nuclear disarmament.

Because developing new monitoring and verification technologies and mechanisms will require sustained resources and commitment, the work initiated by the International Partnership will be a long-term effort. The next IPNDV plenary and working group meetings are scheduled in November 2015, Oslo, Norway.

Output 1.8: Advice to Government

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

Performance Measures

- Provide policy advice, analysis and briefings which meet the needs of Ministers and other key stakeholders
- Contribute to the development of Australia's policies by DFAT in the area of WMD arms control, disarmament and non-proliferation
- Cooperate on technical issues of common interest with departments and agencies such as ANSTO, ARPANSA, Department of Defence, Department of Industry, and the Australian Intelligence Community

Performance Assessment

ASNO's specialists exercise their expertise in complex policy and technical areas by delivering advice to Government on nuclear and chemical non-proliferation issues. ASNO staff have substantial experience in: non-proliferation verification methods; domestic, bilateral and international safeguards; nuclear technology and the nuclear fuel cycle; nuclear security; and CWC and CTBT verification activities. ASNO utilises its international network of contacts within agencies and organisations to provide high-quality technical and policy advice to Government and other organisations on nuclear and chemical safeguards, from both international and domestic perspectives, together with expert advice across the range of WMD technologies.

ASNO provided advice to the Government on the negotiation and implementation of bilateral nuclear cooperation agreements. During the year, ASNO provided key support to Australia's nuclear cooperation negotiations with India and the UAE as well as input on the feasibility of establishing a nuclear cooperation agreement with Ukraine.

ASNO provided advice and analysis on a range of non-proliferation issues and developments. ASNO analysed and reported on nuclear programs of concern and provided advice on the Joint Comprehensive Plan of Action between Iran and the Permanent Members of the Security Council and Germany (P5+1) and developments in the DPRK.

ASNO provided special briefing and additional assistance to the Australian Missions to the IAEA and CTBT Organization in Vienna, as well as supporting activities at the OPCW in The Hague and to the United Nation's Conference on Disarmament in Geneva. ASNO provided support on non-proliferation issues to other Australian missions, particularly in Washington, London, Moscow and Beijing.

Two ASNO staff participated on Australia's delegation to the 2015 Nuclear Non-Proliferation Treaty Review Conference and provided expert advice particularly in relation to nuclear safeguards issues considered in Main Committees II and III.

ASNO worked closely with other departments on a range of issues which may impact upon non-proliferation considerations, including foreign investment proposals, international sanctions, defence export controls and safeguards assessments for the export of ores and concentrates.

ASNO participates in the transport working group of the Uranium Council, a government-industry forum coordinated by the Department of Industry, designed to assist in the development of a sustainable, safe, secure, socially and environmentally responsible uranium industry. The goal of the transport working group is to address impediments to transport of uranium, both domestically and internationally.

Output 2.1: Public Information

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

Performance Measure

- Effective public education and outreach

Performance Assessment

ASNO works to ensure Australia's WMD non-proliferation objectives are widely understood. This involves liaison with industry, universities and research organisations, plus think tanks and practitioners, including presentations at various national and international fora. Activities during the year through which ASNO pursued public information objectives included:

- presentation by the Director General ASNO on managing the risks of theft, sabotage and proliferation at the National Workshop on Nuclear Energy for Australia in Adelaide. The workshop was hosted by the Cooperative Research Centre for Contamination Assessment and Remediation of the Environment (CRC CARE) and covered a range of topics including alternatives to nuclear energy, uranium production and its potential use in domestic nuclear power, managing waste from nuclear reactors and risks arising from modern nuclear reactors. Dr Floyd also joined experts in a panel discussion.
- attendance at the Australian Radiation Protection Society annual conference for stakeholder outreach to current and potential nuclear permit holders on safeguards issues and permit requirements
- attendance at the Kokoda Foundation's Future Strategic Leaders Congress on *Australia's Role in Addressing Global Nuclear Security Challenges* and the Asia-Pacific Model United Nations Conference 2014 to present on the role of IAEA safeguards.

ASNO clarified the CWC's requirements and regulations regarding the import of Schedule 2/3 chemicals to permit holders in Perth in June 2015. ASNO also discussed the CWC and regulatory requirements for producers of Schedule 3 Chemicals during an on-site visit to a chemical facility in Western Australia. Discussions focussed on promoting greater awareness of the CWC, regulatory obligations and preparing declared sites for OPCW inspections. ASNO took the opportunity to demonstrate how to use the new secure online portal for reporting purposes.

ASNO has an active program of preparing papers and presentations for workshops, conferences and professional journals. Details can be found at Appendix H.

ASNO's website, http://www.dfat.gov.au/asno/, contains detailed information on Australia's non-proliferation policies, treaty and statutory obligations, and safeguards agreements as well as notification and permit application forms. The Current Topics section of this, and previous, ASNO annual reports is also included as a public information source.

OUTPUT MANAGEMENT AND ACCOUNTABILITY

5

SECTION

Output 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, the Hon Julie Bishop.

Director General ASNO

The Director General ASNO reports 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 Chemical Weapons Convention, as established by the *Chemical Weapons (Prohibition) Act 1994*
- Director of the national authority for the Comprehensive Nuclear-Test-Ban Treaty, 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. Dr Robert Floyd was appointed as the Director General ASNO on 29 November 2010 for a period of five years.

Assistant Secretary ASNO

The Assistant Secretary ASNO deputises for the Director General and is responsible for the day-to-day operations of the office. Dr John Kalish has held this position since 21 April 2010.

ASNO Staff

ASNO has a small core of staff whose day-to-day activities are overseen by the Director General. ASNO staff are employed under the *Public Service Act 1999* as a division within the Department of Foreign Affairs and Trade (DFAT). ASNO staff, other than the Director General, are also employed under the DFAT Enterprise Agreement. Further details can be found in Table 15 and the DFAT Annual Report 2014–15.

In 2014–15 ASNO had an allocated staff level of 17 FTE.

ASNO's organisational structure is closely aligned with the outputs and can be found in Figure 5.

Figure 5: ASNO's Organisational Structure at 30 June 2015

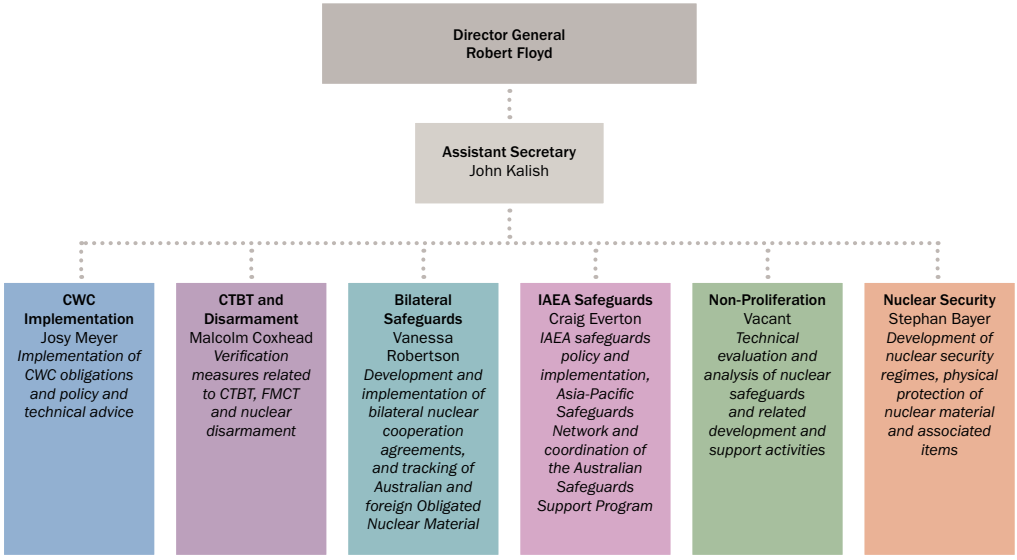


Table 15: ASNO Staff at 30 June 2015

	Male	Female	Total
SES B2	1	0	1
SES B1	1	0	1
Executive Level 2	3	2	5
Executive Level 1	3	1	4
APS Level 6		2	2
APS Level 5		1	1
APS Level 4		1	1
TOTAL	**8**	**7**	**15**

Training and Development

ASNO's primary training requirements are professional development of specialist skills. ASNO is proactive in managing this training, in part through participation in IAEA and OPCW led training courses and participation in international conferences and negotiations. Further details are in Table 16.

Table 16: Training and Development Activities during 2014–15

Training and Development Activity	Person Days
Formal DFAT courses	18
Structured work unit and on-the-job training, including planning days	16
Seminars, workshops, conferences, overseas negotiations and IDCs	62
External formal courses	37
Academic study	0
Other (IAEA Consultancy)	0
TOTAL	**133**

Financial Management

The 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[1]

		2013–14	2014–15
Salaries [2]		2 444 438	$2 163 994
Running Costs	General	743 833	$709 583
	Seismic monitoring[3]	589 635	$584 650
	Sub-Total	1 333 468	$1 294 234
TOTAL		**$3 777 906**	**$3 458 228**

(1) Excludes GST; DFAT's salaries costing model was altered in 2014 – 15 making comparison with previous years inaccurate.

(2) Includes Long Service Leave accruals.

(3) Undertaken by Geoscience Australia.

Regulatory performance and risk management

Stemming from the governance and risk management requirements of the *Public Governance Performance and Accountability Act 2013* (PGPA Act) and the Government's deregulation agenda several policies and guidelines have been established over 2014 and 2015 that set the frameworks under which regulatory authorities must conduct their activities and manage risks.

The PGPA Act is designed to enhance accountability of Commonwealth entities through focusing on their respective duties, internal controls and the way risk is managed. The PGPA Act requires that all Commonwealth entities establish and maintain appropriate systems of risk oversight, management and internal controls. The Department of Finance published on 1 July 2014 the *Commonwealth Risk Management Policy*[1] to support the requirements of the PGPA Act in this regard.

Following a report by the Productivity Commission in March 2014 on a possible framework for auditing regulator performance with respect to compliance costs on regulated entities, the Government published the *Regulator Performance Framework*[2] in October 2014. The *Regulator Performance Framework* sets out a system to measure the performance of regulators through the establishment of, *inter alia*: outcomes-based key performance indicators (KPIs); measures of good regulatory performance against which the KPIs are assessed; and, a process of annual externally validated self-assessment, complemented by external reviews for selected regulators every three years.

During 2014–15 ASNO worked closely with other divisions in DFAT to develop frameworks to implement the requirements under the *Regulator Performance Framework* and *Commonwealth Risk Management Policy*. As required in the *Regulator Performance Framework*, ASNO has developed a series of metrics under which ASNO's performance

1 http://www.finance.gov.au/comcover/risk-management/

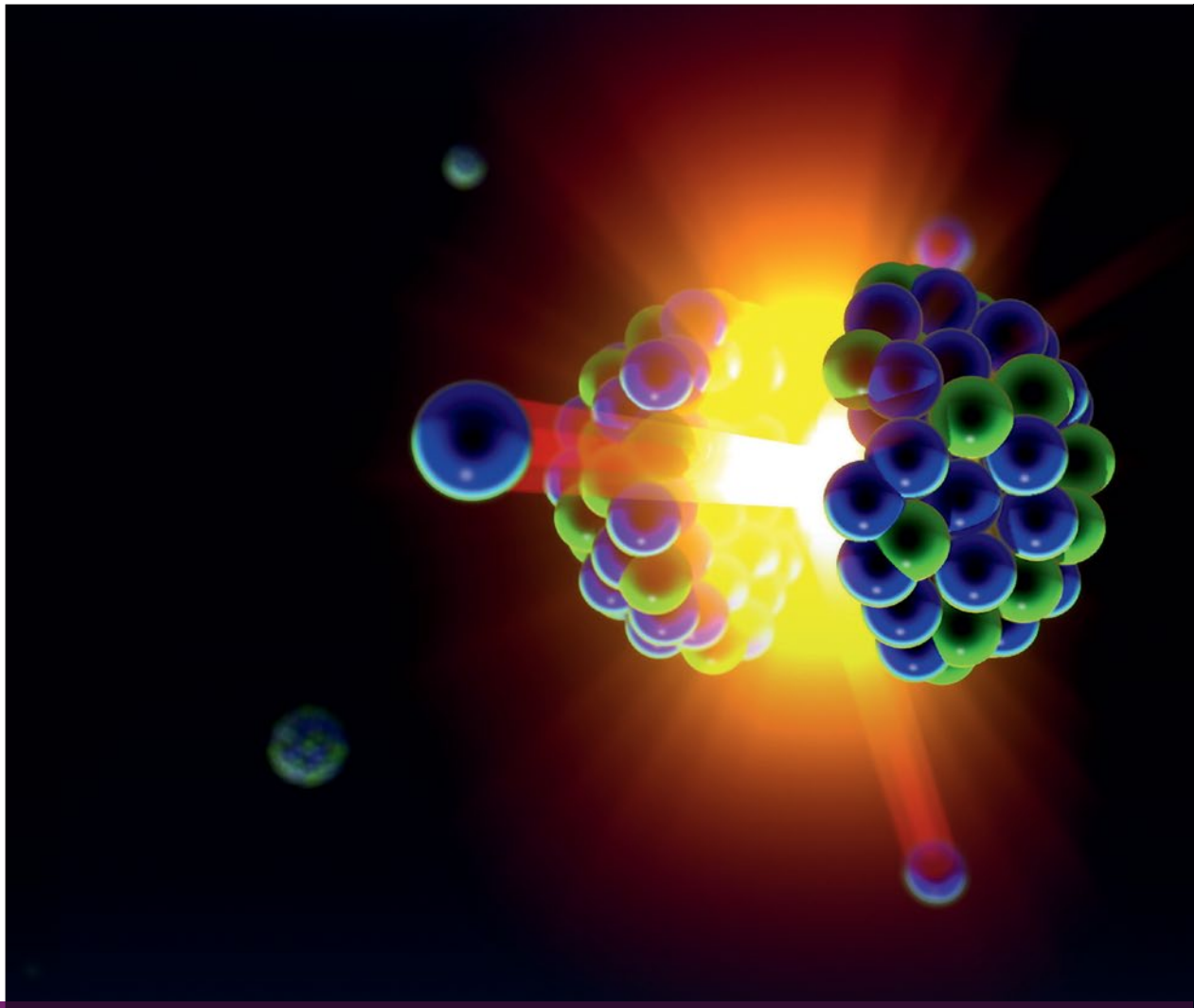
2 https://www.cuttingredtape.gov.au/resources/rpf

against the KPIs can be assessed. The Department's *DFAT Guide to Better Risk Management* was published in May 2015 to set out how the Department will implement the *Commonwealth Risk Management Policy*. ASNO is using this guide to ensure that risk management approaches to nuclear safeguards inspections[3] accord with the policies outlined in DFAT's guide.

3 As recommended by the Australian National Audit Office's 2013 audit of ASNO's management arrangements to meet Australia's obligations under the NPT (see page 53 of ASNO's 2013–14 Annual Report)

Uranium Producers Charge

ASNO is responsible for the Uranium Producers Charge. This charge is payable to Consolidated Revenue on each kilogram of uranium ore concentrate production (set in 2011–12 at 10.3077 cents per kilogram). The total charge levied on 25 November 2014 for uranium production in 2013–14 was $484 489.

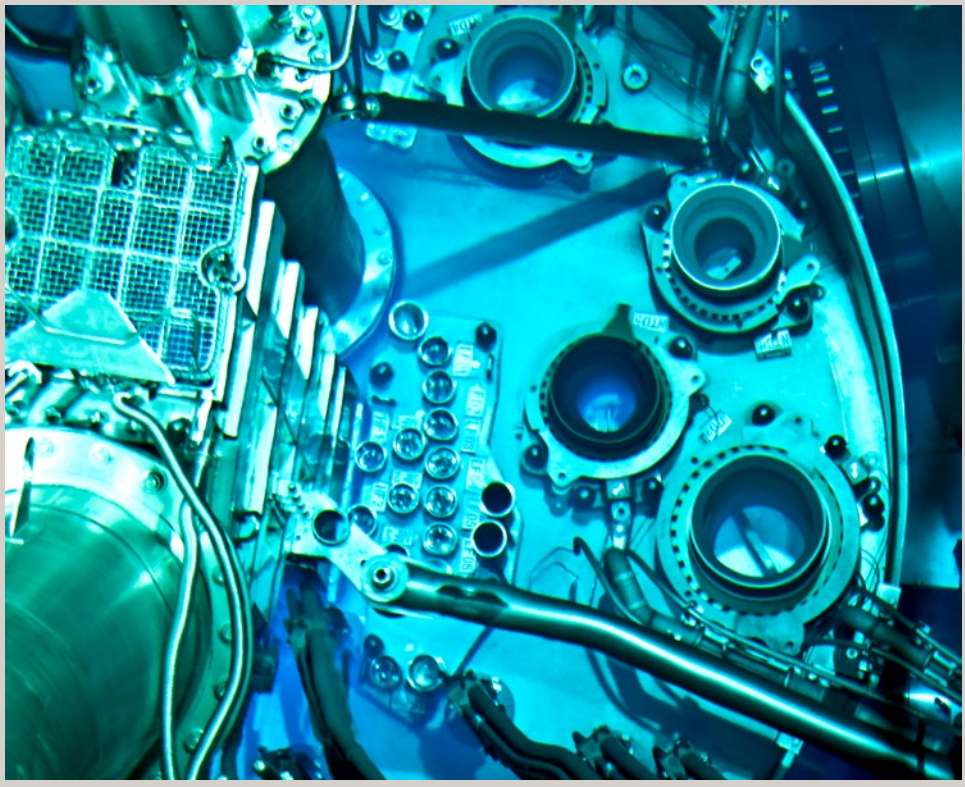


APPENDICES

6

SECTION

Appendices



Appendix A: World Nuclear Energy, 30 June 2015

Table 18: World Nuclear Energy, 30 June 2015[1]

	Operating Reactors		% of Total Electricity in 2014	Reactors under Construction	
	Total	Capacity (GWe)		Total	Capacity (GWe)
United States*	99	98.7	19.5	5	5.6
France*	58	63.1	76.9	1	1.6
Japan*	43	40.3	0.0	2	2.8
Russian Federation*	34	24.7	18.6	9	8.0
Republic of Korea*	24	21.7	30.4	4	5.6
India	21	5.3	3.5	6	4.3
Canada*	19	13.5	16.8	0	0
China*	28	24.0	2.4	24	24.0
United Kingdom*	16	9.9	17.2	0	0
Ukraine	15	13.1	49.4	2	2.0
Sweden*	10	9.7	41.5	0	0
Germany*	8	10.8	15.9	0	0
Spain*	7	7.1	20.4	0	0
Belgium*	7	5.9	47.5	0	0
Czech Republic*	6	3.9	35.8	0	0
Taiwan* [2]	6	5.0	18.9	2	2.7
Switzerland*	5	3.3	37.9	0	0
Finland*	4	2.8	34.7	1	1.7
Hungary*	4	1.9	53.6	0	0
Slovak Republic*	4	1.8	56.8	2	0.9
Pakistan	3	0.7	4.3	2	0.7
Argentina*	3	1.6	4.1	1	0.0
Brazil	2	1.9	2.8	1	1.2
Bulgaria*	2	1.9	33.6	0	0
Mexico*	2	1.3	5.6	0	0
Romania*	2	1.3	18.5	0	0
South Africa	2	1.9	6.2	0	0
Armenia	1	0.4	30.7	0	0
Iran	1	0.9	1.5	0	0
Netherlands*	1	0.5	4.0	0	0
Slovenia*	1	0.7	37.3	0	0
United Arab Emirates*	0	0	0	3	4.0
Republic of Belarus	0	0	0	2	2.2
TOTAL	**438**	**379.6**	**N/A**	**67**	**67.3**

Source: IAEA Power Reactor Information System (PRIS), Reactor Status Reports, as at August 2015, http://www.iaea.org/pris.

(1) Countries having in force bilateral agreements with Australia covering use of AONM are marked with an asterisk. These countries operate 393 power reactors, which produce around 10% of total world electricity and about 94% of world nuclear energy.

(2) Supply of AONM to Taiwan is covered by an agreement between Australia and the United States

Appendix B: Australia's Nuclear Cooperation Agreements

Table 19: Australia's nuclear cooperation agreements at 30 June 2015

Country	Entry into Force
Republic of Korea	2 May 1979
United Kingdom	24 July 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(1)	3 February 2007
Russian Federation	11 November 2010
United States	22 December 2010
Euratom(2)	1 January 2012
United Arab Emirates	14 April 2014

Note: The above list does not include Australia's NPT safeguards Agreement with the IAEA, concluded on 10 July 1974, it also does not include the Nuclear Cooperation Agreement between Australia and India signed on 5 September 2014 which is not yet in force. In addition to the above Agreements, Australia also 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.

(1) Australia has two agreements with China, one covering nuclear material transfers and one covering nuclear cooperation.

(2) Euratom is the atomic energy agency of the European Union. The Euratom agreement covers all 28 member states of the European Union.

Appendix C: Status of Additional Protocols

At 30 June 2015, there were 71 states (plus Taiwan) with significant nuclear activities.[1] Of these states, five were nuclear-weapon states (NWS), 63 were non-nuclear-weapon states (NNWS) party to the NPT, and three were non-NPT Parties.

At 30 June 2015, there were a total of 126 states plus Taiwan with an Additional Protocol in force, an increase of three over the same time last year. Of the 63 NNWS NPT Parties with significant nuclear activities, 51 had an Additional Protocol in force (Table 20).

In the following tables, states with significant nuclear activities are shown in **bold**.

Table 20: States with Additional Protocols in force at 30 June 2015

State			
Afghanistan	**Djibouti**	Kyrgyzstan	**Poland**
Albania	**Denmark**	**Latvia**	**Portugal**
Andorra	Dominican Republic	Lesotho	**Republic of Korea**
Angola	Ecuador	**Libya**	**Romania**
Antigua and Barbuda	El Salvador	**Lithuania**	**Russia**
Armenia	**Estonia**	Luxembourg	Rwanda
Australia	Fiji	Madagascar	Seychelles
Austria	**Finland**	Malawi	Singapore
Azerbaijan	**France**	Mali	**Slovakia**
Bahrain	FYROM	Malta	**Slovenia**
Bangladesh	Gabon	Marshall Islands	**South Africa**
Belgium	The Gambia	Mauritania	**Spain**
Bosnia and Herzegovina	**Georgia**	Mauritius	St Kitts & Nevis
Botswana	**Germany**	**Mexico**	Swaziland
Bulgaria	**Ghana**	Moldova	**Sweden**
Burkina Faso	**Greece**	Monaco	**Switzerland**
Burundi	Guatemala	Mongolia	**Tajikistan**
Cambodia	Haiti	Montenegro	Tanzania
Canada	Holy See	**Morocco**	**Togo**
Central African Republic	**Hungary**	Mozambique	**Turkey**
Chad	Iceland	Namibia	Turkmenistan
Chile	**India**	**Netherlands**	Uganda
China	**Indonesia**	New Zealand	**Ukraine**
Colombia	**Iraq**	Nicaragua	United Arab Emirates
Comoros	Ireland	Niger	**United Kingdom**
Congo, Republic of the	**Italy**	**Nigeria**	**United States of America**
Costa Rica	**Jamaica**	**Norway**	Uruguay
Croatia	**Japan**	Palau	**Uzbekistan**
Cuba	Jordan	Panama	Vanuatu
Cyprus	**Kazakhstan**	Paraguay	**Vietnam**
Czech Republic	Kenya	**Peru**	
DR Congo	Kuwait	**Philippines**	
TOTAL: 126 states (including 51 NNWS with significant nuclear activities), plus Taiwan			

Source: International Atomic Energy Agency, https://www.iaea.org/safeguards/safeguards-legal-framework/additional-protocol/status-of-additional-protocol

1 'Significant nuclear activities' encompasses any amount of nuclear material in a facility or 'location outside a facility' (LOF), or nuclear material in excess of the exemption limits in INFCIRC/153, paragraph 37.

At 30 June 2015, 22 states did not have an Additional Protocol (AP) in force but had signed an AP and or had an AP approved by the IAEA Board of Governors (Table 21).

Table 21: States with an Additional Protocol signed or approved but not in force at 30 June 2015

State			
Algeria	Djibouti	Lao PDR	**Thailand**
Belarus	Guinea	Liechtenstein	Timor-Leste
Benin	Guinea-Bissau	**Malaysia**	Tunisia
Cameroon	Honduras	Myanmar	Zambia
Cape Verde	**Iran**(1)	Senegal	
Côte d'Ivoire	Kiribati	**Serbia**	
TOTAL: 22 states (including 5 NNWS NPT Parties with significant nuclear activities)			

Source: International Atomic Energy Agency, https://www.iaea.org/safeguards/safeguards-legal-framework/additional-protocol/status-of-additional-protocol

(1) Iran implemented its Additional Protocol 'provisionally' from 2003 but 'suspended' this in 2005.

The remaining six NNWS NPT Parties and two non-NPT states with significant nuclear activities had not signed an Additional Protocol (Table 22).

Table 22: States with Significant Nuclear Activities and no additional protocol at 30 June 2015

State			
Argentina	DPRK(1)	Israel (non-NPT)	Syria
Brazil	Egypt	Pakistan (non-NPT)	Venezuela
TOTAL: 8 states (including 6 NPT Parties)			

Source: International Atomic Energy Agency, https://www.iaea.org/safeguards/safeguards-legal-framework/additional-protocol/status-of-additional-protocol

(1) On 10 January 2003, DPRK gave notice of withdrawal from the NPT. Pending clarification of its status, DPRK is counted as an NPT Party.

Appendix D: IAEA Statements of Conclusions for Australia 2014

IAEA inspection regime in Australia

The IAEA conducts verification activities in Australia under the Comprehensive Safeguards Agreement and under the Additional Protocol.

Under the Comprehensive Safeguards Agreement the IAEA conducts inspections to verify nuclear material inventory and facility design features. There are three types of inspections conducted in Australia each year under the Comprehensive Safeguards Agreement:

- **Physical inventory verification (PIV):** a scheduled inspection in a selected material balance area (MBA)[1] to verify the stocktake of physical inventory (known as a physical inventory taking) from that MBA. PIVs involve a more complete verification of nuclear material inventory in the MBA than short notice random inspections. The frequency of PIVs depends on the types and quantities of nuclear material held in each MBA. PIVs are scheduled annually for the OPAL reactor (AS-F) and ANSTO's R&D laboratories (AS-C) and approximately once every two years for ANSTO's storage areas (AS-D). For locations outside of ANSTO (AS-E and ASE1), the IAEA schedules a PIV approximately once every four or five years at one location (usually a university) taken as representative of all locations outside of ANSTO. PIVs for each MBA are scheduled to coincide each year so the IAEA can complete all with one visit to Australia.
- **Short notice random inspection (SNRI):** an inspection called by the IAEA at a random time with limited notice. The IAEA calls an SNRI once or twice each year at the OPAL reactor with three hours' notice to ASNO and ANSTO.
- **Design Information Verification (DIV):** inspection to verify the correctness and completeness of the design features of a facility relevant to the application of safeguards. The IAEA typically conducts one or two DIVs during a SNRI or PIV.

Under the Additional Protocol the IAEA conducts complementary access visits to verify the absence of undeclared nuclear material or activities or to resolve any questions or inconsistencies in the correctness and completeness of Australia's declarations. Complementary Access activities called while inspectors are on the ANSTO site for other inspections can be conducted at any selected building at ANSTO with two hours' notice. Complementary Access activities for locations outside ANSTO (e.g. universities, uranium mines) require a minimum of 24 hours' notice but given the considerable distances in Australia are typically issued with a few days' notice. The IAEA typically conducts one or two complementary access activities in Australia each year.

IAEA conclusions on Australia's compliance

The IAEA's conclusions for Australia are provided at two levels: a component of the overarching findings and conclusions published in the IAEA's Safeguards Statement for 2014 (see Appendix E); 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 2014. Australia was the first country to receive the 'broader

1 Australia's material balance areas for IAEA safeguards purposes are described in table 2.

conclusion' in 2000 and has received it every year since.

The IAEA's statements of conclusions related to inspections in Australia are provided in several ways:

Article 91(a) of Australia's NPT Safeguards Agreement: the results of inspections at individual material balance areas (MBAs)

Article 91(b) of Australia's NPT Safeguards Agreement: the conclusions the IAEA has drawn from its verification activities in Australia for each individual MBA.

(**Statement of results**) of design information verification activities (DIVs)

Article 10.a of the Additional Protocol: Statement on complementary access activities undertaken

Article 10.c of the Additional Protocol: Statement on the conclusions the IAEA has drawn from complementary access activities

Material balance area: AS-A (HIFAR reactor)
Material balance period: N/A (safeguards status: closed down)

Inspection Activity	Date(s) of inspection	Inspection location	Statement of Results	Date statement provided
Design Information Verification	22 April 2015	ANSTO	"Based on the activities conducted and information available, the results of the DIV were satisfactory"	23 July 2015

Material balance area: AS-C (research and development laboratories)
Material balance period: 22 May 2013 – 11 March 2014

Inspection Activity	Date(s) of inspection	Inspection location	Statement of Results	Date statement provided
Physical Inventory Verification	12–13 March 2014	ANSTO	91(a): "Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory"	12 May 2014
Design Information Verification	13 March 2014	ANSTO	"Based on the activities conducted and information available, the results of the DIV were satisfactory"	12 May 2014
91(b) Statement of Conclusions (20 January 2015)			"The IAEA has concluded from its verification activities carried out at AS-C during the material balance period …, 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"	

Material balance area: AS-C (research and development laboratories)
Material balance period: 12 March 2014 – 19 April 2015

Inspection Activity	Date(s) of inspection	Inspection location	Statement of Results	Date statement provided
Physical Inventory Verification	20–21 April 2015	ANSTO	*91(a) Statement not available at time of publication of this Annual Report*[1]	
Design Information Verification	21 April 2015	ANSTO	*DIV Statement not available at time of publication of this Annual Report*[1]	
91(b) Statement of Conclusions		Not available at time of publication of this Annual Report[1]		

(1) Statements will be published, when available, on ASNO's website: http://www.dfat.gov.au/asno.

Material balance area: AS-D (Vault storage)
Material balance period: 19 May 2012 – 21 April 2015

Inspection Activity	Date(s) of inspection	Inspection location	Statement of Results	Date statement provided
Physical Inventory Verification	22 April 2015	ANSTO	*91(a): "Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory"*	
Design Information Verification	22 April 2015	ANSTO	*DIV Statement not available at time of publication of this Annual Report*[1]	
91(b) Statement of Conclusions		Not available at time of publication of this Annual Report[1]		

(1) Statements will be published, when available, on ASNO's website: http://www.dfat.gov.au/asno.

Material balance area: AS-E and ASE1 (other locations)
Material balance period: 1 July 2010 – 30 June 2013

Inspection Activity	Date(s) of inspection	Inspection location	Statement of Results	Date statement provided
Physical Inventory Verification	17 March 2014	Australian National University	*91(a): "Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory"*	29 January 2015
91(b) Statement of Conclusions (20 August 2015)			AS-E: "The IAEA has concluded from its verification activities carried out at AS-E during the material balance period …, 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. However, due to inconsistencies in some State reports, the Material Balance Period could not be closed on time for a positive evaluation of the facility[1]." ASE1: "The IAEA has concluded from its verification activities carried out at ASE1 during the material balance period …, 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"	

(1) The inconsistency referred to related to the aggregated totals in ASNO's reports to the IAEA of enriched uranium across all permit holders in Australia outside of ANSTO. The discrepancy totalled 0.1 grams of elemental uranium weight and 0.01 grams of isotopic weight. These discrepancies have now been corrected in the annual inventory reports ASNO submitted for the period 1 July 2014 to 30 June 2015.

Material balance area: AS-F (OPAL reactor)
Material balance period: 21 May 2013 – 13 March 2014

Inspection Activity	Date(s) of inspection	Inspection location	Statement of Results	Date statement provided
Short notice random inspection	27 November 2013	ANSTO	*91(a): "Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory"*	17 March 2014
Physical Inventory Verification	14 March 2014	ANSTO	*91(a): "Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory"*	12 May 2014
Design Information Verification	14 March 2014	ANSTO	*"Based on the activities conducted and information available, the results of the DIV were satisfactory"*	12 May 2014
91(b) Statement of Conclusions (7 July 2014)			"The IAEA has concluded from its verification activities carried out at AS-F during the material balance period …, 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"	

Material balance area: AS-F (OPAL reactor)
Material balance period: 14 March 2014 – 22 April 2015

Inspection Activity	Date(s) of inspection	Inspection location	Statement of Results	Date statement provided
Short Notice Random Inspection	21 November 2014	ANSTO	*91(a): "Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory"*	6 February 2015
Physical Inventory Verification	23 April 2015	ANSTO	*91(a): "Based on the activities conducted and the information available to date in connection with such activities, the results from this inspection were satisfactory"*	7 September 2015
Design Information Verification	23 April 2015	ANSTO	*"Based on the activities conducted and information available, the results of the DIV were satisfactory"*	7 September 2015
91(b) Statement of Conclusions			*Not available at time of publication of this Annual Report*[1]	

(1) Statements will be published, when available, on ASNO's website: http://www.dfat.gov.au/asno.

Material balance area: AS-H (Synroc Waste Immobilisation Plant) **Material balance period:** N/A (under construction, no nuclear material held)

Inspection Activity	Date(s) of inspection	Inspection location	Statement of Results	Date statement provided
Design Information Verification	15 April 2015	ANSTO	*DIV Statement not available at time of publication of this Annual Report*(1)	

(1) Statements will be published, when available, on ASNO's website: http://www.dfat.gov.au/asno.

Additional Protocol Assessment Period: 1 January 2014 – 31 December 2014

Date of Complementary Access (CA)	Location	10(a) Statement of activities
21 November 2014	Lucas Heights Science and Technology Centre: Buildings 54, 76, 80	"The Agency was able to carry out all planned activities during the CA"
10(c) Statement of Conclusions (9 March 2015)	"The Agency 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 LHSTC – Lucas Heights Science and Technology Centre"	

Additional Protocol Assessment Period: 1 January 2015 – 31 December 2015

Date of Complementary Access (CA)	Location	10(a) Statement of activities
28 April 2015	Four Mile Mine	"The Agency was able to carry out all planned activities during the CA"
10(c) Statement of Conclusions	*Not available at time of publication of this Annual Report*(1)	

(1) Statements will be published, when available, on ASNO's website: http://www.dfat.gov.au/asno.

Appendix E: IAEA Statements of Statement for 2014

In 2014, safeguards were applied for 180 States[1,2] with safeguards agreements in force with the Agency. The Secretariat's findings and conclusions for 2014 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.

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

a. For 65 of these States,[2] 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.

b. For 53 of these States, the Secretariat found no indication of the diversion of declared nuclear material from peaceful nuclear activities. 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 54 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. On this basis, the Secretariat concluded that, for these States, declared nuclear material remained in peaceful activities.

While the Secretariat concluded that, for 2014, declared nuclear material in Iran remained in peaceful activities, it was unable to conclude that all nuclear material in Iran was in peaceful activities.

3. As of the end of 2014, 12 non-nuclear-weapon States party 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, 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 diversion 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 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.
2 And Taiwan, China.

Appendix F: Status of CTBT International Monitoring System Facilities in Australia

Table 23: Status of Australian CTBT IMS FACILITIES at 30 June 2015 [1] [2]

Facility	Status	Operator
Primary Seismic Stations		
Warramunga, NT	Operational and certified against CTBTO standards	ANU
Alice Springs, NT	Operational and certified against CTBTO standards	GA/USA
Stephens Creek, NSW	Operational and certified against CTBTO standards	GA
Mawson, Australian Antarctic Territory	Operational and certified against CTBTO standards	GA
Auxiliary Seismic Stations		
Charters Towers, QLD	Operational and certified against CTBTO standards	GA
Fitzroy Crossing, WA	Operational and certified against CTBTO standards	GA
Narrogin, WA	Operational and certified against CTBTO standards	GA
Infrasound Stations		
Warramunga, NT	Operational and certified against CTBTO standards	ANU
Hobart, TAS	Operational and certified against CTBTO standards	GA
Shannon, WA	Operational and certified against CTBTO standards	GA
Cocos Islands	Operational and certified against CTBTO standards	GA
Davis Station, Australian Antarctic Territory	Procurement of infrastructure components underway	GA
Radionuclide Stations		
Melbourne,[1] VIC	Operational and certified against CTBTO standards	ARPANSA
Perth, WA	Operational and certified against CTBTO standards	ARPANSA
Townsville, QLD	Operational and certified against CTBTO standards	ARPANSA
Darwin,[2] NT	Operational and certified against CTBTO standards	ARPANSA
Cocos Islands	Operational and certified against CTBTO standards	ARPANSA
Macquarie Island, TAS	Operational and certified against CTBTO standards	ARPANSA
Mawson, Australian Antarctic Territory	Operational and certified against CTBTO standards	ARPANSA

Facility	Status	Operator
Radionuclide Laboratory		
Melbourne, VIC	Operational and certified against CTBTO standards	ARPANSA
Hydroacoustic Stations		
Cape Leeuwin, WA	Operational and certified against CTBTO standards	GA

(1) In addition to the IMS particulate monitoring station at Melbourne, an IMS noble gas monitoring system is installed and operating in a testing and evaluation phase.

(2) In addition to the IMS particulate monitoring station at Darwin, an IMS noble gas monitoring system is installed and operating in a testing and evaluation phase.

Appendix G: Australian Nuclear Security Profile

1. International Legal Framework

Instrument	Status	Date
Convention on the Physical Protection of Nuclear Material	Ratified	22/09/1987
+ 2005 Amendment	Ratified	17/07/2008
+ Information pursuant to Article 14.1	Submitted	27/09/1991
	Updated	04/03/2014
International Convention for the Suppression of Acts of Nuclear Terrorism	Ratified	16/03/2012
UNSCR 1540 Committee Approved Matrix	Report submitted	30/12/2010
UNSCR 1540 (S/AC.44/2004/(02)/53)	Report submitted	28/10/2004
UNSCR 1540 (S/AC.44/2004/(02)/53/Add.1)	Report approved	09/11/2005

2. Nuclear Security related Initiatives, Partnerships and Groups

Initiative, Partnership or Group	Status	Year Joined
Global Initiative to Combat Nuclear Terrorism (GICNT)	Founding Member	2006
Global Partnership	Participant	2004
Proliferation Security Initiative	Participant	2003

3. Domestic Nuclear Security

Nuclear Regulatory Authorities	Web-site
Australian Safeguards and Non-Proliferation Office (Nuclear material and nuclear facility security)	www.dfat.gov.au/asno
Australian Radiation Protection and Nuclear Safety Agency (Radioactive sources security and emergency response for the Commonwealth)	www.arpansa.gov.au
Key Legislation (available on www.comlaw.gov.au)	
Nuclear Non-Proliferation (Safeguards) Act 1987	
Australian Radiation Protection and Nuclear Safety Act 1998	
Weapons of Mass Destruction Act 1995	
Customs Act 1901	
Customs (Prohibited Imports) Regulations 1956	
Customs (Prohibited Exports) Regulations 1958	
Implementation	
IAEA Recommendations	Implementation of INFCIRC/225/Rev.5 (NSS-13) is a licence requirement for all nuclear facilities.
Design Basis Threat	Year of revisions: 2012, 2002, 1990.

4. Radioactive Sources

Item	Status
Support for Code of Conduct on the Safety and Security of Radioactive Sources	Australian support confirmed through political commitment pursuant to GC(47)/RES/7
Supplementary Guidance on the Import and Export of Radioactive Sources	Australian support confirmed through political commitment pursuant to GC(48)/RES/10
National Register	National sealed sources register: Category 1 and 2 sources.

5. Peer review

Type	Years
International Physical Protection Advisory Service (IPPAS)	November 2013
US Bilateral Security Visits pursuant to Australia-US Nuclear Cooperation Agreement	1976, 1987, 1991, 1997, 2003, 2005, 2013
Integrated Regulatory Review Service (IRRS)	2007, 2011

6. Nuclear Forensics and Detection

Type	Status	Years
GICNT Nuclear Forensics Working group	Chair	2010 – present
GICNT Response and Mitigation Working Group	Participant	2011 – present
GICNT Nuclear Detection Working Group	Participant	2010 – present
Nuclear Forensics International Technical Working Group (ITWG)	Participant	2003 – present

7. Major Support and Involvement with the IAEA

Activity	Detail	Year(s)
Advisory Group on Nuclear Security (AdSec)	Member	2013 – present
Nuclear Security Guidance Committee (NSGC)	Member	2012 – present
Emergency Preparedness and Response Expert Group	Member	2012 – present
IAEA Coordinated Research Project on Identification of High Confidence Nuclear Forensic Signatures for the Development of Nuclear Forensic Libraries	Participant	2012 – present
IAEA Radioactive Source Security Working Group	Member	2012 – present
Code of Conduct on the Safety and Security of Radioactive Sources	Chairs experts group on information exchange	2007 – present
Development and review of Nuclear Security Series documents	Expert consultant	2003 – present
Incident & Trafficking Database	Member	1995 – present
Analytical Laboratories for the Measurement of Environmental RadioActivity (ALMERA)	Member	1995 – present
Nuclear Security Fund	Contributor	2002, 2006, 2007, 2009, 2013, 2014
International Physical Protection Advisory Service (IPPAS) Missions	Team members	2002, 2003, 2005(2), 2013(2), 2014(2).
Regional IAEA Nuclear Security Training Courses and other courses led by IAEA Office of Nuclear Security	Expert Consultants and Presenters	Ongoing

Activity	Detail	Year(s)
Major Past Activities		
IAEA Coordinated Research Project on Application of Nuclear Forensics in Illicit Trafficking of Nuclear and other Radioactive Material	Participant	2008 – 2011
Amendment to the Convention on Physical Protection of Nuclear Material	Chaired Committee of the Whole at the Diplomatic Conference	2005
Code of Conduct on the Safety and Security of Radioactive Sources	Chaired negotiation of Code and Export/Import Guidance	2000 – 2004

8. Contributions to Outreach and Capacity Building

Activity/Event	Date
Events	
National Workshop on IPPAS Missions – Kuala Lumpur, Malaysia	June 2015
GICNT "Sugong Bagani: Envoy Warrior" workshop and exercise, Manila	April 2015
Nuclear Security Summit Drafting Group Meeting on Action Plan for IAEA, Canberra	April 2015
AISC Program: Nuclear Forensics: Enhancing nuclear security in Indonesia through knowledge sharing	December 2014
15th Ministerial Level Meeting of the Forum for Nuclear Cooperation in Asia (FNCA), Sydney	November 2014
4th Workshop on Nuclear Security and Safeguards Project, Forum for Nuclear Cooperation in Asia (FNCA), Daejeon, Korea	November 2014
Regional Workshop on Integrated Nuclear Security Support Plans, Yogyakarta, Indonesia	August 2014
National Workshop on IPPAS Missions – Jakarta, Indonesia	July 2014
ANSTO/BATAN Information exchange on nuclear forensics	June 2014
Fourth Regional Review Meeting on Radioactive Source Security, Thailand	February 2014
GICNT Joint Working Group Activity "Tiger Reef" on Radiological Crime Scene Management, Malaysia	February 2014
IAEA training course on Nuclear Forensics Methodologies	October 2013
IAEA ANSN training course on Preparation, Conduct and Evaluation of exercises for nuclear safety and security events at nuclear facilities, Indonesia	September 2013
2nd ASEAN Regional Forum Workshop on Nuclear Forensics	September 2013
Technical Visit to Australia on the Implementation of Nuclear Security for the Uranium Industry	June 2013
IAEA Regional Workshop on nuclear security for Pacific Island States, Fiji	April 2013
IAEA regional workshop on the nuclear security in the transport of nuclear material, Sydney.	December 2012
ASEAN Regional Forum Workshop on Nuclear Forensics	December 2012
IAEA regional workshop on IPPAS missions, Sydney.	November 2012
GICNT Nuclear Forensics workshop Iron Koala: Information Sharing during Nuclear Smuggling Events	May 2012
IAEA Regional Workshop on Radiological Crime Scene Management and Introduction to Nuclear Forensics	March 2012
GICNT activity Discex Hermes: Public Messaging	November 2011

Activity/Event	Date
Programs	
Informal working group on nuclear security (Asia-Pacific Safeguards Network)	2011 – present
Regional Security of Radioactive Sources Project	2004 – 2013
IAEA regional training courses on nuclear security of research facilities held in Australia	2004, 2006, 2009
IAEA regional training courses on nuclear forensics and radiological crime scene management	2008 – present

Appendix H: 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 http://www.dfat.gov.au/foi/ips.html.

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. These include:

- Stephan Bayer, Australia's IPPAS experience. Presentation at the National Workshop on IPPAS missions, Jakarta, Indonessia 14–16 July 2014
- Stephan Bayer, Legal framework and responsibilities for safeguards in Australia and Implementation Practices in the Asia-Pacific Related to Establishing State Safeguards Infrastructure. Two presentations at 4th Workshop on Nuclear Security and Safeguards Project, Forum for Nuclear Cooperation in Asia (FNCA), Daejeon, Korea, 5–7 November 2014
- Stephan Bayer, Role of Australian Safeguards and Non-Proliferation Office. Presentation at the ANSTO-BATAN Cooperation on Nuclear Forensics Knowledge Sharing Second Workshop, Sydney, 10–12 December 2014
- Stephan Bayer, Australia's IPPAS experience. Presentation at the National Workshop on IPPAS missions, Kuala Lumpur, Malaysia 6–12 June 2015
- Michael East, Australia's Assistance for Nuclear Security in Asia. Presentation at the Regional Workshop on Integrated Nuclear Security Support Plans, Yogyakarta, Indonesia, 19–21 August 2014
- Michael East, Uranium Transport Security and Maritime Piracy. Presentation at the AusIMM International Uranium Conference, Adelaide, 10 June 2015
- Jodie Evans, Role of Australian Safeguards and Non-Proliferation Office. Presentation at the Women in Nuclear Conference, Sydney, 21 October 2014
- Jodie Evans, Role of Australian Safeguards and Non-Proliferation Office. Presentation at the International Training Course on State Systems of Accounting for and Control of Nuclear Material, Oak Ridge, Tennessee, USA, 26 April to 8 May 2015
- Craig Everton, IAEA Nuclear Safeguards – Overview – International-level, Asia-Pacific, Australia, Presentation at Asia-Pacific Model United Nations Conference 2014, Brisbane, 28 June – 5 July 2014
- Craig Everton, Rob Floyd, Accountability and Transparency – Essential Underpinnings of Quality Safeguards, Presentation at IAEA Safeguards Symposium, Vienna, Austria 20–24 October 2014
- Craig Everton, Implementation Practices in the Asia-Pacific Related to Establishing State Safeguards Infrastructure, Presentation at IAEA Safeguards Symposium, Vienna, Austria 20–24 October 2014

- Craig Everton, Introduction to IAEA Safeguards. Presentation at Kokoda Foundation Future Strategic Leaders' Congress on Australia's Role in Addressing Global Nuclear Security Challenges, Kioloa, NSW, 7–9 November 2014
- Craig Everton, IAEA Safeguards – Limitations and Challenges for "Future Strategic Leaders". Presentation at Kokoda Foundation Future Strategic Leaders' Congress on Australia's Role in Addressing Global Nuclear Security Challenges, Kioloa, NSW, 7–9 November 2014
- Craig Everton, Australia's Regulatory Perspective – Security and Export Controls on Uranium Production, Transport and Export for Conventional and Non-Conventional Resources. Presentation at IAEA Regional Workshop on Implementing Prudent Management Practices for Uranium Ore Concentrates, Livingstone, Zambia, 8–12 June 2015
- Rob Floyd, Craig Everton, Susi Lestari (Indonesian Nuclear Energy Regulatory Agency, BAPETEN), Promoting Safeguards Best Practice through the Asia-Pacific Safeguards Network (APSN), Presentation at IAEA Safeguards Symposium, Vienna, Austria 20–24 October 2014
- Martin Lyons, Physical Protection of Uranium Ore Concentrates in Australia: Maintaining appropriate security standards through the highs and lows. Presentation at the Friends of Responsible Uranium Mining, Vienna, Austria, 24 September, 2014
- Josy Meyer, Chemical Security – Australia's Experience. Presentation on behalf of the Attorney-General's Department at an OPCW Symposium on Bridging International Gaps in Chemical Security Symposium, The Hague, Netherlands 26 November 2014
- Josy Meyer, The CWC and regulatory requirements for importers of Schedule 2 and Schedule 3 Chemicals. Presentation to various importers during on-site visits, Perth, 29 May 2015
- Josy Meyer, The CWC and regulatory requirements for Schedule 3 and Discrete Organic Chemical Production Facilities. Presentation to CWC-Scheduled chemical facility during on-site visit, Perth, 29 May 2015
- Vanessa Robertson, Australian Nuclear Cooperation Agreements. Presentation at the US Nuclear Materials Management and Safeguards System (NMMSS) Annual Conference, Las Vegas, USA 11–14 May 2015
- Tammy de Wright, Additional Protocol and uranium mining: Experience from Australia. Presentation at the International Training Course on State Systems of Accounting for and Control of Nuclear Material, 1–12 December, 2014.

List of Requirements

This list is prepared from the checklist of annual report requirements set out in Attachment F to the Requirements for Annual Reports for Departments, Executive Agencies and FMA Act Bodies as approved by the Joint Committee of Public Accounts and Audit under subsections 63(2) and 70(2) of the Public Service Act 1999 on 29 May 2014.

Description	Requirement	Location
Letter of transmittal	Mandatory	
Table of contents	Mandatory	
Index	Mandatory	
Glossary	Mandatory	
Contact officer(s)	Mandatory	
Internet home page address and Internet address for report	Mandatory	
Review by Statutory officer		
Review by statutory office holder	Mandatory	
Summary of significant issues and developments	Suggested	
Overview of department's performance and financial results	Suggested	N/A
Outlook for following year	Suggested	ASNO
Significant issues and developments – portfolio	Portfolio departments – suggested	N/A
Departmental Overview		
Role and functions	Mandatory	ASNO
Organisational structure	Mandatory	ASNO
Outcome and program structure	Mandatory	ASNO
Where outcome and program structures differ from PB Statements/PAES or other portfolio statements accompanying any other additional appropriation bills (other portfolio statements), details of variation and reasons for change	Mandatory	N/A
Portfolio structure	Mandatory for portfolio departments	DFAT
Report on Performance		
Review of performance during the year in relation to programs and contribution to outcomes	Mandatory	ASNO
Actual performance in relation to deliverables and KPIs set out in PB Statements/PAES or other portfolio statements	Mandatory	DFAT
Where performance targets differ from the PBS/ PAES, details of both former and new targets, and reasons for the change	Mandatory	N/A
Narrative discussion and analysis of performance	Mandatory	ASNO
Trend information	Mandatory	ASNO
Significant changes in nature of principal functions/ services	Suggested	ASNO
Performance of purchaser/provider arrangements	If applicable, suggested	ASNO
Factors, events or trends influencing departmental performance	Suggested	N/A
Contribution of risk management in achieving objectives	Suggested	N/A
Performance against service charter customer service standards, complaints data, and the department's response to complaints	If applicable, mandatory	N/A

Description	Requirement	Location
Discussion and analysis of the department's financial performance	Mandatory	ASNO
Discussion of any significant changes in financial results from the prior year, from budget or anticipated to have a significant impact on future operations	Suggested	N/A
Agency resource statement and summary resource tables by outcomes	Mandatory	DFAT
Management and Accountability		
Corporate Governance		
Agency heads are required to certify that their agency comply with the Commonwealth Fraud Control Guidelines.	Mandatory	DFAT
Statement of the main corporate governance practices in place	Mandatory	DFAT
Names of the senior executive and their responsibilities	Suggested	ASNO
Senior management committees and their roles	Suggested	N/A
Corporate and operational planning and associated performance reporting and review	Suggested	DFAT
Internal audit arrangements including approach adopted to identify areas of significant financial or operational risk and management to manage those risks	Suggested	DFAT
Policy and practices on the establishment and maintenance of appropriate ethical standards	Suggested	DFAT
How nature and amount of remuneration for SES officers is determined	Suggested	ASNO
External Scrutiny		
Significant developments in external scrutiny	Mandatory	DFAT
Judicial decisions and decisions of administrative tribunals and by the Australian Information Commissioner	Mandatory	DFAT
Reports by the Auditor-General, a Parliamentary Committee or the Commonwealth Ombudsman or an agency capability review	Mandatory	DFAT
Management of Human Resources		
Assessment of effectiveness in managing and developing human resources to achieve departmental objectives	Mandatory	DFAT
Workforce planning, staff retention and turnover	Suggested	ASNO
Impact and features of enterprise or collective agreements, individual flexibility arrangements (IFAs), determinations, common law contracts and AWAs	Suggested	DFAT
Training and development undertaken and its impact	Suggested	ASNO
Work health and safety performance	Suggested	DFAT
Productivity gains	Suggested	DFAT
Statistics on staffing	Mandatory	ASNO
Enterprise or collective agreements, IFAs, determinations, common law contracts and AWAs	Mandatory	DFAT
Performance pay	Mandatory	DFAT
Assets Management		
Assessment of effectiveness of assets management	If applicable, mandatory	DFAT
Purchasing		
Assessment of purchasing against core policies and principles	Mandatory	DFAT
Consultants		

Description	Requirement	Location
The annual report must include a summary statement detailing the number of new consultancy services contracts let during the year; the total actual expenditure on all new consultancy contracts let during the year (inclusive of GST); the number of ongoing consultancy contracts that were active in the reporting year; and the total actual expenditure in the reporting year on the ongoing consultancy contracts (inclusive of GST). The annual report must include a statement noting that information on contracts and consultancies is available through the AusTender website.	Mandatory	DFAT
Australia National Audit Office Access Clauses		
Absence of provisions in contracts allowing access by the Auditor-General	Mandatory	DFAT
Exempt Contracts		
Contracts exempt from the AusTender	Mandatory	DFAT
Financial Statements		
Financial Statements	Mandatory	DFAT
Other Mandatory Information		
Work health and safety (Schedule 2, Part 4 of the Work Health and Safety Act 2011)	Mandatory	DFAT
Advertising and Market Research (Section 311A of the Commonwealth Electoral Act 1918) and statement on advertising campaigns	Mandatory	DFAT
Ecologically sustainable development and environmental performance (Section 516A of the Environment Protection and Biodiversity Conservation Act 1999)	Mandatory	DFAT
Compliance with the agency's obligations under the Carer Recognition Act 2010	If applicable, mandatory	DFAT
Grant programs	Mandatory	DFAT
Disability reporting – explicit and transparent reference to agency-level information available through other reporting mechanisms	Mandatory	DFAT
Information Publication Scheme statement	Mandatory	ASNO
Correction of material errors in previous annual report	If applicable, mandatory	N/A
Agency Resource Statements and Resources for Outcomes	Mandatory	
List of Requirements	Mandatory	ASNO

Glossary

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.
ANSTO	Australian Nuclear Science and Technology Organisation
APSN	Asia-Pacific Safeguards Network
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ASSP	Australian Safeguards Support Program
Australian Obligated Nuclear Material (AONM)	Australian uranium and nuclear material derived therefrom, which is subject to obligations pursuant to Australia's bilateral safeguards agreements.
BAPETEN	Indonesian Nuclear Energy Regulatory Agency (Badan Pengawas Tenaga Nuklir)
BWC	Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction. Also known as the Biological Weapons Convention.
Challenge Inspection	(For CWC purposes) an inspection, requested by a CWC State Party, of any facility or location in the territory or in any other place under the jurisdiction or control of another State Party.
Complementary Access	The right of the IAEA, pursuant to the Additional Protocol, for access to a site or location to carry out verification activities.
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.
Concise Note	Supplementary explanatory notes on formal reports from a national safeguards authority to the IAEA.
Conversion	Purification of uranium ore concentrates or recycled nuclear material and conversion to a chemical form suitable for isotopic enrichment or fuel fabrication.
CPPNM	Convention on the Physical Protection of Nuclear Material
CTBT	Comprehensive Nuclear-Test-Ban Treaty
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization. The Vienna-based international organisation established at entry into force of the CTBT to ensure the implementation of its provisions.
Customs	Australian Customs & Border Protection Service
CWC	Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction. Also known as the Chemical Weapons Convention.
CWC-Scheduled Chemicals	Chemicals listed in the three Schedules 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).
Department of Defence	Australian Department of Defence
Depleted Uranium (DU)	Uranium with a ^{235}U content less than that found in nature (e.g. as a result of uranium enrichment processes).
DFAT	Department of Foreign Affairs and Trade
Direct-Use Material	Nuclear material defined for safeguards purposes as being usable for nuclear explosives without transmutation or further enrichment, e.g. plutonium, HEU and ^{233}U.

Discrete Organic Chemical (DOC)	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.
DOE	United States Department of Energy
DPRK	Democratic People's Republic of Korea
DSTO	Defence Science and Technology Organisation
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 LEU fuel 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 and the United Kingdom.
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 (e.g. ^{233}U, ^{235}U, ^{239}Pu and ^{241}Pu).
Fissile Material Cut-off Treaty (FMCT)	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 by a neutron. In a fission reaction, a neutron collides with a fissile nuclide (e.g. ^{235}U) that then splits, releasing energy and further neutrons. Some of these neutrons may 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 (e.g. ^{233}U, ^{235}U, ^{238}U, ^{239}Pu, ^{240}Pu, ^{241}Pu and ^{242}Pu).
Full-Scope Safeguards	The application of IAEA safeguards to all of a state's present and future nuclear activities. Now more commonly referred to as comprehensive safeguards.
GA	Geoscience Australia
GW	Gigawatt (Giga = billion, 109)
GWe	Gigawatts of electrical power
GWt	Gigawatts of thermal power
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.
HIFAR	High Flux Australian Reactor. The 10 MWt research reactor located at ANSTO, Lucas Heights. 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	Term referring to underwater propagation of pressure waves (sounds). One category of CTBT IMS station monitoring changes in water pressure generated by sound waves in the water.
IAEA	International Atomic Energy Agency
Indirect-Use Material	Nuclear material that cannot be used for a nuclear explosive without transmutation or further enrichment (e.g. depleted uranium, natural uranium, LEU and thorium).
INFCIRC	IAEA Information Circular. A series of documents published by the IAEA setting out, inter alia, safeguards, physical protection and export control arrangements.
INFCIRC/153 (Corrected)	The model agreement used by the IAEA as a basis for comprehensive safeguards agreements with non-nuclear-weapon states party to the NPT.
INFCIRC/225 Rev.5 (Corrected)	IAEA document entitled '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 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.
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.
Inventory Change Report (ICR)	A formal report from a national safeguards authority to the IAEA on changes to nuclear materials inventories in a given period.
Isotopes	Nuclides with the same number of protons, but different numbers of neutrons, e.g. ^{235}U (92 protons and 143 neutrons) and ^{238}U (92 protons and 146 neutrons). The number of neutrons in an atomic nucleus, while not significantly altering its chemistry, does alter its properties in nuclear reactions. As the number of protons is the same, isotopes are different forms of the same chemical element.
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 material balance area can be determined; and (b) The physical inventory of nuclear material in the material balance area 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.
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%.
Moata	Small training reactor previously located at Lucas Heights.
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.
MUF	Material Unaccounted For. 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.
MWe	Megawatts of electrical power
MWt	Megawatts of thermal power
Natural uranium	In nature, uranium consists predominantly of the isotope ^{238}U (approx. 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.
NPT	Treaty on the Non-Proliferation of Nuclear Weapons
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 United States, Russia, the United Kingdom, France and China.
Nuclide	Nuclear species characterised by the number of protons (atomic number) and the number of neutrons. The total number of protons and neutrons is called the mass number of the nuclide.
Old Chemical Weapons (OCW)	Defined under the Chemical Weapons Convention as: a) chemical weapons produced before 1925; or b) 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.
OPAL	Open Pool Australian Light-Water reactor. 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.
OPCW	Organisation for the Prohibition of Chemical Weapons
Other Chemical Production Facility (OCPF)	Defined under the Chemical Weapons Convention as all plant sites that: a) produced by synthesis during the previous calendar year more than 200 tonnes of unscheduled discrete organic chemicals; or b) 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).

PrepCom	Preparatory Commission. In this report the term is used for the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization.
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.
PTS	Provisional Technical Secretariat for the CTBTO Preparatory Commission
^{239}Pu	An isotope of plutonium with atomic mass 239 (94 protons and 145 neutrons). The fissile isotope of plutonium most suitable for nuclear weapons.
R&D	Research and Development
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 will 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, 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 Agency inspections and complementary access in Australia.
Schedule 2A/2A*	These are toxic Part A Schedule 2 chemicals (2A: Amiton and PFIB, 2A*: BZ) listed under the CWC.
Seismic	Referring to the movements of the ground that can be generated by earthquakes, explosions etc. The seismic element of the CTBT monitoring system 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 uranium-235; thorium; or any of the foregoing in the form of metal, alloy, chemical compound, or concentrates.
Special Fissionable Material	Plutonium-239; uranium-233; uranium enriched in the isotopes 235 or 233; any material containing one or more of the foregoing. The term special fissionable material does not include source material.
Standing Advisory Group on Safeguard Implementation (SAGSI)	An international group of experts appointed by, and advising, the IAEA Director General on safeguards implementation matters.
^{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.
UNSCR	United Nations Security Council Resolution
Uranium ore concentrate (UOC)	A commercial product of a uranium mill 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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