Australian Government

Australian Safeguards and Non-Proliferation Office

ANNUAL REPORT 2012–2013

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Australian Government

Australian Safeguards and Non-Proliferation Office

ANNUAL REPORT 2012–2013

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Annual Report:	http://www.dfat.gov.au/asno/annual_reports.html

ISSN 1442 7699
ISBN 978–1–74322–114–3

Australian Government

Australian Safeguards and Non-Proliferation Office

7 October 2013

The Hon Julie Bishop MP
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 2013. 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

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GUIDE TO THE REPORT

This report complies with the formal reporting obligations of the Director General ASNO. It also 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 2012–13 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 2012–13
- the 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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IAEA Director-General Yukiya Amano receiving a tour of the OPAL reactor at ANSTO's Lucas Heights facility, October 2012. (Image: ANSTO)

DIRECTOR-GENERAL'S REPORT

SECTION 1

Safeguards ***Nuclear*** OPCW **Non-Proliferation** ***Chemical*** IAEA **Security** CTBTO ***Nuclear*** CTBTO ***Chemical*** **Security** **Safeguards** OPCW ***Nuclear*** **Non-Proliferation** ***Chemical*** **Non-Proliferation** IAEA ***Nuclear*** ***Chemical*** **Security** CTBTO **Safeguards** OPCW **Securi** ***Chemical*** **Safeguards** OPCW **Security** **Non-Proliferation** ***Chemical*** IAEA ***Nuclear*** OPCW ***Nuclear*** **Non-Proliferation** IAEA ***Chemical*** **Security** CTBTO ***Chemical*** **Safeguard** **Security** CTBTO ***Chemical*** ***Nuclear*** OPCW **Safeguards** IAEA ***Nuclear*** CTBTO ***Cher*** ***Nuclear*** IAEA **Security** CTBTO ***Chemical*** ***Nuclear*** **Non-Proliferation** **Security** OPCW

DIRECTOR GENERAL'S REPORT

The Year in Review

The International Non-Proliferation Environment

Nuclear Security and Safeguards Developments

Comprehensive Nuclear-Test-Ban Treaty Developments

Chemical Weapons Convention Developments

Other Non-Proliferation Developments

The Year Ahead

DIRECTOR-GENERAL'S REPORT

The Year In Review

The International Non-Proliferation Environment

The international non-proliferation framework continues to be widely supported by most countries. There is close cooperation on a range of non-proliferation issues. One example was the Third Review Conference of the Chemical Weapons Convention (CWC) in April 2013 which was attended by delegations from 122 of the then 188 States Parties to the CWC. Non-proliferation obligations and norms have created a system where compliance is the overwhelming standard practice, and states take their non-proliferation credibility seriously. This is evidenced by the steady progress towards universality of important agreements, such as an Additional Protocol with the IAEA, the Comprehensive Nuclear Test Ban Treaty (CTBT) and the CWC.

A positive development in the international non-proliferation arena was the announcement by the Myanmar Government in November 2012 that it intends to sign an Additional Protocol and a Modified Small Quantities Protocol with the International Atomic Energy Agency (IAEA). Once ratified, the Additional Protocol will equip the IAEA to provide assurance of the absence of undeclared nuclear materials and activities in Myanmar. Myanmar has also been cooperating with the IAEA in training and preparation for implementing IAEA safeguards under the Additional Protocol. This is a positive step towards transparency on nuclear issues for Myanmar and is also a key development in the country's moves towards democracy and openness.

However, despite these positive developments, the international non-proliferation framework has faced another year of challenges. Some of these challenges are long-running issues, such as the progress of Iran's nuclear program in defiance of United Nations (UN) Security Council resolutions. Other non-proliferation issues were marked by escalations such as the rocket and nuclear tests by the Democratic People's Republic of Korea (DPRK) and the alleged use of chemical weapons in Syria during that country's civil war. These escalations have exacerbated tense and deadly situations in their respective regions, making the task of finding solutions – or in the case of Syria, finding peace – more complicated.

In late 2012, tensions on the Korean Peninsula again escalated when, in December, the DPRK launched a long-range rocket despite UN Security Council resolutions calling for a halt to missile-related activity. This rocket launch was in conjunction with increased provocative rhetoric by the DPRK, threatening war against the United States and its allies. Then, on 12 February 2013, the DPRK conducted its third nuclear test. The test occurred at Punggye, which was the site of the DPRK's 2006 and 2009 tests. The approximately 5 kiloton explosion, though the DPRK's largest to date, was relatively small, it was quickly detected by monitoring stations in the Comprehensive Nuclear-Test-Ban Treaty network, including several in Australia (see article on page 17). North Korea's claim of successfully testing 'a smaller and light' device has raised questions about the nuclear material used in the test and whether the device is able

to fit onto a missile warhead. However, there is little information about the nature of the test, so there has been no means to substantiate the DPRK's claim to have constructed and tested a miniaturised device or what nuclear material was used.

Iran has continued in its non-compliance with UN Security Council resolutions and its safeguards agreement with the IAEA. These require Iran to cease all reprocessing, heavy-water and enrichment-related activities. However, Iran has continued to increase both its enrichment capacity and capability, continued the production of low enriched uranium (including uranium enriched to just below 20 per cent) and continued the construction of the IR-40 heavy water reactor at Arak. Furthermore, there has been no progress resolving the possible military dimensions of Iran's nuclear program. The IAEA remains unable, in part due to the lack of cooperation by Iran, to provide credible assurance of the absence of undeclared nuclear material and activities in Iran.

During the ongoing conflict in Syria, both government and anti-government groups accused the other of using chemical weapons. Following mounting evidence of chemical weapons' use by Government forces, the UN subsequently received a request from Syrian authorities for a 'specialised, impartial and independent mission' to investigate the alleged use of chemical weapons near the city of Aleppo. UN Secretary General Ban Ki-moon launched an investigation of all allegations of chemical weapons use in Syria (outlined on page 20). The UN investigation team would include representatives from the Organisation for the Prohibition of Chemical Weapons (OPCW) and the World Health Organization. At the time of writing, the Terms of Reference for the UN mission, including sites to be visited, had yet to be finalised with the Syrian Government.

Although not a CWC State Party, Syria is still bound not to use chemical weapons as State Party to the 1925 Geneva Protocol. The risk of further chemical weapons use in Syria, or their falling into the hands of terrorists, remains cause for grave concern. In 2012, the Australia Group of members dedicated to preventing the proliferation of chemical and biological weapons, chaired on a permanent basis by Australia, took the unprecedented step of instituting a Syrian-specific export control list, and in January 2013 issued a 'statement of concern' urging all countries to intensify scrutiny of exports to Syria, including to guard against that country's ongoing procurement activities.

Nuclear Security and Safeguards Developments

International Atomic Energy Agency Safeguards

At the practical implementation level, good progress was made in strengthening the IAEA safeguards system. The number of countries that have brought an Additional Protocol into force – the safeguards strengthening instrument that gives the IAEA greater access to locations and information in states – continued to increase. As at 30 June 2013 there were 120 countries with an Additional Protocol in force (up from 116 at 30 June 2012) and 22 that had been signed or approved by the IAEA Board of Governors. The new adherents to the Additional Protocol are Iraq, Togo, Vanuatu, and Vietnam. Of the 63 non-nuclear weapon states with significant nuclear activities that are a Party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), 56 (or 89 per cent) have an Additional Protocol in force. The Additional Protocol is firmly established as part of the NPT comprehensive safeguards standard. As a result of implementing Additional Protocols, the IAEA reported in its Safeguards Statement for 2012 that 60 states (up from 57 at 30 June 2012) had drawn the 'broader conclusion',

i.e. that not only was there no indication of the diversion of declared nuclear material, but it had found no indication of undeclared nuclear material or activities, and therefore concluded that all nuclear material in these countries remained in peaceful activities.

An important achievement in the reporting period was the adoption at the September 2012 IAEA General Conference of a 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). In 2011 the conference failed for the first time to agree a Safeguards Resolution, which was a disappointing outcome. While these resolutions do not bind the IAEA, they give endorsements and directions from Member States to the IAEA on this fundamentally important component of non-proliferation architecture. In 2012, the delegates at the General Conference did manage to find enough common ground on the key principles of safeguards to agree to a resolution, but as outlined below this was not without controversy (and on page 73).

In 2012–13, the IAEA continued its development (which began in 2010) of the state-level concept for safeguards implementation, with the expectation that it will be fully implemented for states with a comprehensive safeguards agreement by 2014. The state-level concept uses evaluation methodologies within the IAEA's mandate to improve the efficiency and effectiveness of safeguards implementation and evaluation by taking greater account of all available safeguards information on a state. This contrasts with the traditional approach that used criteria-based primarily on facility and nuclear material types and quantities. This approach had become detrimental to the efficient use of IAEA resources. This was discussed in detail on pages 15–17 of the 2010–11 ASNO Annual Report. ASNO contributed to the development of the state-level concept through its participation in the Director General's Standing Advisory Group on Safeguards Implementation and through presenting on this subject at international meetings. Additionally, as chair of the Asia-Pacific Safeguards Network (APSN), ASNO facilitated broader discussions on this topic between the IAEA and the safeguards regulatory authorities in the Asia-Pacific region.

In 2012, some states began to express concerns with the development of the state-level concept, arguing that the expansion of state-level approaches to all states required approval from the Board of Governors. Debate on this featured prominently in the negotiations of the Safeguards Resolution at the IAEA General Conference in September 2012. It was challenging to find an appropriate accommodation on this issue that balanced the desire of many states for the resolution to give adequate support to the IAEA's use of the state-level concept and the concerns of other states with the broader application of the concept. It was resolved by the inclusion in the resolution of a direct request to the IAEA Secretariat 'to report to the Board of Governors on the conceptualisation and development of the State-level concept for safeguards'. It is important to note that this request was not for the Secretariat to seek approval from the Board of Governors, as taking a state-level approach is well within the IAEA's mandate and the central elements have been endorsed by Member States at various times over several years. But when the report is presented, it will be an opportunity for states with concerns to discuss this with other Member States and the Secretariat with the benefit of a full explanation.

Regional Developments

The Asia-Pacific Safeguards Network met for its 3rd plenary meeting in Bangkok on October 2012. The plenary meeting was attended by 11 countries plus the IAEA. The meeting was hosted by the Thai Office of Atoms for Peace, and sponsored by the US Department of Energy. During the reporting period, APSN's working group on 'safeguards infrastructure, implementation and awareness raising' completed and published a paper on the fundamentals and best practices of safeguards regulatory authorities. This paper will complement and support the IAEA's advocacy for raising the competency of safeguards regulatory authorities by providing the perspective on nuclear safeguards of the broad community of countries that make up APSN. The IAEA has chosen to include this paper on its website for safeguards resources for states.[1]

Domestic Developments

During the reporting period, the IAEA conducted five design information verification inspections, two routine inspections and one short notice inspection in Australia, and also undertook three complementary access visits in accordance with Australia's Additional Protocol. It used the results from these inspections, plus its evaluation of Australia's reports and of other safeguards-relevant information to draw its compliance conclusions for Australia. The IAEA continues to draw the highest level conclusion with regard to Australia's safeguards compliance, known as the broader conclusion, that '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 Australia] all nuclear material remained in peaceful activities.' The IAEA has drawn the broader conclusion for Australia every year since 2000. The details of the IAEA's conclusions on Australia are at Appendix D, and its overall statement of conclusions for all states is at Appendix E.

In September 2012, the Australian Government announced two major infrastructure projects at the Australian Nuclear Science and Technology Organisation (ANSTO), an export-scale plant for producing the radiopharmaceutical, molybdenum-99, and a collocated Synroc[2] waste plant for immobilising waste from the manufacture of nuclear medicines. Construction is expected to commence in 2014 and be completed by 2016. The nuclear medicine plant will produce molybdenum-99 from uranium target plates irradiated in the OPAL reactor. ANSTO's current and planned expanded molybdenum-99 production has inherent non-proliferation and security benefits compared to many other producers around the world as the target plates and fuel use low-enriched uranium, not high-enriched uranium. With ANSTO's molybdenum-99 production capacity expected to increase by a factor of about four at the completion of this project, it will likely be the largest producer worldwide using low-enriched uranium fuel and targets, representing an important contribution by Australia to the objective of the nuclear security summits of minimising the civilian use of high enriched uranium around the world. ASNO has commenced discussions with ANSTO and the IAEA on nuclear safeguards and security considerations for the new facilities.

1 http://www.iaea.org/safeguards/Resources_for_States/additional-documents.html

2 Synroc is an Australian innovation to lock up high-level nuclear waste.

In 2012–13 Australia hosted visits by the Director General of the IAEA, Mr Yukiya Amano, and by the Deputy Director General, Head of the Department of Safeguards, Mr Herman Nackaerts. Mr Amano's visit to Australia in early October 2012 was very welcome as it was the first visit to Australia by an IAEA Director General since 2004. His visit included meetings with ministers, senior government officials, technical experts and industry representatives. He also received a tour of ANSTO's OPAL reactor and a briefing on ANSTO's plans for expanded molybdenum-99 radiopharmaceutical production. Australia is a strong supporter of the important work that the IAEA does in nuclear safeguards and security. Having both the Director General and Deputy Director General Safeguards visit Australia was a valuable opportunity to promote the important practical work Australia is doing that underpins the IAEA's mission.

The highlight of Mr Nackaerts's visit was the official ceremony to welcome the University of Western Australia's (UWA) Centre for Microscopy, Characterisation and Analysis into the IAEA's Network of Analytical Laboratories (NWAL). His visit also included discussions with senior officials in Canberra, a tour of the Olympic Dam mine and a tour of ANSTO's OPAL reactor for discussions on safeguards requirements for expanded molybdenum-99 radiopharmaceutical production. Mr Nackaerts was accompanied by the IAEA Section Head for the Safeguards Operations section that covers Australia, Mr John Patten.

As reported in the 2011–12 ASNO Annual Report (page 18), the IAEA maintains a Network of Analytical Laboratories (NWAL) that it uses for the analysis of environmental sample and destructive assay samples. Environmental sample analysis and destructive assay analysis are some of the most powerful tools the IAEA has for detecting undeclared activities, making a significant contribution to the IAEA's safeguards verification work. In recent years this capability has been enhanced through the use of advanced analytical instruments known as large-geometry secondary ion mass spectrometers (LG-SIMS) that are becoming the IAEA's analytical workhorse. Australia is making a major contribution through the decision of UWA to add its LG-SIMS and services to the IAEA's analytical arsenal. The NWAL contract between UWA and the IAEA was signed on 22 October 2012. In the first year of UWA's participation in the NWAL it has analysed 16 environmental samples for the IAEA.

In 2013 the Australian National Audit Office (ANAO) commenced an audit of the implementation by ASNO of arrangements to meet Australia's obligations under its comprehensive safeguards agreement and Additional Protocol with the IAEA. ASNO worked closely with the ANAO in late 2012 and early 2013 on compiling information and responding to questions for the audit. The ANAO's final report is expected to be tabled in Parliament in late 2013.

In November 2012 ASNO received capital funding of $1.4 million to complete projects for the migration of ASNO's nuclear and chemical databases to a new platform and to create an online web-interface for permit holders. The work will be undertaken by the DFAT's Information Management and Technology Division. These databases are critical to ASNO's administration of legislative requirements under the *Nuclear Non-Proliferation (Safeguards) Act 1987* and the *Chemical Weapons (Prohibitions) Act 1994* and for meeting reporting obligations under the Chemical Weapons Convention, the comprehensive safeguards agreement, the Additional Protocol and various bilateral nuclear cooperation agreements.

Bilateral Safeguards Developments

The Agreement between Australia and the United Arab Emirates (UAE) on the peaceful uses of nuclear energy was signed by the Australian Minister for Foreign Affairs Senator Carr and UAE Foreign Minister Sheikh Abdullah bin Zayed Al Nahyan on 31 July 2012. The Agreement was tabled in Parliament on 12 March 2013 for review by the Joint Standing Committee on Treaties (JSCOT), which held public hearings on the Agreement on 13 May and 17 June 2013. JSCOT is expected to issue its report on the proposed agreement in 2013–14.

The proposed Australia–UAE Agreement complies with Australia's nuclear safeguards policy (described on page 70) on the use of Australian nuclear material through the application of stringent conditions on safeguards, physical security and accountability, and highlights a shared commitment to the peaceful uses of nuclear energy. The UAE is following a responsible and transparent model of nuclear power development. Significantly, it has decided (backed up by legislation) to forgo enrichment and reprocessing in its territory.

Following Prime Minister Gillard's announcement in October 2012 that negotiations on a bilateral civil nuclear cooperation agreement between Australia and India would commence, the first round of negotiations was held on 19 March 2013 in New Delhi. Further negotiations will take place through 2013–14. There is no set timeframe for the conclusion of negotiations.

Exports of Australian uranium to India can only commence after Australia and India have negotiated and brought into force a bilateral nuclear cooperation agreement, which satisfies Australia's policy and safeguards requirements, and Australia and India have agreed administrative arrangements associated with the bilateral agreement. India's conclusion of an Additional Protocol with the IAEA is also a pre-condition for the export of Australian uranium. India has signed an Additional Protocol with the IAEA, and is in the process of implementing its provisions.

Nuclear Security

ANSTO completed its periodic security review for the OPAL reactor in August 2012 which included 88 recommendations addressing the review's terms of reference which included assessment against international standards. ASNO is working with the Australian Radiation Protection and Nuclear Safety Agency to consider ANSTO's recommendations and will formally respond in the coming year.

In November 2012, ASNO hosted an IAEA-led regional workshop on International Physical Protection Advisory Service (IPPAS) missions in Sydney to educate participants on the importance, activities, scope, and process of IPPAS mission activities. As part of a nine member team of experts, ASNO participated in an IPPAS mission hosted in Hungary, held over two weeks in May–June 2013.

In preparation for the 2014 Nuclear Security Summit in the Netherlands, ASNO participated in Sherpa and Sous-Sherpa Nuclear Security Summit meetings in Istanbul, The Hague and Vienna. ASNO also attended a number of track 1.5 workshops and dialogues which were variously attended by some summit Sherpas and Sous-Sherpas, to discuss ways in which the summit process could be used to further strengthen global nuclear security.

Comprehensive Nuclear-Test-Ban Treaty Developments

At 30 June 2013, 183 countries had signed the CTBT and 159 had ratified, including 36 of the 44 countries which must ratify the Treaty to trigger its entry into force (known as Annex 2 states). Ratification of the CTBT by all of the NPT nuclear-weapon states (NWS) is widely seen as necessary to stimulate most of the remaining ratifications by Annex 2 states. Three of the five have already ratified. The US Government continues to highlight its support for the CTBT, but garnering the two-thirds majority in the US Senate that is needed for ratification remains difficult. China also stresses its support for the CTBT, but is likely to ratify only when the US does.

Around 85 per cent of CTBT International Monitoring System (IMS) facilities are operational. Twenty of Australia's 21 IMS facilities are operational. All 20 have been certified as meeting CTBT requirements. Installation of the final station, at Davis Base, Australian Antarctic Territory, is in planning. Development of its capability to conduct an effective on-site inspection as required in the CTBT is a major current focus for the CTBT Organisation. Australian experts have made a leading contribution during the year to field exercises conducted to test and refine that capability.

Judgments about compliance with the CTBT will be made by parties to the Treaty, based on technical analyses carried out by National Data Centres (NDCs). All CTBT signatories are encouraged to establish the technical analysis capacity needed for them to carry out their task in verification of the CTBT. Cooperation among the NDCs of countries will also bring valuable peer-review to scientific analysis of events of possible concern. In October 2012 ASNO and New Zealand's CTBT National Authority signed a memorandum of understanding to provide a framework for cooperation between Australian and New Zealand NDCs.

Chemical Weapons Convention Developments

From 24 to 26 July 2012, Australia hosted a visit by OPCW Director-General Ahmet Üzümcü where he held discussions with a number of government officials in Sydney and Canberra, including with the Minister for Foreign Affairs, Senator Carr. The visit helped strengthen Australia's engagement with the OPCW and demonstrate its on-going commitment to the CWC.

During 2012, a number of events took place to commemorate the 15th anniversary of the entry into force of the CWC. A high-level meeting was held in The Hague on 3 September 2012 at the commencement of one week of activities to mark the anniversary. Of special relevance to Australia, this date also marked the adoption of the text of the Convention by the Conference on Disarmament in 1992 (Geneva), after 20 years of difficult negotiation in which Australia had played a key role.

The centrepiece of the OPCW's activities in regards to the 15-year anniversary occurred on 1 October 2012, with a high-level meeting of the OPCW that took place at the UN Headquarters in New York. In his address to the meeting, Mr Laurie Ferguson MP reiterated Australia's continuing and enduring commitment to the Convention.

Mr Ferguson encouraged States Parties to examine collectively how the Convention can evolve and remain relevant while ensuring that chemicals are not diverted for non-peaceful purposes.[3]

At 30 June 2013 there were 189 CWC States Parties, with Somalia the latest country to join. Universality is fundamental to ensuring a world free of chemical weapons, but it remains elusive despite ongoing diplomatic efforts. Seven countries remain outside the Convention; two have signed, but are yet to ratify (Israel and Myanmar), and five are yet to accede to the Convention (Angola, DPRK, Egypt, South Sudan and Syria).

The achievements under the Convention have been impressive. Three quarters (55,474 metric tonnes) of the world's declared stockpiles of chemical weapons (71,196 metric tonnes) have been destroyed under strict verification by the OPCW. The three remaining chemical weapons possessor States have committed to the destruction of their remaining stockpiles by the planned completion dates.[4] At 28 February 2013, the OPCW had conducted 5,124 inspections at 223 chemical weapon-related sites and 1,865 industrial sites within the territories of 86 States Parties since April 1997.

The 3rd Review Conference of the CWC took place in The Hague from 8–19 April 2013 (on page 21). The Conference concluded with the adoption by consensus of a two-part Conference Report consisting of a political declaration and a comprehensive review of CWC implementation since the 2nd Review Conference. The Report also provides forward-looking direction to the OPCW beyond the time when all declared chemical weapons will have been destroyed.

The political declaration of the 3rd Review Conference included a commitment to adopt the necessary measures to fully implement the Convention as a matter of priority, noting that 97 States Parties have still to adopt all necessary measures.[5] As such, Australia supports continued efforts to strengthen States Parties' capacity to fully implement the Convention.

ASNO continued to strengthen its engagement with the chemical industry as a means to ensure Australia meets all of its CWC reporting obligations. As foreshadowed in ASNO's inaugural newsletter (November 2012) for the chemical industry, two seminar series were held in Sydney and Melbourne in 2013 to raise awareness among industry stakeholders about how the CWC impacts on them.

In 2012–13, ASNO facilitated two routine OPCW inspections at 'Other Chemical Production Facilities' declared by Australia. These inspections helped demonstrate Australia's compliance with the CWC, and reflects positively on the cooperation of Australia's chemical industry.

3 For a transcript of Mr Ferguson's statement refer to http://australia-unsc.gov.au/2012/10/statement-to-the-united-nations-high-level-meeting-of-the-organisation-for-the-prohibition-of-chemical-weapons/.

4 Libya, the Russian Federation and the United States of America have committed to destroy all remaining chemical weapons stockpiles by December 2016, December 2015 and September 2023, respectively.

5 This refers to the National Implementation Measures under Article VII of the CWC. Ninety-seven States Parties have not yet notified the OPCW that they have legislative and/or administrative measures covering all key areas of the Convention.

Other Non-Proliferation Developments

Fissile Material Cut-off Treaty

The Conference on Disarmament remains unable to break the diplomatic impasse preventing negotiations on a Fissile Material Cut-off Treaty (FMCT). An initiative in the United Nations offers a possible step forward through work by a Group of Governmental Experts (GGE) providing a report to the UN Secretary General on aspects of an FMCT. The GGE is intended to meet for two two-week sessions in 2014 and in 2015.

The Year Ahead

The following developments in the international security environment are likely to impact on ASNO's work during 2013–14:

- continued interest in developing and promoting understanding at all stages of nuclear development in the Asia-Pacific region and elsewhere
- the work program and further development of the Asia-Pacific Safeguards Network
- conducting regional outreach on safeguards capacity building and awareness raising, including work on uranium mining and transport regulations in newcomer uranium mining countries
- the Director-General of the IAEA's report to the Board of Governors on the state-level concept and negotiating appropriate references to this in the Safeguards Resolution at the General Conference in September 2013
- positive steps Myanmar is taking to prepare for an Additional Protocol and modified Small Quantities Protocol, and also continued interest in promoting the benefits to Myanmar of ratifying the CWC
- Iran's nuclear program and the IAEA's continuing efforts to resolve questions about possible military dimensions
- international efforts to strengthen nuclear security including through the 2014 Nuclear Security Summit in The Hague
- ongoing efforts to commence negotiations of a fissile material cut-off treaty, including the proposal for the UN Secretary General to establish a Group of Governmental Experts to conduct work in 2014 and 2015 on recommendations on aspects of a treaty
- the United Nations-led investigation into chemical weapons use in Syria, and the risk of further chemical weapons use or the possibility of their spread to extremist groups as the conflict continues
- implementation by the OPCW of recommendations arising from the 3rd Review Conference of the CWC, held in April 2013.

In addressing the challenges posed by the international security environment, ASNO will continue to provide specialist analysis and policy advice to the Australian Government in the areas of non-proliferation and disarmament. ASNO will continue to ensure Australia's international treaty and regulatory obligations are met.

Internationally, ASNO will continue to work with the IAEA and other member states on strengthening the safeguards system, including through Australia's membership of the IAEA Board of Governors, and through the Australian Safeguards Support Program, the Standing Advisory Group on Safeguards Implementation, and other international safeguards fora.

Regionally, 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 further development of the Asia-Pacific Safeguards Network.

Domestically, ASNO will work with ANSTO and other permit holders to ensure safeguards and nuclear security requirements are met. In addition, ASNO will work with industry and relevant regulatory authorities in the establishment of new uranium mines, especially in Western Australia. Related to this, the IAEA is considering changes to how it safeguards uranium production which may require detailed consultations and planning between ASNO, IAEA and uranium producers. ANSTO's new infrastructure projects to establish an export-scale plant for producing the radiopharmaceutical molybdenum-99, a Synroc waste immobilisation plant and an interim storage facility for Australian intermediate level radioactive waste, will have safeguards and security requirements that will need to be planned and managed.

When ANAO completes its report on the management of ASNO arrangements to meet Australia's obligations under its comprehensive safeguards agreement and Additional Protocol, ASNO will respond to its recommendations in the 2013–14 Annual Report.

ASNO will continue to work with the DFAT Information Management and Technology Division through 2013–14 to develop, finalise for release and maintain the critically important upgrades of the nuclear and chemical databases used for administering Australia's compliance with its comprehensive safeguards agreement, the Additional Protocol, nuclear cooperation agreements and the Chemical Weapons Convention.

Australia will host its first International Physical Protection Advisory Service (IPPAS) mission in November 2013 to review nuclear security practices at ANSTO.

ASNO will continue to manage Australia's network of bilateral nuclear cooperation agreements, including the detailed scrutiny of the transfer and use of Australian Obligated Nuclear Material (AONM) around the world. ASNO will also continue to work with others in DFAT as well as other departments and agencies to develop a framework for the supply of Australian uranium to India, in particular on the development of a bilateral nuclear cooperation agreement.

ASNO will support Australia's efforts to collaborate closely 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 continue to work with the CTBT Organization and other Australian agencies to establish the key elements of CTBT verification: the IMS; the International Data Centre (IDC); on-site inspection (OSI) and NDC capabilities. ASNO coordinates whole-of-government efforts to establish and maintain Australia's IMS stations and NDC, and has an active and leading role in the Commission's work on OSI.

Efforts to get negotiations on an FMCT underway will likely remain high on the international agenda in 2013–14. Most interested countries have said that they prefer the CD as the venue for FMCT negotiation, but there is strong support to at least begin work on aspects of a treaty through a mechanism outside the CD, such as the abovementioned Group of Governmental Experts. ASNO will continue to support Australia's work in this area as opportunities arise, focusing in particular on how an FMCT can be effectively verified.

ASNO will continue to build Australia's engagement in technical issues related to the verified dismantlement of nuclear weapons as international developments allow.

Dr Robert Floyd
Director General ASNO

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Minister for Foreign Affairs, Senator Bob Carr, meeting OPCW Director-General Ahmet Üzümcü during Mr Üzümcü's visit to Australia , July 2012

CURRENT TOPICS
SECTION 2

Safeguards *Nuclear* OPCW **Non-Proliferation** *Chemical* IAEA **Security** CTBTO *Nuclear* CTBTO *Chemical* **Security** **Safeguards** OPCW *Nuclear* **Non-Proliferation** *Chemical* **Non-Proliferation** IAEA *Nuclear* *Chemical* **Security** CTBTO **Safeguards** OPCW **Securi** *Chemical* **Safeguards** OPCW **Security** **Non-Proliferation** *Chemical* IAEA *Nuclear* OPCW *Nuclear* **Non-Proliferation** IAEA *Chemical* **Security** CTBTO *Chemical* **Safeguard** **Security** CTBTO *Chemical* *Nuclear* OPCW **Safeguards** IAEA *Nuclear* CTBTO *Cher* *Nuclear* IAEA **Security** CTBTO *Chemical* *Nuclear* **Non-Proliferation** **Security** OPCW

CURRENT TOPICS

Detection and Analysis of the DPRK Nuclear Test in February 2013

International Concerns About Chemical Weapons in Syria

Outcomes of the Third Review Conference of the CWC

Building International Confidence in Nuclear Security Practices

Fundamentals and Good Practices for safeguards regulatory authorities – an Asia-Pacific Safeguards Network (APSN) Project

CTBT: Looking for the smoking gun

Australia-Russia Nuclear Cooperation – Trial Shipment of Australian Uranium

Australia's Uranium Production and Exports

CURRENT TOPICS

Detection and Analysis of the DPRK Nuclear Test in February 2013

On 12 February 2013, the DPRK announced that it had conducted an underground nuclear test. Even before the public announcement, seismic sensors of the CTBT's International Monitoring System (IMS) had alerted the international community to the event, and analysis of the apparent test had started. This third nuclear test (following one each in 2006 and 2009) was in clear breach of UN Security Council resolutions 1718 (2006), 1874 (2009) and 2087 (2013) which demand North Korea not to conduct any further nuclear tests.

Scientists at Geoscience Australia, using data from IMS (and national) seismic monitoring stations (reference Figure 1) identified a suspicious seismic event occurring at approximately 13:58 hours AEST. This event was subsequently confirmed to be an explosive event with an initial estimated magnitude of 4.9 occurring in the vicinity of the P'unggye nuclear test site in north-eastern DPRK (the site of the declared 2006 and 2009 tests). This was almost certainly the DPRK's third test given its explosive-like characteristics, proximity to the P'unggye test site and its shallow depth (refer Figure 1). This was consistent with the DPRK's announcement later that afternoon.

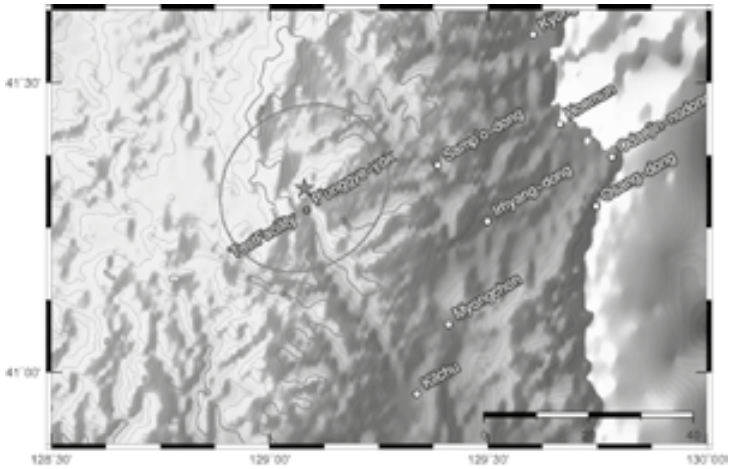
The estimated magnitude corresponds to a likely nuclear explosive yield of 5 kilotons (ranging from 3 to 13 kilotons). This is greater than the 2009 test (1–4.6 kilotons) and is many times larger than the first DPRK nuclear test (less than 1 kiloton) in 2006. It was nevertheless quite small compared to most nuclear tests conducted by other countries in the past.

The IMS employs other sensing technologies to determine whether an event is a nuclear explosion, including detection of radioactive gases and particles emitted by a nuclear explosion as well as infrasound and hydroacoustic monitoring.

The event was detected globally by 94 seismic and two infrasound IMS stations. It was more strongly observed than the 2009 and 2006 tests. The clear detection of all DPRK tests by seismic stations, including the much smaller 2006 test, has demonstrated how seismic monitoring will provide a strong underpinning for verification of the CTBT when it enters into force.

However, conclusive confirmation of a nuclear test would need collection, analysis and confirmation of relevant radionuclides, in particular radioxenon, that are associated with nuclear explosive events, if and when this is available. The IMS currently has 66 radionuclide stations in operation across the globe, of which 30 are able to detect noble gases such as xenon. Assuming the availability/collection of the radionuclides and prevailing weather conditions, radionuclide data may be available in days or take up to several weeks.

FIGURE 1: INITIAL LOCATION AND ERROR ELLIPSE OF THE EVENT AS OBTAINED BY GEOSCIENCE AUSTRALIA USING THE 26 IMS STATIONS INDICATED ON THE GLOBE. NOTE THAT THE ERROR ELLIPSE COVERS THE P'UNGGYE TEST.



Event Location – Evid: 0			
Location Details		Error Ellipse	
Lat:	41.2184 deg	Semi-major Axis:	17.1 km
Lon:	129.6796 deg	Semi-minor Axis:	15.0 km
Depth:	0.10 km	Azimuth:	44.804 deg
Origin Time (UTC):	2013-02-12 02:57:50.90	Area:	807.6 km^2
Algorithm:	NAloutte	Depth Error:	+/- 35.06 km

Geoscience Australia
Nuclear Monitoring Toolkit – DEV->TESTBED SVN-REVISION: 1011

Author: mdekool – 2013-02-12 04:16:18.61 UTC

A detection of xenon isotopes that could be attributed to the event was made at the radionuclide station in Takasaki, Japan, located at around 1,000 kilometers from the DPRK test site, 55 days after the event's occurrence. Lower levels were picked up at another station in Ussuriysk, Russia. In particular, the radioisotopes xenon-131m and xenon-133 were observed. Analysis of the ratio of these isotopes showed consistency with a nuclear fission event occurring more than 50 days before the detection (nuclear fission can occur in both nuclear explosions and nuclear energy production). While not clear proof of a nuclear explosion, these detections coincide very well with the seismic detection of the explosion event occurring on 12 February 2013.

After the 2006 test, radioactive xenon was detected by a CTBT radionuclide monitoring station in Canada, supporting the assessment that the 2006 test was a nuclear explosion. However, no radionuclides were detected following the 2009 test. This suggests that radionuclides generated by that explosion were largely contained underground – whether by chance or effective design is not clear.

Of significance in 2013, is the DPRK's claim of successfully testing 'a smaller and light A-bomb unlike the previous ones, yet with great explosive power.' There has been open source conjecture on whether highly enriched uranium (HEU) or plutonium was used in the device. In the 2006 and 2009 tests, it is widely considered that plutonium was used. If timely radionuclide observations were available, it might have been possible to determine, based on radioxenon isotope ratios, whether a uranium or plutonium based device had been used. However, such data needs to be collected within around six hours from the time of detonation. On this occasion, that was not possible.

Open source reporting suggests that it is more difficult to construct a compact device using uranium, than for plutonium. For this reason alone, it may be presumed that plutonium was used. In any case, the available information does not tell us anything to substantiate the DPRK's claim to have constructed and tested a miniaturised device, irrespective of whether HEU or plutonium was used.

In order to clarify whether a nuclear explosion has occurred in cases such as the 2009 test where no relevant radionuclides were observed, the CTBT provides for the conduct of an on-site inspection (OSI). But this is not possible before the Treaty enters into force – and entry into force requires ratification by all Annex 2 countries, including the DPRK. Although the 2009 test does not appear to have vented radioactive particles or gases in quantities sufficient to be detected at a distance, on-site investigation could be expected to find such evidence. Noble gases should rise to the surface over time, even from a well contained nuclear explosion, and be detectable. An inspection team would also look for other evidence of test activity at or below the ground surface. Drilling could also take place to obtain samples at an explosion site. Drilling samples could provide evidence of whether HEU or plutonium was used.

International Concerns About Chemical Weapons in Syria

Sixteen years after the Chemical Weapons Convention (CWC) entered into force, its prohibitions on the development, production, stockpiling and use of chemical weapons have become an international norm which leaves no tolerance for defiance by anyone, including the few countries – Syria being one – that remain outside the Convention. That said, events taking place in Syria highlight the importance of universality to achieving a global chemical weapons ban. The Syrian Government is known to hold large stockpiles of chemical weapons, and there is mounting evidence that chemical weapons, including the nerve agent sarin, have been used in a number of locations in Syria.

Australia has called on the Syrian Government to ensure the safety and security of its chemical weapons stockpiles, and expressed deep concern about the alleged use of these weapons against the Syrian people. While Syria is not yet Party to the CWC, it has an obligation not to use chemical weapons as a State Party to the 1925 Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare (the 'Geneva Protocol').

The Director-General (DG) of the Organisation for the Prohibition of Chemical Weapons (OPCW), wrote to the Syrian authorities in December 2012, as did United Nations Secretary-General (UNSG) Ban Ki-moon in July 2012, urging Syria to become a member of the CWC without delay. The risk of further chemical weapons' use in Syria, or their falling into the hands of terrorists, remains cause for grave concern.

Following the allegations of chemical weapons' use by Syrian Government forces, on 20 March 2013, the United Nations (UN) received a formal request from Syrian authorities for a 'specialized, impartial and independent mission' to investigate the alleged use of chemical weapons near the city of Aleppo. In response, UNSG Ban Ki-moon announced that the UN would conduct an investigation of all allegations of chemical weapons use in Syria, with assistance from the OPCW and the World Health Organisation (see boxed insert). Following a formal request to DG OPCW, a special meeting of the Executive Council was convened on 27 March and CWC States Parties pledged their full support. Australia and many others have expressed support for a comprehensive UN investigation into all reports chemical weapons' use in Syria and urged the Assad Government to give UN inspectors unconditional access.

At the time of writing, the Terms of Reference for the UN mission, including sites to be visited, had yet to be finalised and the investigation team was still awaiting permission to enter Syria. In the interim, the UN team has conducted fact-finding activities in Turkey, a CWC member country bordering Syria that has reportedly received victims of chemical weapons attacks seeking medical attention.

Investigating the Alleged Use of Chemical Weapons

The CWC allows for the investigation of alleged use (IAU) of chemical weapons by or against a State Party. An IAU is initiated pursuant to Articles IX (Consultations, Cooperation and Fact-Finding) or X (Assistance and Protection against Chemical Weapons) and conducted in accordance with Part XI of the Verification Annex and any detailed procedures established by the Director-General (DG) of the Organisation for the Prohibition of Chemical Weapons (OPCW). These procedures also extend to investigations of alleged use of riot control agents as a method of warfare.

Any State Party can request an IAU of chemical weapons by another State Party through the DG of the OPCW. However, where the alleged use is by a State not party to the Convention, or in territory not controlled by a State Party, the request for an IAU involving the OPCW must be made through the Secretary-General of the United Nations (UNSG). Should such a request be made, the OPCW would put its resources at the disposal of the UNSG and cooperate closely with him/her in accordance with paragraph 27 of Part XI.

Investigation of alleged use of chemical weapons by a non-CWC State Party against another non-State Party, or within its own territory, is the responsibility of the UN. When requested by a UN Member State, the UNSG has the authority to investigate alleged uses of chemical, biological and toxin weapons. This authority has its origins in UN General Assembly resolutions 35/144C of 1980, 37/98D of 1982 and 42/37C of 1987, which were reaffirmed by UN Security Council resolution 620 of 1988.

Arrangements for the conduct of investigations of alleged use involving the OPCW, but initiated through the UN, are governed by the 2000 OPCW Relationship Agreement with the UN and the more recent 2012 Supplementary Arrangement Concerning the Implementation of Article II(2)(c) of that Agreement.

Thus far, the OPCW has not received any IAU requests from CWC Member States. However, 12 investigations of alleged use of chemical weapons were conducted by the UN in various countries between 1980 and 1993, prior to entry into force of the CWC.

Outcomes of the Third Review Conference of the CWC

The Third Review Conference of the Chemical Weapons Convention (3rd Revcon – see boxed insert) held in The Hague from 8 to 19 April 2013 was well attended by representatives from 122 of the then 188 States Parties. Australia's delegation was headed by Australia's Permanent Representative to the OPCW, Ambassador Neil Mules, and included representatives from DFAT's International Security Division, ASNO and the Department of Defence.

United Nations Secretary-General (UNSG), Ban Ki-moon, noted in his opening remarks to the Conference the importance of the OPCW's work in contributing to international peace and security. This was the first time that a UNSG had attended a Review Conference, testament in part to the enhanced cooperation between the United Nations and the OPCW through the Syrian Government's request for a UN-led investigation into allegations of chemical weapons use in Syria (also refer to Current Topics on page 20).

UN Secretary-General Ban Ki-moon addressing the Third Review Conference of the CWC, April 2013 (Image: OPCW)

During the general debate, Australia joined the overwhelming majority of States Parties in voicing its concerns about the situation in Syria, which is not yet Party to the Convention. Ambassador Mules noted the existence of large chemical weapons stockpiles in Syria and the need for the Conference to urge Syria to ensure that these remained secure until they could be destroyed under international verification.

The 3rd Revcon concluded with the adoption by consensus of a two-part Conference Report consisting of a political declaration and a comprehensive review of CWC implementation since the 2nd Revcon.

The political declaration expressed deep concern by States Parties that chemical weapons may have been used in Syria, a determination that the destruction of all existing declared chemical weapons be completed in the shortest time possible, and a commitment to adopt the necessary measures to fully implement the Convention as a matter of priority, noting that 97 States Parties still needed to adopt such measures.[6]

Australia's key positions, as highlighted in Australia's National Statement, were preserved in the Conference Report. The Report also provides forward-looking direction to the OPCW beyond the post-destruction phase, when all declared chemical weapons will have been destroyed. For example, States Parties expressed their commitment that the OPCW remain the global repository of knowledge and expertise on the implementation of the Convention, and requested that the Technical Secretariat present proposals for ensuring continuity of its knowledge base and expertise.

6 This refers to the National Implementation Measures under Article VII of the CWC. Ninety-seven States Parties have not yet notified the OPCW that they have legislative and/or administrative measures covering all key areas of the Convention.

One issue that drew considerable debate was the topic of so-called incapacitating chemical agents. These can best be described as classes of toxic chemicals, other than riot control agents, which are permitted for use for law enforcement purposes. Of concern to a number of States Parties was the potential for these toxic chemicals to be developed for purposes prohibited by the Convention under the guise of 'law enforcement'. Although not included in the Conference Report, States Parties benefitted from discussing this issue for the first time within the OPCW.

As part of the OPCW's effort to improve interaction with the chemical industry, the scientific community, academia and civil society, the 3rd Revcon was unique in its level of engagement with non-government organisations (NGOs). NGOs addressed the Plenary Session of the Conference and participated in the informal discussions in the margins of, and in the lead-up to, the Conference.

Further details of the outcomes of the 3rd Revcon and other documentation can be found at https://www.opcw.org/rc3.

Review Conferences under the CWC

The Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction (known as the Chemical Weapons Convention or CWC) entered into force on 29 April 1997 and was designed to eliminate chemical weapons worldwide, in a verifiable way. The Organisation for the Prohibition of Chemical Weapons (OPCW) oversees the global implementation of the Convention and is based in The Hague.

Article VIII paragraph 22 of the CWC requires the Conference of the States Parties (the 'Conference') to convene special sessions every five years to conduct reviews of the operation of the Convention taking into account any relevant scientific and technological developments.

The main outcomes of the CWC review conferences to date (2003, 2008 and 2013) have been a unanimous declaration of commitment by States Parties to the global chemical weapons ban and a comprehensive review of CWC implementation in the preceding five years, including a range of actions or recommendations for improving the Convention's implementation and effectiveness.

The achievements of the CWC so far have been impressive, as noted in the 3rd Revcon Report. By 31 March 2013, 55,474 metric tonnes (80 per cent) of the world's declared stockpiles of Category 1 chemical weapons (71,196 metric tonnes) had been destroyed under OPCW verification. The OPCW had conducted 5,124 inspections at 223 chemical weapon-related sites and 1,865 industrial sites within the territory of 86 States Parties. At the time of the Conference there were 188 States Parties, with five new members joining since the 2nd Revcon (Guinea-Bissau, Lebanon, Iraq, the Dominican Republic and the Bahamas). On 28 June 2013 the CWC entered into force for Somalia, making it the 189th State Party and leaving only seven countries still to ratify or accede to the treaty.[7]

7 The states not yet party to the Convention at 30 June 2013 are: Israel, Myanmar (both have signed but not yet ratified) and Angola, Egypt, North Korea, South Sudan and Syria.

Building International Confidence in Nuclear Security Practices

'International assurances' can be defined as: activities undertaken, information shared or measures implemented voluntarily by a state or other stakeholder that can build the confidence of others (e.g. other governments, a designated international organisation, the public) about the effectiveness of nuclear security within a given state. International assurance of nuclear security is best understood through its objective, that is, to build confidence about effectiveness. When a state demonstrates to others that its systems, processes, plans and people are effective, capable, qualified, proficient and prepared, they are assured; meaning that they feel more confident that, should the worst happen, the state can prevent or manage the consequences of a nuclear security incident.

Nuclear security is both a shared and sovereign responsibility. The state is responsible for its nuclear security regime and operators should have the responsibility for site specific security and physical protection systems. However, all governments and the global public have a stake in how effectively nuclear security responsibilities are met as the economic and security consequences of a nuclear catastrophe are global in scope. These shared consequences give rise to a shared responsibility for nuclear security which can be met by states taking steps to assure others that they are discharging their sovereign responsibilities.

Building confidence in nuclear security practices does not require a new legally binding commitment, the disclosure of sensitive information, verification or international inspections, but it does require a willingness to cooperate in building international security, a desire for an appropriate level of openness and a robust nuclear security culture. Such assurances are about building confidence in the effectiveness of a state's nuclear security system with other governments and the public, rather than making a guarantee about specific behaviours and sensitive security practices.

Although international assurances can be implemented on a voluntary basis, there are, however, some ways of providing international assurance that make use of previously existing obligations that states have already undertaken (e.g. United Nations Security Council Resolution (UNSCR) 1540 reporting and reporting required by States Party to the Convention on the Physical Protection of Nuclear Material).

International assurance is not a new concept. 'Assurance' mechanisms are widely used across many industries, including those involving sensitive information. These industries (e.g. nuclear safety, aviation, shipping) demonstrate that providing international assurances is not only possible, but actually commonplace.

An added benefit is that for states participating in assurance mechanisms, their level of security practice is likely to rise. Different ways of providing assurance, such as sharing best practices, peer review and sharing information regarding legal and regulatory frameworks, can help all states improve. This is because a state must internally assure itself before it can assure others. Sufficient internal assurance and accountability mechanisms could facilitate the ability of a state to provide international assurances that all of its nuclear materials and facilities are secure.

How Can Assurances be Provided?

Assurances can vary in who provides them, how they are provided and who are the beneficiaries of the assurances. They can be provided by those engaged in assurance activities and information sharing such as ministries and agencies from the government and regulators, as well as nuclear industry and operators. Assurances can be provided in a variety of ways: unilaterally (such as publishing an annual report on nuclear security), bilaterally (such as engaging in nuclear security cooperative measures with another state) or multilaterally (such as best practice exchanges).

International assurance is not a one-size-fits-all concept. Therefore, a state could have a range of options taking into account its circumstances, the ways in which it uses nuclear materials and the means by which it internally assures itself. Assurances can apply to materials and facilities in both civilian and non-civilian use. The foundation for international assurances already exists and some states are already able to provide assurances to others about the effectiveness of their nuclear security systems.

Outlined below are some ways by which a state can assure others about the effectiveness of its nuclear security system while protecting sensitive information about materials and sites.

Peer Review

Undertaking peer reviews such as the IAEA's International Physical Protection Advisory Service (IPPAS) missions or the World Institute for Nuclear Security (WINS) peer reviews on corporate governance and management practices for operators as they relate to nuclear security, demonstrate a commitment to strengthening nuclear security. A state can further build confidence about its nuclear security practices by publishing the results of the IPPAS mission report (redacted for sensitive information), reporting on steps taken to respond to IPPAS recommendations for improvements and by requesting a follow-up mission within a reasonable period of time. Australia will host its first IPPAS mission in November 2013.

Expanded Best Practice Sharing: WINS offers a series of best practice guides on a wide range of topics and conducts workshops to gather and disseminate best practices. IPPAS missions also provide a mechanism for best practice sharing.

Bilateral Cooperative Measures: One existing bilateral mechanism is based on the physical protection requirements in nuclear cooperation agreements or as part of export agreements instituted by several states such as the US, Canada, Australia, and EURATOM countries when engaging in nuclear commerce. The US, for instance, visits partner countries to observe the physical protection systems in place for the protection of US-origin nuclear material. Australia hosted such a visit in February–March 2013.

The US–Russian cooperative threat reduction program demonstrates the value of bilateral mechanisms to improve security and build confidence, and that nuclear security cooperation at sensitive sites and with sensitive materials is possible without compromising sensitive information.

Declarations and Accounting: Declarations about quantities of material (e.g. annual reports, INFCIRC/549, historical production) or, at a minimum, demonstrating that a regular accounting/auditing process with respect to these materials takes place, without divulging sensitive details could help provide assurance that material is accounted for and could also encourage the sharing of best practices for accounting.

For the first time the ASNO annual report will set out Australia's total holdings of highly-enriched uranium.

Training and Certification: Nuclear security training helps states and operators ensure that personnel with nuclear security responsibilities can competently discharge their responsibilities. Training can be provided by government entities, nuclear industry, the IAEA, WINS, centres of excellence and nuclear security support centres. In 2012, the IAEA created the International Network for Nuclear Security Training and Support Centres to encourage collaboration and coordination of training initiatives. The development of a certification program to assure that nuclear security professionals have all participated in internationally recognised training programs could also raise confidence in the security of all materials under their purview, both in civilian and non-civilian use.

Further Establishing Assurances

A review of the options in the previous section for providing assurances showed examples of both existing and new assurance activities. To further build international assurance these activities could be enhanced in scope and detail, conducted on a more regular basis and broadened in participation, all while protecting that which remains sensitive. For example, a few states provide regular declarations about the quantities of nuclear material subject to regulatory control. Such declarations could be enhanced by increasing the types of materials reported, broadening participation and encouraging regular and frequent reporting.

With actions from states individually to provide assurances and collectively to ensure that missing implementation architecture is put in place, international assurance is an achievable and worthwhile goal that is within reach.

Information Sharing and Reporting

Australia's Nuclear Security Profile (provided at the end of this article) provides a form of international assurance. Public release of official documents containing details of nuclear security regulations and other selected details of nuclear security-related activities increases confidence that the basic legal and regulatory framework required for nuclear security may be in place within a state. Australia's Nuclear Security Profile was compiled with input from ASNO, ARPANSA, ANSTO and the International Security Division of DFAT, and lists key treaties, legislation, activities and practices relevant to Australia and nuclear security, and will be updated annually for inclusion in future annual reports.

In addition, there are two mechanisms whereby states could use existing obligations to provide assurance. First, through UNSCR 1540, each state provides reporting on nuclear security-related issues. A state could choose to make its UNSCR 1540 report and matrix (developed by the UNSCR 1540 Committee) available to the public. Second, all States Party to the Convention on the Physical Protection of Nuclear Material (CPPNM) (and its 2005 Amendment when in force) have, through Article 14.1 committed to inform the depositary, in this case the IAEA, of the laws and regulations that give effect to the CPPNM. The assurance comes from the IAEA communicating 'such information periodically to all States Party' as specified in Article 14.1. The procedures for doing so, however, have yet to be specified.

Australia's Nuclear Security Profile

1. INTERNATIONAL LEGAL FRAMEWORK

Instrument	Status	Date
Convention on the Physical Protection of Nuclear Material + 2005 Amendment	Ratified Ratified	22/09/1987 17/07/2008
International Convention for the Suppression of Acts of Nuclear Terrorism	Ratified	16/03/2012
UNSCR 1540 Committee Approved Matrix UNSCR 1540 (S/AC.44/2004/(02)/53) UNSCR 1540 (S/AC.44/2004/(02)/53/Add.1)	Report submitted Report submitted Report approved	30/12/2010 28/10/2004 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	Website
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	Compliance with 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 IAEA GC(47)/RES/7
Supplementary Guidance on the Import and Export of Radioactive Sources	Australian support confirmed through political commitment pursuant to IAEA 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 (planned)
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	Chair 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
International Physical Protection Advisory Service (IPPAS) Missions	Team members	2002, 2003, 2005(2), 2013(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	Chair Committee of the Whole at the Diplomatic Conference	2005
Code of Conduct on the Safety and Security of Radioactive Sources	Chair negotiation of Code and Export/Import Guidance	2000 – 2004

8. OUTREACH AND CAPACITY BUILDING

Activity/Event	Date
Events	
GICNT Joint Working Group Activity on Radiological Crime Scene Management (planned)	February 2014
IAEA training course on Nuclear Forensics Methodologies (planned)	October 2013
2nd ASEAN Regional Forum Workshop on Nuclear Forensics (planned)	September 2013
Technical Visit to Australia on the Implementation of Nuclear Security for the Uranium Industry	June 2013
IAEA regional workshop on the nuclear security in the transport of nuclear material	December 2012
ASEAN Regional Forum Workshop on Nuclear Forensics	December 2012
IAEA regional workshop on IPPAS missions	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
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 at research facilities held in Australia	2004, 2006, 2009
IAEA regional training courses on nuclear security forensics and radiological crime scene management	2008 – present

* Information as of 30 June 2013

Contributing Agencies

Australian Safeguards and Non-Proliferation Office
Australian Nuclear Science and Technology Organisation
Australian Radiation Protection and Nuclear Safety Agency
Department of Foreign Affairs and Trade

ASNO Director-General Robert Floyd with Armenian Sherpa, Samvel Mkrtchia at the Nuclear Security Summit, The Hague, June 2013

Fundamentals and Good Practices for safeguards regulatory authorities – an Asia-Pacific Safeguards Network (APSN) Project

The main element of the required architecture for states to implement their obligations under IAEA safeguards agreements is the safeguards regulatory authority. It is important that each safeguards regulatory authority is effective in its administration of the state's safeguards obligations as it is the interface through which the IAEA conducts all its verification activities and receives state reports and declarations.

The importance of effectiveness, cooperation and transparency of safeguards regulatory authorities has received greater focus recently in light of the work of the IAEA Department of Safeguards to evolve its approaches for safeguards implementation and evaluation to consider a broader range of safeguards-relevant information about each state – known as the state-level concept (see report at pages 15–17 of the 2010–11 ASNO Annual Report). International confidence in the compliance of states with their non-proliferation obligations is dependent on confidence in the IAEA's inspection and evaluation activities for each state, and an effective safeguards regulatory authority contributes to this. If a safeguards regulatory authority has demonstrable authority to compel compliance by nuclear facilities, consistently

prepares accurate and timely reports to the IAEA, and is responsive, cooperative and transparent in responding to IAEA enquiries, then clearly this will make the IAEA's task of evaluating compliance more efficient, and have a positive influence on the IAEA's evaluations of that State. This was put very well in the IAEA's recently published Safeguards Guidance document[8]:

> 'while clearly a requirement for both States and the IAEA, effective cooperation also demonstrates a State's commitment to the peaceful use of nuclear energy and furthers national interests by strengthening nuclear security and reducing the risk of unauthorized use of nuclear material. A partnership between the IAEA and the State can also make safeguards implementation more cost effective and minimize its impact on nuclear operations without compromising the safeguards objectives.'

Essentially the IAEA is stating that the confidence dividends that arise from a cooperative and transparent relationship with the IAEA can pay efficiency dividends in how safeguards are implemented.

So, with this in mind, if a state wishes to strive for a high standard of effectiveness, cooperation and transparency in its dealings with the IAEA, then what should it do and how should it conduct itself? The concept of effectiveness can lend itself to being evaluated in a semi-quantitative way by considering, for example, the timeliness and accuracy of reports, but the concepts of cooperation and transparency are more difficult to measure. One aspect of cooperation and transparency is going beyond minimum legal reporting requirements and IAEA access requirements where doing so can reasonably assist the IAEA in its inspection and evaluation activities. There is currently no particular guidance on this, and the IAEA is somewhat constrained in setting guidelines that go beyond legal requirements, which is where the value of regional networks of safeguards practitioners such as Asia-Pacific Safeguards Network (APSN) comes to the fore.

APSN comprises around 15 members and observers from states across the Asia-Pacific region, with a broad range of nuclear profiles, such as: states with small populations through to states with large populations; developing states through to developed states; states with no nuclear fuel cycle activities through to states with advanced nuclear fuel cycle activities; and, states with and without the Additional Protocol on strengthened safeguards in force. This broad community of safeguards practitioners desiring to complement and support the important work the IAEA is doing in promoting effective safeguards completed a paper on their collective perspectives on the fundamentals and good practices for safeguards regulatory authorities. The APSN paper is available on the IAEA's website of safeguards resources for states, and on the APSN website.

The APSN paper outlines the fundamentals and good practices for safeguards regulatory authorities under three categories: international engagement; domestic engagement; and education, training and professional development. The paper goes into some detail under each of these categories, but this article will summarise the key narratives under the international and domestic engagement categories.

8 http://www.iaea.org/safeguards/Resources_for_States/additional-documents.html

International Engagement

The main thread that runs through this category is the importance of cooperation and transparency with the IAEA. For example, the fundamentals and good practices under this category include promoting and cultivating a good cooperative relationship with the IAEA, being proactive in the voluntary provision of relevant information to the IAEA, and being responsive to IAEA requests for information.

Domestic Engagement

The main thread in this category is accountability of safeguards regulatory authorities to a suitably high level of government and the authority to compel compliance by facilities within the State.

These messages on international and domestic engagement appear obvious, but do in fact relate to real issues the IAEA has experienced in the safeguards performance of some states. In mid-2013 there were reports from some media outlets on the areas of difficulty in safeguards implementation highlighted in the IAEA's Safeguards Implementation Report for 2012. These areas of difficulty included that several states had not provided timely responses to IAEA requests for clarifications of safeguards relevant information, and that not all safeguards regulatory authorities have the necessary authority and independence.

The purpose of APSN's paper is to provide practical guidance that states in other regions of the world can draw upon in assessing, evaluating or benchmarking their safeguards regulatory authorities. The paper represents the collective views of the broad community of states that make up APSN, which has the added value of demonstrating that the fundamentals and good practices are universal and do not just apply to one category of state, nor, for that matter, only to states with the Additional Protocol in force. A testament to the value of this APSN paper is that the IAEA has chosen to include APSN's paper in its small library of safeguards resources for states.[9]

CTBT: Looking for the smoking gun

The imaginary country of Forestia has been feeling under pressure. The world is worried that tensions between it and neighbouring Equilibria have led Forestia to clandestinely develop and test a nuclear weapon. Seismic stations have detected an event that appears to be an underground explosion big enough to be a small nuclear test. Some unusual radioactive particles have also been detected by a Comprehensive Nuclear-Test-Ban Treaty (CTBT) radionuclide monitoring station in Equilibria – not enough to prove a nuclear explosion, but raising suspicions.

This scenario has set the background to a series of exercises, conducted by the CTBT Organization (CTBTO) over the last year, as part of its work to establish the practical capability to implement the on-site inspection (OSI) element of the CTBT. Once the Treaty is in force, OSI will be available as a tool to investigate and clarify events detected by the CTBT's global monitoring system.

9 http://www.iaea.org/safeguards/Resources_for_States/additional-documents.html

Similar to the CTBT's monitoring system, the OSI mechanism is based around the use of scientifically credible methods and tools to search for and gather information to clarify the nature of an event of concern. The search is conducted over an area of up to 1000 km^2 using visual and multispectral observation techniques together with radiation surveys and environmental sampling to close in on areas of interest. Local seismic monitors are installed to detect events such as rockfalls in the underground cavity created by a nuclear explosion. A number of geophysical imaging techniques are applied to detect and investigate possible underground features related to a nuclear test. Finally, and if necessary, drilling to obtain a sample of radioactive material from an underground nuclear explosion is possible.

Three 'build-up' exercises linked to the Forestia story have been conducted since April 2012. The first focused on activities prior to an inspection, where, within just a few days, a team of 40 inspectors needs to be assembled and deployed and their initial investigative work planned. The second exercise, in Austria in September 2012, played out the arrival of the inspection team in Forestia and establishment of a base of operations for its work. Finally, in Hungary in May–June 2013, the third exercise began with the team at work in the field and focused on close-in investigation of the possible nuclear explosion site.

To add realism to the exercises, the inspectors have worked with a 'team from Forestia' to conduct the inspection in an area that includes military facilities. The CTBT requires the inspected State Party to support the conduct of the inspection. Forestia has done this, but it has exercised its rights under the CTBT to protect its national interest. Forestia has sought to manage the inspectors' access to locations it considers are sensitive, but has also wanted to ensure that the inspectors' findings 'show its innocence'. The interplay of these interests, together with the practical exercise of deploying inspectors to the field and analysing inspection data, has been a realistic test for many aspects of the CTBTO's current OSI capability, and has demonstrated strong progress in the development of the capability in recent years.

The logistics involved in running these simulations has been impressive. Over 200 technical experts have participated in the various exercises, deploying more than one hundred tonnes of equipment. This is valuable experience for the CTBTO, as the logistics of an actual OSI could be very challenging – and would need to be activated on very short notice.

The three exercises have been termed 'build-up' activities and are part of a cycle of activities leading to a major and integrated test of CTBT OSI, set to be conducted over five weeks in late 2014 in Jordan. These exercises are crucial to the development of the CTBTO's capability and readiness to conduct an OSI when the CTBT enters into force.

Australian accents have been heard in the fields of Forestia. Several CTBTO staff working on the exercise hail from Down-Under, as well as a geophysicist from Australian industry. ASNO's Malcolm Coxhead has also contributed, playing the part of a Forestian government official, and leading the Forestian Team in one of the three exercises.

Did Forestia conduct a nuclear test? In the fictional scenario, as in reality, that is a question for CTBT States Parties to consider. But they can now do so with a great deal of valuable 'ground-truth' information available to them.

Australia-Russia Nuclear Cooperation – Trial Shipment of Australian Uranium

Three years on from the entry into force of the Australia–Russia nuclear cooperation agreement in November 2010, Australia and Russia's collaboration on these matters continues to grow. Through 2012–13, ASNO officers worked closely with officers from the Russian State Atomic Energy Corporation 'Rosatom' to trial the first shipment of Australian uranium to Russia.

The trial shipment of uranium ore concentrate from an Australian mine departed Australia in September 2012 and arrived at the seaport of St. Petersburg in November 2012. The trial shipment enabled the Australian producer to test commercial and transport arrangements. In addition, it enabled Australian and Russian government officials to ensure that there was a common understanding of the administrative arrangements underpinning the nuclear cooperation agreement.

The consignment of Australian uranium ore concentrate upon arrival in the seaport of St. Petersburg in November 2012 (Photo: Russian State Atomic Energy Company 'Tenex')

Australian officers from ASNO and the Department of Resources, Energy and Tourism worked closely with officers from the Australian producer, and in turn with Rosatom officers. All parties involved worked to ensure that all relevant transportation, logistical and administrative arrangements were implemented effectively. This was not an easy task as arrangements needed to take into account a number of safeguards, safety and physical security considerations. However, the attention to detail and positive attitude of all parties involved ensured that the shipment took place smoothly.

As is the case for all Australian uranium that is exported, the shipment to Russia will enter the civil nuclear fuel cycle and will eventually be converted, enriched and fabricated into fuel for the production of electricity by civil nuclear reactors and for related research and development. The successful implementation of the

Australia–Russia nuclear cooperation agreement provides Australian uranium producers with access to the expanding Russian market.

On 25–26 March 2013, officials from ASNO and Russia met in Canberra for bilateral consultation on the implementation of the Australia–Russia nuclear cooperation agreement. These consultations enabled officials to review the arrangements as implemented. ASNO looks forward to continuing our close cooperation with Rosatom officials.

ASNO and Russian officials from the State Atomic Energy Corporation 'Rosatom', Russian nuclear facilities and the Russian Embassy in Canberra at a bilateral consultation held in Canberra on 25–26 March 2013 (Photo: ASNO)

Australia's Uranium Production and Exports

Statistics related to Australia's exports of uranium ore concentrates (UOC) are listed in Table 1 below.

Australia's Reasonably Assured Resources (RAR) of uranium recoverable at costs of less than US$130 per kilogram uranium were estimated to be 1,196,000 tonnes uranium as at December 2011, which represents 34 per cent of world resources in this category. This is based on estimates for Australia by Geoscience Australia in *Australia's Identified Mineral Resources 2012* and for other countries as reported by the OECD Nuclear Energy Agency in 'Uranium 2011: Resources, Production and Demand'. In 2012, the Olympic Dam and Ranger mines were, respectively, the world's second largest (6 per cent of world uranium production) and third largest (5 per cent of world uranium production) uranium producers.[10] Overall, in 2012 Australia was the third largest uranium producer after Kazakhstan and Canada.

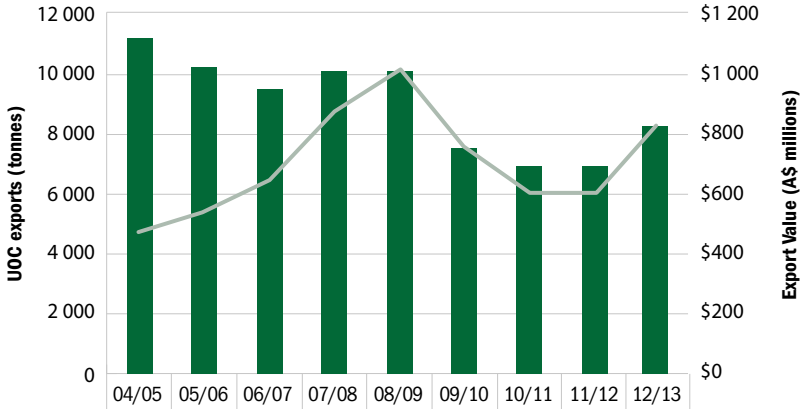
10 Australian production compared with data on global uranium producers from the World Nuclear Association's *World Uranium Mining* (July 2013) – http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Mining-of-Uranium/World-Uranium-Mining-Production/.

TABLE 1: UOC EXPORT AND NUCLEAR ELECTRICITY STATISTICS

Item	Data
UOC Exports	
Total Australian UOC exports 2012–13	8 391 tonnes
Value Australian UOC exports	A$823 million
Australian exports as % world uranium requirements[11]	~10.7%
No. of reactors (GWe) these exports could power[12]	~40
Power generated by these exports	~253 TWh
Expressed as percentage of total Australian electricity production[13]	~99.6%

Worldwide, uranium mining currently provides about 85 per cent of global industry requirements, with the balance coming from down-blending of excess weapons material, stockpiles and reprocessing. In 2012 world uranium consumption decreased due to lower consumption in Japan and Germany associated with the closure of nuclear capacity following the Fukushima Dai-ichi nuclear accident in March 2011. It is anticipated that world uranium consumption will increase in 2013 due to commissioning of new nuclear generating capacity in China, India, the Russian Federation and Taiwan. Over the longer term uranium spot prices are expected to be strong due to the forecast increase in nuclear power worldwide, and the completion of the 20 year US–Russia Megatons to Megawatts program, due to expire in 2013. New mines will be necessary to meet current, as well as future increases in demand.

FIGURE 2: QUANTITY AND VALUE OF AUSTRALIAN UOC EXPORTS



	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13
UOC exports (tonnes)	11 215	10 253	9 518	10 140	10 114	7 555	6 950	6 918	8 391
Value (A$ millions)	$475	$545	$658	$882	$1,033	$758	$610	$607	$823

11 Based on 2013 world requirements of 66,512 tonnes uranium from the *World Nuclear Association's World Nuclear Power Reactors & Uranium Requirements* (1 July 2013) – http://www.world-nuclear.org/info/Facts-and-Figures/World-Nuclear-Power-Reactors-and-Uranium-Requirements/.

12 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* (1 July 2013) – http://www.world-nuclear.org/info/Facts-and-Figures/World-Nuclear-Power-Reactors-and-Uranium-Requirements/.

13 Based on Australia's electricity generation in 2011–12 of 254 TWh from the Australian Government Bureau of Resources and Energy Economics' *2013 Australian Energy Update* (July 2013) – http://www.bree.gov.au/publications/aes.html.

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),[14] 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.

The principal conditions for the use of AONM set out in Australia's safeguards 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 per cent or more in the isotope ^{235}U and reprocessing[15]
- fallback 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

14 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 subject to the conclusion of a bilateral civil nuclear cooperation agreement that met Australia's safeguards and other requirements.

15 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.

- regular consultations on the operation of the agreement are undertaken
- provision is made for the removal of AONM in the event of a breach of the agreement.

Australia currently has 22 nuclear safeguards agreements in force, covering 39 countries plus Taiwan (see Appendix B).[16]

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
- IAEA safeguards activities and IAEA conclusions on each country.

Australia's uranium transhipment security policy

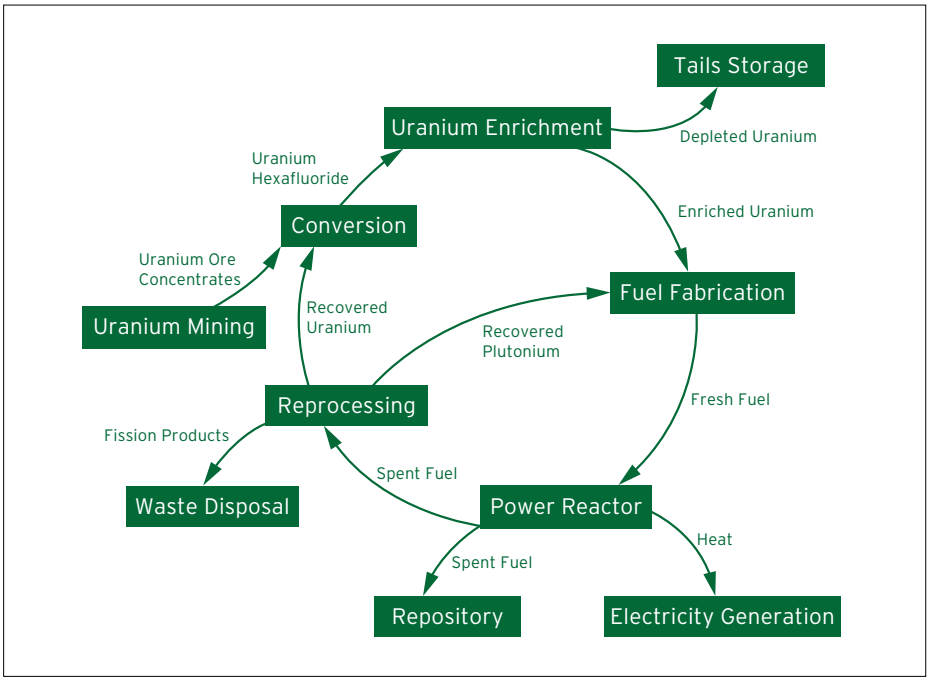
For countries with which Australia does not have a bilateral safeguards agreement in force, but through which Australian uranium ore concentrates (UOC) are transhipped, there must be arrangements in place with such states to ensure the security of UOC during transhipment. If the state is:

- 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[17]. 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.

16 Twenty-seven of the countries making up this total are European Union member states.

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

FIGURE 3: 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.

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Minister for Foreign Affairs Senator Carr and UAE Foreign Minister Sheikh Abdullah bin Zayed Al Nahyan signing the bilateral nuclear cooperation agreement on 31 July 2012 (Image: DFAT)

OVERVIEW OF ASNO
SECTION 3

Safeguards *Nuclear* OPCW **Non-Proliferation** *Chemical* IAEA **Security** CTBTO *Nuclear* CTBTO *Chemical* **Security** **Safeguards** OPCW *Nuclear* **Non-Proliferation** *Chemical* **Non-Proliferation** IAEA *Nuclear* *Chemical* **Security** CTBTO **Safeguards** OPCW **Securi** *Chemical* **Safeguards** OPCW **Security** **Non-Proliferation** *Chemical* IAEA *Nuclear* OPCW *Nuclear* **Non-Proliferation** IAEA *Chemical* **Security** CTBTO *Chemical* **Safeguard** **Security** CTBTO *Chemical* *Nuclear* OPCW **Safeguards** IAEA *Nuclear* CTBTO *Cher* *Nuclear* IAEA **Security** CTBTO *Chemical* *Nuclear* **Non-Proliferation** **Security** OPCW

OVERVIEW OF ASNO

Goal

Functions

Nuclear Safeguards Functions

Comprehensive Nuclear-Test-Ban Treaty Functions

Chemical Weapons Convention Functions

Other Functions

Operating Environment

Outcomes and Outputs Structure

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. These changes confirmed arrangements that had been in place informally for several years.

Nuclear Safeguards Functions

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) is the centrepiece of the international nuclear non-proliferation regime. Since its entry into force in 1970, the NPT has become almost universal, with 190 Parties. Only three states – India, Israel and Pakistan – remain outside the NPT. A fourth – the DPRK – announced its withdrawal from the NPT in 2003, but the validity of this withdrawal has not been determined.

Under the NPT, non-nuclear-weapon states commit not to acquire nuclear weapons, and to conclude an agreement with the International Atomic Energy Agency (IAEA) for the application of IAEA safeguards to all their nuclear material to verify their compliance with this commitment.

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.

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

- the NPT
- Australia's 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
- the International Convention for the Suppression of Nuclear Terrorism.

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 safeguards functions of the Director General ASNO are set out in section 43 of the Safeguards Act. These 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 monitoring compliance with the provisions of these agreements
- undertaking, co-ordinating and facilitating research and development in relation to safeguards
- advising the Minister for Foreign Affairs on matters relating to the international nuclear non-proliferation regime and the international safeguards system.

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 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
- 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* (the 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

- 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 Chemical Weapons Convention (CWC) prohibits the development, production, acquisition, stockpiling, retention and transfer or 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 formulating 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
- administering and developing related regulatory and administrative mechanisms.

Chemical Weapons (Prohibition) Act 1994

The *Chemical Weapons (Prohibition) Act 1994* (the 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 that provide a legal framework for the mandatory provision of data to ASNO by facilities producing or using chemicals, 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
- 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 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.

OPCW, ASNO and facility representatives at a routine OPCW inspection at a chemical plant in Queensland (Image: ASNO)

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.

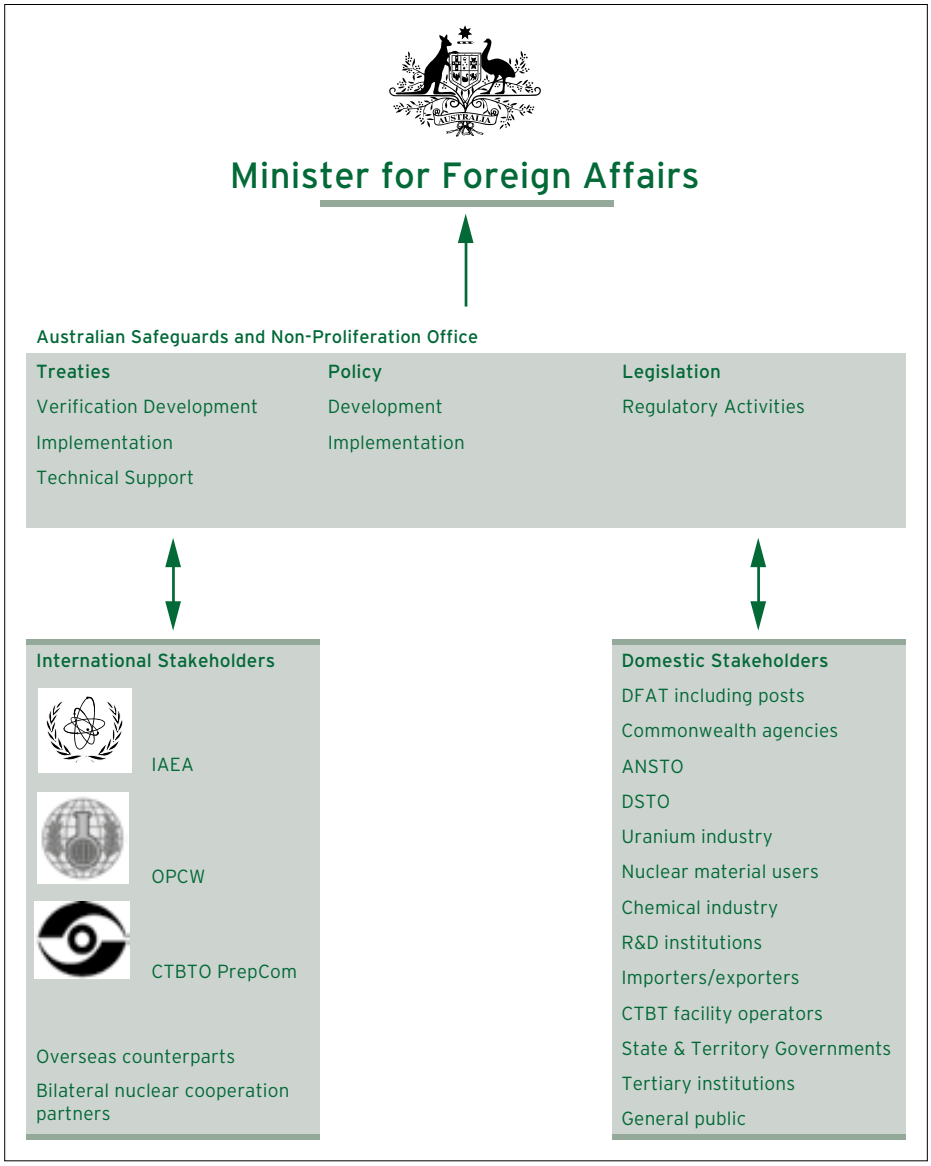
The SPNFZ Treaty has three protocols. Under Protocol 1 the US, UK and France, are required to apply the basic provisions of the Treaty to their respective territories in the zone established by the Treaty. Under Protocol 2, the US, France, UK, Russia and China agree not to use or threaten to use nuclear 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 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 4: ASNO'S OPERATING ENVIRONMENT



Outcomes and Outputs Structure

FIGURE 5: 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. Internationally agreed physical protection standards applied to Australian Obligated Nuclear Material 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.

IAEA Deputy Director General, Head of the Division of Safeguards, Herman Nackaerts (centre) with IAEA, ASNO and facility representatives at the Olympic Dam mine, October 2012 (Image: ASNO)

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Chemical ***Nuclear*** **Non-Proliferation** **Security** OPCW **Safeguards** IAEA ***Chemical***

ASNO Director General Robert Floyd with Rosatom representative Mr Victor Pitel during the bilateral meeting in Canberra in March 2013 (Image: ASNO)

PERFORMANCE
SECTION 4

Safeguards *Nuclear* OPCW **Non-Proliferation** *Chemical* IAEA **Security** CTBTO *Nuclear* CTBTO *Chemical* **Security** **Safeguards** OPCW *Nuclear* **Non-Proliferation** *Chemical* **Non-Proliferation** IAEA *Nuclear* *Chemical* **Security** CTBTO **Safeguards** OPCW **Securi** *Chemical* **Safeguards** OPCW **Security** **Non-Proliferation** *Chemical* IAEA *Nuclear* OPCW *Nuclear* **Non-Proliferation** IAEA *Chemical* **Security** CTBTO *Chemical* **Safeguard** **Security** CTBTO *Chemical* *Nuclear* OPCW **Safeguards** IAEA *Nuclear* CTBTO *Cher* *Nuclear* IAEA **Security** CTBTO *Chemical* *Nuclear* **Non-Proliferation** **Security** OPCW

PERFORMANCE

Output 1.1: National Safeguards System

Output 1.2: Physical Protection

Output 1.3: Bilateral Safeguards

Output 1.4: International Safeguards and Non-Proliferation

Output 1.5: CWC Implementation

Output 1.6: CTBT Implementation

Output 1.7: Other Non-Proliferation Regimes

Output 1.8: Advice to Government

Output 2.1: Public Information

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 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 and facilities as required by Australia's safeguards agreement with the IAEA.

ASNO reported changes to Australia's nuclear material inventory to the IAEA on a monthly basis. These reports are summarised in Tables 2 and 3 below. ASNO audited and reported on the inventory at the Lucas Heights site of the Australian Nuclear Science and Technology Organisation (ANSTO) – the principal location in Australia of nuclear material subject to IAEA safeguards – as well as permit holders around Australia with small quantities of nuclear material. The high number of reports in Tables 2 and 3 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.

TABLE 2: ASNO REPORTS (LINE ENTRIES) TO THE IAEA, 2007–13, BY FACILITY

Facility	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
ANSTO research laboratories	550	588	607	989	1 291	1 040
HIFAR (defuelled 2007)	27	117	8	0	0	3
ANSTO vault storage	18	27	22	26	126	337
Moata (defuelled 1995)	11	10	8	0	0	3
OPAL reactor	60	106	196	381	496	338
Silex laboratories	68	4	13	0	0	3
Other locations	3 024	3 286	2 948	2 940	2 879	3 310
TOTAL	**3 758**	**4 138**	**3 802**	**4 336**	**4 792**	**5 034**

ANSTO and ASNO staff with IAEA inspectors at the HIFAR facility at ANSTO during the 2013 physical inventory verification inspection (Image: ANSTO)

TABLE 3: ASNO REPORTS (LINE ENTRIES) TO THE IAEA, 2007–13, BY DATA TYPE

Type of Data	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
Inventory Change Report	488	589	459	838	1 084	1 015
Physical Inventory Listing	1 476	1 550	1 584	1 541	1 551	1 694
Material Balance Report	152	152	136	132	143	187
Concise Note	1 642	1 847	1 623	1 825	2 014	2 138
TOTAL	**3 758**	**4 138**	**3 802**	**4 336**	**4 792**	**5 034**

Table 4 is a summary of total quantities of nuclear material by nuclear material category in Australia. Notable changes from the previous year's totals include an increase of around 3.7 tonnes of depleted uranium due to the import of several transport containers for radioactive sources.

For the first time in an Annual Report, ASNO has provided for the category of ^{235}U a breakdown by low enrichment and high enrichment levels. This is an additional transparency measure ASNO has introduced in support of the important goals of the series of Nuclear Security Summits. Australia's inventory of high-enriched uranium has decreased considerably since the 1990s due to several important sovereign decisions and actions Australia has taken to lead by example in reducing nuclear security and proliferation risks. These include: transforming the HIFAR reactor to accept low-enriched fuel; shipping spent HIFAR fuel to the US and France; designing the OPAL reactor to operate on low enriched fuel; and, designing the molybdenum-99 radiopharmaceutical production plant to use low-enriched uranium targets.

The small quantity (approximately 2.7 kg) of high-enriched uranium that remains in various locations around Australia, such as ANSTO and some universities, is retained and used for a variety of purposes that utilise the particular characteristics of high-enriched uranium. The uses include: research and development related to nuclear non-proliferation activities; validating the commercial application of ANSTO's Synroc waste immobilisation technology; nuclear forensics for identifying illicit nuclear materials; mass spectrometry; and nuclear materials chemistry work.

TABLE 4: NUCLEAR MATERIAL IN AUSTRALIA AT 30 JUNE 2013

Category	Quantity	Intended End-use
Source Material		
Uranium Ore Concentrates (UOC)	1 666 tonnes	Export for energy use pursuant to bilateral agreements
	6 tonnes	Storage
Natural Uranium (other than UOC)	4 502 kg	Research and shielding
Depleted Uranium	19 492 kg	Research and shielding
Thorium Ore Residues	59 tonnes	Storage/disposal
Thorium (other than Thorium Ore Residues)	1 952 kg	Research, industry
Special Fissionable Material		
^{235}U – low enriched	169 309 grams	Research, radioisotope production, storage
^{235}U – high enriched	2 741 grams	Research, storage
^{233}U	4 grams	Research
Plutonium (other than ^{238}Pu)	1 226 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 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 5: ASSOCIATED ITEMS IN AUSTRALIA AT 30 JUNE 2013

Category	Quantity	Intended End-use
Associated Material		
Deuterium and heavy water	28.7 tonnes	Research, reactors
Nuclear grade graphite	83.4 tonnes	HIFAR, Moata and storage
Associated Equipment		
HIFAR[18]	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[19]	1	Reactor
OPAL control rods	13	Reactor components
OPAL control rod drives	6	Reactor components
Silex equipment	-	Enrichment R&D

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

19 Includes, inter alia, the reactor reflector vessel and core grid

Reporting obligations under the Australia-IAEA Additional Protocol

Australia was the first country to bring into force the IAEA's Additional Protocol on strengthened safeguards in 1997. ASNO prepares and provides declarations under a range of categories under the Additional Protocol on an annual basis (due 15 May each year), as well as quarterly declarations on relevant exports. Table 6 lists the number of declarations Australia has made under each category.

TABLE 6: NUMBER OF DECLARATIONS MADE UNDER THE ADDITIONAL PROTOCOL

Type of Declaration under Article 2.a and 2.b of the Additional Protocol	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
2.a.i – Government funded, authorised or controlled nuclear fuel cycle-related research and development activities not involving nuclear material	-	-	1	-	1	2
2.a.ii – OPAL operational schedules	-	-	1	1	1	1
2.a.iii – General description of each building on each site, e.g. ANSTO, universities	150	146	178	160	158	189
2.a.iv – manufacturing or construction of specified nuclear related equipment	-	-	-	-	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	5	5	6	6
2.a.vii – Information on nuclear material exempted from safeguards	15	8	7	-	-	-
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	-	1	3	-	-	-
2.a.x – General 10 year plans related to nuclear fuel cycle activities	2	1	2	2	3	5
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

Safeguards implications of ANSTO's nuclear infrastructure projects

In September 2012, the Australian Government announced two major infrastructure projects at ANSTO, an export-scale plant for producing molybdenum-99 to secure Australia's supply of this important radiopharmaceutical and increase capacity to meet a significant proportion of the world's needs, and a collocated Synroc[20] waste plant for immobilising waste from past, current and future manufacture of nuclear medicines. Additionally, in April 2012 ANSTO announced it would apply for a licence to construct an interim storage facility for Australian intermediate level radioactive waste generated by several decades of nuclear medicine production and scientific research. These three infrastructure projects, the molybdenum-99 production plant, Synroc plant and interim storage facility have implications with respect to providing the IAEA with safeguards-relevant design information and structuring safeguards material balance areas at ANSTO. In the reporting period, ASNO began discussions with the IAEA on appropriate safeguards arrangements, and expect to have this completed in the 2013–14 period.

Top picture shows an artist's impression of the proposed Synroc treatment facility at ANSTO. The bottom picture is the proposed ANSTO Nuclear Medicine building (Images: ANSTO)

20 Synroc is an Australian innovation to lock up high-level nuclear waste. It can reduce the volume of nuclear by-products by 99 per cent compared to other methods used internationally such as cementation.

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. Administration of this system was carried out in a timely manner.

TABLE 7: STATUS OF SAFEGUARDS PERMITS AND AUTHORITIES AT 30 JUNE 2013

Permit or Authority	Current Total	Granted	Varied	Revoked	Expired
Possess nuclear material	101	8	12	1	1
Possess associated items	14	0	12	0	1
Transport nuclear material	21	2	3	0	1
Transport associated items	0	0	0	0	0
Establish a facility	1	1	0	0	0
Decommission a facility	2	0	0	0	0
Communicate information contained in associated technology	10	0	10	0	1
TOTAL	**149**	**11**	**37**	**1**	**4**

Notice of all permit changes was published in the Commonwealth Gazette as required by subsection 20(1) of the *Nuclear Non-Proliferation (Safeguards) Act 1987*. Ten permits were granted to organisations that possess or transport nuclear material and one permit was granted to establish a facility. This was for a pilot plant for conducting uranium mineral processing test work. One permit was revoked where the permit holder no longer held nuclear material or associated items. In the past year, 37 permits were varied as a result of changes to organisational details and approved locations.

ASNO Inspections

During the reporting period, ASNO carried out four domestic inspections to ensure that requirements of permits and authorities were being met. From these inspections, ASNO found no indication of unauthorised access to, or use of, nuclear materials or nuclear items. The number of inspections ASNO conducted was considerably lower than in previous years due to the effort required in support of a range of other policy and regulatory activities. Given the small number of inspections, this Annual Report does not include graphs of the spread of inspection effort across different regulatory entities.

IAEA Inspections

ASNO ensured that all of Australia's obligations with respect to IAEA inspections were met. During the reporting period, the IAEA conducted one physical inventory verification inspection and one routine nuclear material inventory verification inspection. The IAEA exercised its complementary access rights in accordance with the Additional Protocol on one occasion, at the Ranger uranium mine. Details are provided in Table 8.

TABLE 8: IAEA SAFEGUARDS INSPECTIONS AND COMPLEMENTARY ACCESSES 2012–13

Date	Facility	Material balance area	Type
3 July 2012	OPAL Reactor	AS-F	Short Notice Inventory Verification Inspection
	ANSTO research laboratories	AS-C	Complementary Access
4 July 2012	SSL Laboratories	AS-G	Complementary Access
6 July 2012	Ranger Uranium Mine	AS-E	Complementary Access
20 May 2013	OPAL Reactor	AS-F	Routine Inventory Verification Inspection Design Information Verification Inspection
21–22 May 2013	ANSTO – Research and Development	AS-C	Routine Inventory Verification Inspection Design Information Verification Inspection
23 May 2013	HIFAR Reactor	AS-A	Design Information Verification Inspection
	Moata Reactor	AS-B	Design Information Verification Inspection
23 May 2013	SSL Laboratories	AS-G	Design Information Verification Inspection

During the physical inventory verification inspection at ANSTO, in May 2013, the IAEA also conducted design information verification inspections at the SSL Laboratories (Silex) and of the building that contained the Moata research reactor before it was dismantled. The purpose of these design information verification inspections was to verify that these two facilities are decommissioned for the purposes of safeguards. The IAEA's decision on the facility status of Silex and Moata is expected during the 2013–14 period. Should the IAEA determine that Silex and Moata are decommissioned, the material balance areas AS-G (Silex) and AS-B (Moata) will no longer exist but the IAEA will still retain access rights to the relevant buildings by virtue of these being on the ANSTO site.

The IAEA reports the outcomes of safeguards inspections and complementary access in Australia in statements under Article 91(b) of Australia's Safeguards Agreement with the IAEA and Article 10(c) of the Additional Protocol (see Appendix D).

During the reporting period, some small inventory differences were reported to the IAEA. These were primarily due to re-measurements of batches at various locations outside of ANSTO (e.g. universities). For the inventory difference in other locations listed below, 0.05 kilograms in depleted uranium and 0.01 kilograms in natural uranium resulted from a few small jars of chemical reagents not being identified during a permit holder's physical inventory taking at the end of the reporting period. There were no inventory differences at Lucas Heights facilities. Details are provided at Table 9.

TABLE 9: INVENTORY DIFFERENCES RECORDED DURING 2012–13

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	Nil	Book inventory equalled the physical inventory
Other locations	-3.41 kg Natural uranium	Primarily rounding, re-measurement and correcting double-counted batches.
	-1.85 kg Depleted uranium	
	-2.06 kg Thorium	
	-0.04 g Enriched uranium	

ANAO Audit

The Australian National Audit Office (ANAO) commenced an audit in late 2012 of the management by ASNO of arrangements to meet Australia's obligations under the comprehensive safeguards agreement and Additional Protocol with the IAEA. ASNO worked closely with ANAO in late 2012 and early 2013 on compiling information and responding to questions for the audit. The ANAO's final report is expected to be tabled in Parliament in late 2013.

ASNO officer, Dr Stephan Bayer, addresses the Regional Workshop on the Amended Convention on the Physical Protection of Nuclear Material, Beijing, April 2013

OUTPUT 1.2: PHYSICAL PROTECTION

Protection of Australia's nuclear facilities, nuclear material and nuclear items against unauthorised access and sabotage. Internationally agreed physical protection standards applied to Australian Obligated Nuclear Material overseas.

Performance Measures

- Physical protection of nuclear material, technology and facilities meets Australia's obligations under the Convention on the Physical Protection of Nuclear Material (CPPNM), bilateral agreements and IAEA guidelines
- Australian uranium at mines and in transit is properly protected
- Internationally agreed standards for the physical protection of nuclear material are applied to all AONM
- Proactive and professional contributions made to the development and effective international implementation of the CPPNM and associated physical protection guidelines

Performance Assessment

International and Bilateral Obligations

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

During 27 February – 1 March 2013, Australia hosted a US delegation from the National Nuclear Security Administration, the Department of Energy, the Nuclear Regulatory Commission and the Department of State for a bilateral security visit pursuant to the Australia–US Nuclear Cooperation Agreement to assess the security of US-obligated nuclear material in Australia. In particular, the visit was triggered by ANSTO's request for the export of US-obligated nuclear material to Australia to fuel the OPAL reactor. The previous bilateral visit took place in 2005 (see page 43, 2005–06 Annual Report). The US delegation visited facilities where US-obligated nuclear material is used or stored and concluded that physical security at the buildings visited meet the intent of INFCIRC/225/Rev.4[21], but provided some strong suggestions to further enhance security.

21 Given that many countries are still in transition to meet to recommendations of INFCIRC/225/Rev.5, the US bilateral visits currently assess against revision 4, but make suggestions relevant to revision 5. Future US bilateral visits will involve assessment against INFCIRC/225/Rev.5.

Nuclear Security at Uranium Mines

On 23 May 2013, ASNO conducted an inspection at the Olympic Dam uranium mine, evaluating security plans and procedures against ASNO's permit requirements. ASNO reviewed documentation, physical protection equipment and procedures during the inspection. During the visit, ASNO also verified that recommendations arising from the previous inspection, including changes to the security plan and training documentation, had been appropriately addressed.

Transport of Uranium Ore Concentrate – Stakeholders meeting in Kalgoorlie

In February 2013, ASNO accompanied a small Western Australian Government delegation to Kalgoorlie to discuss with stakeholders the potential for uranium ore concentrates to transit through Kalgoorlie should uranium mining commence in Western Australia. The meetings were helpful to build an understanding of the roles and capabilities of first responders and the concerns of the local council and for ASNO to explain its role in the regulation of uranium transport in Australia.

Nuclear Security at Lucas Heights

ANSTO completed its periodic security review for the OPAL reactor in August 2012 which contained 88 recommendations for addressing the terms of reference which included assessment against international standards and ASNO's permit conditions. A joint working group between ASNO and ARPANSA held a meeting to discuss ANSTO's review and begin formulating a formal response which will be provided in the coming financial year.

ASNO considered and approved security arrangements associated with an extension to the OPAL reactor building (to accommodate new work space) and attended planning meetings to discuss security arrangements for ANSTO's proposed new nuclear medicine manufacturing plant.

ASNO also attended some of the series of security and crisis management exercises conducted by ANSTO throughout the year. The experiences gained from these exercises help improve emergency preparedness and response arrangements in place for ANSTO.

Exports of Australian Uranium

Reporting by conversion facilities, safeguards authorities and shipping agencies confirmed that all AONM exported from Australia safely reached its destination. Physical protection procedures applied to these exports included checking of the physical condition of the containers and verifying the integrity of the containers and seals at each port of unloading or transhipment to detect any breaches of physical protection.

IPPAS Workshop and Upcoming Mission

In November 2012, ASNO hosted an IAEA led regional workshop on International Physical Protection Advisory Service (IPPAS) missions in Sydney to educate participants on the importance, activities, scope, and process of IPPAS mission activities. The workshop was attended by 25 participants, including from Australia, Bangladesh, Hungary, Indonesia, Japan, Malaysia, Pakistan, the Philippines, the Republic of Korea, Thailand, the UK and Vietnam. The workshop was especially useful for countries considering or planning IPPAS missions.

After the workshop, ASNO also hosted a two-day preparatory meeting for Australia's planned IPPAS mission in November 2013. The scope, timing, schedule, team composition and financing were discussed and written up as a draft arrangement. Further correspondence on the scope of the mission concluded that it should include national arrangements and facility security, nuclear material and radioactive sources, transport security and cyber security at Lucas Heights, Sydney.

ASNO also provided a team member for an IPPAS mission hosted in Hungary held over two weeks in May–June 2013.

Transport Workshop – Sydney

During 3–7 December 2012 in Sydney, ASNO and ARPANSA co-hosted an IAEA international regional training course on security in the transport of nuclear material. Participants from China, India, Indonesia, Malaysia and Thailand attended, as well as Australian participants and IAEA representatives. Key topics included prevention of theft and sabotage, recovery of nuclear materials and response to sabotage, threat assessments, international and domestic transport and transport security plans. ASNO presented on Australia's nuclear materials security regulation and experiences.

Uranium Production Regulatory Workshop – Darwin

The IAEA and the Department of Resources, Energy and Tourism co-hosted a Training Meeting on the Effective Regulatory and Environmental Management of Uranium Production, held from 13–17 August 2012 in Darwin. The purpose of the workshop was to share and discuss best practice and innovative approaches for managing regulatory and environmental issues during uranium exploration, mining and ore processing. The presentations given at the meeting focused on sharing concepts to effectively regulate and facilitate safe, secure and responsible uranium mining activities. The meeting was attended by Commonwealth, state and territory government representatives, uranium mining and exploration companies, and international regulatory bodies. The workshop was also attended by an African uranium mining study tour, hosted by AusAID, that was visiting Australia at the time of the workshop. ASNO gave two presentations, one on Safeguards Reporting and Verification at Uranium Mines and another on Security Requirements and Implementation. Further details of the workshop, including copies of the presentations, can be found on the IAEA's website (http://www.iaea.org/OurWork/ST/NE/NEFW/Technical_Areas/NFC/uranium-production-cycle-TR-Darwin-2012.html).

International Regulator's Conference on Nuclear Security

During 3–6 December 2012, ASNO attended an International Regulator's Conference on Nuclear Security in the US hosted by the US Nuclear Regulatory Commission. Thirty-nine countries were represented at the conference. Keynote speakers included IAEA Director General Amano, and the then Assistant to the President of the United States for Homeland Security and Counterterrorism, John Brennan. The topic of nuclear cyber security featured prominently at the conference, among other topics such as legal and regulatory frameworks, design basis threats, personal trustworthiness, the safety-security interface, response to security events, radioactive source security, and IPPAS missions. ASNO presented on revising Australia's Design Basis Threat.

Regional Workshop on the Amended CPPNM

ASNO presented on Australia's experience in ratifying and implementing the Amendment to the CPPNM during an IAEA regional workshop on Facilitating Adherence to and Implementation of the 2005 Amendment to the Convention on the Physical Protection of Nuclear Material, held in Beijing, 1–3 April 2013. The workshop was one of a series of workshops held by the IAEA who are strongly promoting the entry into force of the Amended CPPNM which requires two-thirds of state parties to the CPPNM to ratify the amendment before it enters into force. The Beijing workshop was attended by participants and presenters from Afghanistan, Bangladesh, Cambodia, China, Indonesia, Japan, Laos, Lebanon, Mongolia, Oman, Pakistan, Philippines, Vietnam, and Yemen.

IAEA Nuclear Security Guidance Committee and the Nuclear Security Series

ASNO attended the 2nd and 3rd meetings of the IAEA's Nuclear Security Guidance Committee (NSGC) held during 9–13 December 2012 and 13–17 May 2013, both held in Vienna and attended by over 40 member states. For the December meeting, ARPANSA also attended as Australia's alternate member. Aside from consideration of specific documents in the IAEA's nuclear security series, the main topics of discussion were: the document production roadmap for the Nuclear Security Series; criteria for the attendance of observers to the NSGC; a 'fast-track' process for urgent documents; and a proposed nuclear security glossary.

Development of Nuclear Security Guidance for the Uranium Industry

Continuing the IAEA's work to produce detailed nuclear security guidance for nuclear security in the natural uranium industry, ASNO joined a small group of experts from France, Canada, US, South Africa, Russia and Denmark for an IAEA-led consultancy meeting held during 29 October to 2 November 2012 in Vienna. ASNO chaired a subgroup that composed state-level recommendations. The consultancy produced a solid draft of a guidance document designed to be used by regulators, operators and transporters in countries currently and prospectively involved with uranium mining or transport. The IAEA has already begun to 'road-test' the document as part of a series of workshops and outreach visits in Africa. The ultimate goal is to develop a document suitable for publication in the IAEA nuclear security series.

Nuclear Security Summit

ASNO attended intersessional Sherpa and Sous-Sherpa meetings of the nuclear security summit in Istanbul, The Hague and Vienna in preparation for the 2014 nuclear security summit in the Netherlands. During the meetings, delegates discussed arrangements and content for the 2014 summit, including progress on previous commitments, potential new initiatives, and the outline of The Hague summit communiqué. At the request of the Dutch Sherpa, Director General ASNO (Australia's Sherpa) gave presentations on international assurances in nuclear security (an outline of which is provided in Current Topics page 24).

ASNO also attended a number of track 1.5 workshops and dialogues, variously attended by some summit Sherpas and Sous-Sherpas, which discussed initiatives that could be delivered at the upcoming nuclear security summit to further strengthen global nuclear security.

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 2013, 68 states had ratified the amended CPPNM, requiring 30 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 2013 has 85 partner nations and four observers (UNODC, 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.

ASNO Assistant Secretary John Kalish at the Fourth International Nuclear Non-Proliferation and Security Symposium, Seoul, Republic of Korea, September 2012

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. 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 2012.

TABLE 10: SUMMARY OF AONM BY CATEGORY, QUANTITY AND LOCATION AT 31 DECEMBER 2012[22]

Category	Location	Tonnes[23]
Depleted Uranium	Canada, European Union, Japan, Republic of Korea, United States,	113 562
Natural Uranium	Canada, China, European Union, Japan, Republic of Korea, United States, Russia	25 016
Uranium in Enrichment Plants	European Union, Japan, United States	21 284
Low Enriched Uranium[24]	Canada, European Union, Japan, Mexico, Republic of Korea, Switzerland, Taiwan, United States	15 785
Irradiated Plutonium[25]	Canada, European Union, Japan, Mexico, Republic of Korea, Switzerland, United States, China	155
Separated Plutonium[26]	European Union, Japan	1.6
TOTAL		**175 804**

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

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

24 An estimated 80–90 per cent of Australian obligated low enriched uranium is in the form of spent reactor fuel.

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

26 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 11: SUPPLY OF AUSTRALIAN URANIUM TO CUSTOMERS DURING 2012 – AS DELIVERED TO CUSTOMERS' CONVERTER ACCOUNTS

Region	Tonnes UOC (U_3O_8)	% of Total
Asia	1 829	27.9
Europe	2 632	40.1
North America	2 104	32.0
TOTAL	**6 565**	**100.0**

Note: This table does not include material (Australian and non-Australian obligated) which has been loaned to, or purchased by, Australian uranium producers overseas to meet contractual delivery obligations due to shortfalls in production.

(Source: Uranium Industry Section, Department of Resources, Energy and Tourism)

TABLE 12: SUMMARY OF AONM TRANSFERS, 2012[27]

	Destination	U (tonnes)
Conversion	Canada	1 745
	China	1 347
	European Union[28]	996
	Russia	11
	United States	2 504
Enrichment	European Union	786
	United States	0
Fuel Fabrication	Japan	85
	Republic of Korea	144
	United States	222
	European Union	141
Reactor Irradiation	Japan	5.9
	Taiwan	4.5

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 data 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.

27 Figures are for transfers completed between jurisdictions from 1 January to 31 December 2012. Figures do not include transfers of AONM made within the fuel cycle of a state (or of Euratom), return of heels (residual UF_6 remaining in cylinders after emptying), or damaged product.

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

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 10 and Table 12 are based on ASNO's analysis of all available information at the time of publication.

Australia–Russia Nuclear Cooperation Agreement Implementation

In September 2012, Australia and Russia conducted a trial shipment of Australian uranium to Russia. This was the first shipment of Australian uranium subject to the Australia–Russia nuclear cooperation agreement, which came into force in November 2010. The trial was completed successfully. On 25–26 March 2013, Australian and Russian officials met to consult on practical arrangements for the implementation of the bilateral nuclear cooperation agreement (see Current Topics article on this subject on page 34). A key focus of the discussions was a review of the trial shipment.

Australia–United Arab Emirates Nuclear Cooperation Agreement

The Agreement between Australia and the United Arab Emirates (UAE) on the peaceful uses of nuclear energy was signed by the Australian Minister for Foreign Affairs Senator Carr and UAE Foreign Minister Sheikh Abdullah bin Zayed Al Nahyan on 31 July 2012. The Agreement was tabled in Parliament on 12 March 2013 for review by the Joint Standing Committee on Treaties (JSCOT), which held public hearings on the Agreement on 13 May and 17 June 2013. JSCOT is expected to issue its report on the proposed agreement over 2013–14.

Australia–India Nuclear Cooperation Negotiations

Following the Prime Minister's announcement in October 2012 that negotiations on a bilateral civil nuclear cooperation agreement between Australia and India would commence, the first round of negotiations was held on 19 March 2013 in New Delhi. Further negotiations will take place through 2013–14. There is no set timeframe for the conclusion of negotiations.

Silex Systems Limited

On 25 September 2012, the US Nuclear Regulatory Commission (NRC) issued a license to General Electric-Hitachi Global Laser Enrichment LLC (GLE) to construct and operate a uranium enrichment plant using Silex laser technology in Wilmington, N.C. In March 2013, ASNO met with US Nuclear Regulatory Commission officials and representatives from GLE at Silex systems Limited (SSL) to discuss oversight arrangements pertaining to on-going collaborative work between SSL and GLE. ASNO and NRC also discussed necessary updates to the classification guide for Silex technology and corresponding updates to the Australia–US administrative security arrangements for the Australia–US nuclear cooperation agreement on Silex technology.

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 engagement includes the Director General's IAEA's Standing Advisory Group on Safeguards Implementation (SAGSI), technical meetings on IAEA safeguards projects, and conferences and workshops. Additionally, ASNO participated in the Australian delegation to the IAEA Board of Governors and General Conference meetings in September 2012, and at the General Conference contributed actively to the negotiation of the safeguards resolution.

Engagement in such fora enables ASNO to maintain specialist knowledge on developments, emerging issues, and challenges in safeguards, which supports ASNO's policy advice to Government on international non-proliferation issues as well as informing ASNO's scrutiny and administration of Australia's bilateral nuclear safeguards arrangements. ASNO has provided input into shaping the evolution of safeguards implementation, such as through participation in SAGSI. ASNO has made a number of presentations during the reporting period at international conferences to assist in explaining and supporting the work of the IAEA. ASNO also assisted the IAEA with its communication of the state-level concept by providing opportunities for the

IAEA to present to the broad community of states that attended the Asia-Pacific Safeguards Network (APSN) plenary in October 2012.

ASNO assessed that the IAEA safeguards system effectively fulfilled its task of verifying the non-diversion of significant quantities of nuclear material subject to IAEA safeguards. There are some on-going areas of difficulty in safeguards implementation that the IAEA has identified that were reported by some media outlets in 2013. These issues include, for some states: inadequately developed State Systems of Accountancy and Control; accuracy, completeness and timeliness of nuclear material accountancy reports; and, not cooperating to the fullest extent expected, as manifested in actions such as delaying inspector access or limiting inspector activities. These are not new issues, and the degree to which these are a concern for each state should be assessed in the specific context of each state concerned, considering how these issues affect the IAEA's overall compliance conclusions and the international community's confidence in these conclusions. Amongst the states the IAEA had in mind in drawing attention to these issues some are clearly of considerable concern and subject to long-standing consideration by the Board of Governors, such as Iran and Syria, but many would relate more to implementation performance and regulatory capacity of states rather than deliberate efforts to disrupt or impede IAEA safeguards implementation.

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 this important endeavour. The purpose of IAEA safeguards is fundamentally about maintaining the international community's confidence in the non-proliferation compliance of each state, so 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 in parallel it is also significantly improving and expanding its public guidance materials for states. In March 2012 it published a new high-level safeguards implementation guidance document, *Guidance for States Implementing Comprehensive Safeguards Agreements and Additional Protocols* (Service Series 21), and in April 2013 a more targeted, *Safeguards Implementation Guide for States with Small Quantities Protocols* (Service Series 22). There are further guidance documents under development.

To the extent possible within budget constraints, ASNO continues to support these important activities by working with the IAEA and with regional and international counterparts, principally APSN, to develop the skills and capacity of safeguards authorities through training and support. ASNO has also contributed to the development of guidance documents through DG ASNO's chairmanship of SAGSI and the involvement of other ASNO staff in technical review committees. The most significant APSN project in the reporting period was a paper on the fundamentals and good practices for safeguards regulatory authorities[29]. This paper is designed to be a resource for states wishing to evaluate or benchmark their safeguards implementation, and it is significant that the IAEA has chosen to promote this paper on its web page for safeguards resources for states. ASNO has promoted the work of APSN on this paper through presentations at the Institute of Nuclear Material Measurement annual international meeting, Orlando, Florida (July 2012), and at a Vienna Centre for Nonproliferation and Disarmament workshop held in Vienna (September 2012).

29 Available at: www.apsn-safeguards.org, and http://www.iaea.org/safeguards/Resources_for_States/additional-documents.html.

ASNO Director General Robert Floyd speaking at the Next Generation Safeguards conference, Hanoi, Vietnam, July 2012

Contribution to DFAT Policy Development and Diplomatic Activity

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 issues such as Iran and the DPRK.

The state-level concept

One aspect of safeguards that attracted considerable attention and scrutiny in the IAEA Board of Governors and the General Conference in the reporting period was the further development of safeguards implementation by the IAEA Department of Safeguards of the state-level concept. The state-level concept is the term the IAEA uses to describe the approach to safeguards implementation whereby it considers all safeguards-relevant information about a state as a whole, rather than the traditional and rigid criteria-based approach applied at the level of individual nuclear facilities.

The IAEA is developing the state-level concept in response to changes in a number of factors that impact the use of its resources used to efficiently and effectively implement safeguards. These are: the IAEA operates in a budget-constrained environment; the quantity of nuclear material under safeguards is increasing; the number and complexity of fuel cycle facilities is increasing; and, the proliferation risk profile of the nuclear fuel cycle is changing. The perennial challenge for the IAEA is finding the right balance between meeting the expectations of its Member States that it ensures states are honouring their safeguards obligations, and doing so as efficiently as possible without diminishing safeguards effectiveness or the objectiveness of its safeguards conclusions. With this in mind, the IAEA began a major project in 2010 to evolve the state-level concept to improve its effectiveness and efficiency and ultimately to apply this to all states. Further details are contained on pages 17–18 in ASNO's Annual Report for 2010–2011.

In 2012 some states began to express considerable concerns with the direction the IAEA was taking, arguing that the expansion of state-level approaches to all states had the potential to be subjective and inequitable in application and as such required approval from the Board of Governors. Australia does not share this view. State-level approaches have been applied for several years in states, such as Australia, that have a comprehensive safeguards agreement and Additional Protocol in force and where the IAEA has drawn the 'broader conclusion' that not only is all declared nuclear material accounted for, but that there is no undeclared nuclear material or activities. Australia was the first country to receive the broader conclusion and as such qualify for the application of state-level approaches (January 2001), so the IAEA has been implementing such approaches in Australia for over 10 years. The improvements in safeguards efficiency and effectiveness that has resulted has benefited Australia both in terms of implementation effort and also the benefit of enhanced international confidence in Australia's safeguards compliance resulting from the IAEA being able to consistently draw the strong conclusion that all nuclear material in Australia remains in peaceful use.

ASNO was actively involved in the negotiations of the safeguards resolution at the September 2012 IAEA General Conference. The concerns of some Member States with the state-level concept were very prominent in these negotiations. It was challenging to find an appropriate accommodation on this issue that balanced the desire of many states for the resolution to give adequate support to the IAEA's use of the state-level concept and the concerns of others states with the broader application of the concept. It was resolved by the inclusion in the resolution of a direct request to the IAEA Secretariat 'to report to the Board of Governors on the conceptualisation and development of the State-level concept for safeguards'. It is important to note that this request was not for the Secretariat to seek approval from the Board of Governors, as taking a state-level approach is well within the IAEA's mandate and the central elements have been endorsed by Member States at various times over several years. But when the report is presented (expected in late 2013), it will be an opportunity for states with concerns to discuss this with other members states and the Secretariat with the benefit of a fulsome explanation.

IAEA Standing Advisory Group on Safeguards Implementation

SAGSI is an advisory group of international experts appointed by and advising the IAEA Director General (DG) on safeguards implementation issues. Each expert is invited by the DG to serve a 3-year term, with the possibility of renewal. SAGSI has been in place since the late 1970s, and safeguards specialists in ASNO (and its predecessor the Australian Safeguards Office) have been on SAGSI for most of this time. SAGSI has two series of meetings each year, with each series usually comprising a working group meeting followed by a plenary meeting. During each series of meetings SAGSI examines and provides advice on a list of safeguards implementation topics set by the IAEA Director General. These topics relate to general issues of safeguards implementation, not country-specific issues. SAGSI members are appointed for a three-year period, with the current period spanning 2012 to 2014. In 2013, upon the retirement of the prior Canadian Chair, Dr Robert Floyd (DG ASNO) was appointed Chair of SAGSI by the IAEA Director General for the remainder of the current term. Dr Floyd's appointment started with the 77th series of SAGSI meetings which were held in the first half of 2013. SAGSI currently comprises 17 members from a broad mix of IAEA member states[30]

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

Much of the work of SAGSI during the reporting period (76th and 77th series of meetings) was focused on various aspects of the IAEA's development and implementation of the state-level concept (see page 73), including related elements of the state-level concept such as state-specific factors that could form part of the evaluation process, the information landscape in support of the state-level concept and communication plans. Other topics on SAGSI's agenda included:

- enhancing safeguards infrastructure and capabilities at the IAEA Safeguards Analytical Laboratories
- a draft IAEA safeguards implementation policy paper on the composition and purity properties of uranium at the front end of the fuel cycle (such as uranium ore concentrates) that meet the requirements for the application of full safeguards under comprehensive safeguards agreements
- the annual IAEA Safeguards Implementation Report (SIR) and evaluation methodologies that support the SIR.

Australian Safeguards Support Program

The resources available to the IAEA are not sufficient to allow all necessary safeguards research and development programs to be conducted 'in-house'. Safeguards are an evolving discipline and the Australian Safeguards Support Program (ASSP) assists the IAEA develop the concepts, equipment and procedures needed to meet new challenges in a cost-effective way. The ASSP comprises collaborative work with ASNO, ASNO's counterparts and expert groups on a number of safeguards projects formally 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. These projects are outlined below.

Re-examination of basic safeguards implementation parameters

This project remains open, but there were no activities during the reporting period.

Analytical services for environmental sampling

Environmental sampling is an important safeguards measure that enhances the IAEA's capability to detect undeclared nuclear activities. Work on this important project by ANSTO is ongoing.

Experimental investigation of behaviour of trace elements in uranium during the concentration and conversion processes

An ANSTO-wide uranium ore concentrates (UOC) half-day workshop was held in December 2012 to examine the future direction of UOC provenance research within ANSTO. The aim of the workshop was to utilise site-wide capabilities and expert knowledge to guide thinking on new projects. Several new ideas for future research arising from the workshop are current being formulated into research projects.

To ensure accurate analytical measurement of trace elements in uranium materials, the detailed examination of analytical data obtained on the certified uranium ore concentrate CUP-2, measured using inductively coupled mass spectrometry, was undertaken. An internal ANSTO report was prepared and further analytical work using a variety of analytical techniques for comparison is now proposed.

The goal of this task is to develop the capability of states to identify the origin of uranium materials. ANSTO's capability to determine the origin of an unknown UOC sample was required when Australian law enforcement authorities requested ANSTO provide identification and provenance of a 'real' seized uranium material. The analytical process undertaken at ANSTO, in collaboration with Lawrence Livermore National Laboratory, has now been documented. A paper titled *Nuclear Forensic Analysis of an Unknown Uranium Ore Concentrate Sample Seized in New South Wales, Australia* is expected to be submitted for publication in late 2013.

ANSTO plans to participate in an IAEA Coordinated Research Project 'Development of High Confidence Nuclear Forensic Signatures for the Development of National Nuclear Forensic Libraries' and ANSTO's 'Proposal for Research Agreement' has been prepared. A large proportion of ANSTO's contribution involves investigation into the trace elemental signatures in uranium ores UOCs. Further Australian ore and UOC samples are currently being sourced for this project. In addition, further statistical analysis of analytical data will be undertaken.

Use of multi-sensor data for monitoring and detecting signatures relevant to the nuclear fuel cycle

This project remains open, but there were no activities during the reporting period.

Updates to fuel cycle manuals

This project remains open, but there were no activities during the reporting period.

Proliferation Analysis Workshop

The sixth Proliferation Analysis Workshop was conducted by the ASSP from 18 to 20 June 2013 in Vienna. The workshop participants were drawn from the support and operations divisions of the IAEA Safeguards Department. An analyst from the Office of National Assessments led the workshop and the Australian Permanent Mission to the IAEA actively supported the running of the workshop. The focus of the workshop was proliferation analysis. Participants explored not just analytical tools, but also the techniques for combining information from disparate sources to provide an overall picture of topics of interest. The IAEA considers that these workshops enhance the participants' analytical knowledge and skills so they can obtain a comprehensive perspective on safeguards-related issues.

All source information analysis for safeguards purposes

This project remains open, but there were no activities during the reporting period.

Network of analytical laboratories

In 2012, Australia's expanded its role in the IAEA's Network of Analytical Laboratories through the qualification of the University of Western Australia's Safeguards Laboratory (UWASL) which includes a large-geometry secondary ion mass spectrometer.

A contract between the IAEA and the University of Western Australia was signed on 23 October 2012. The UWASL received the first set of samples for environmental particle analysis on 9 November 2012 and reported the results for those samples to the IAEA on 6 December 2012.

During the reporting period, the UWASL has analysed 16 samples from two analytical requests including a total of 10 high-priority samples. The UWASL has received feedback from the IAEA concerning the analysis of one blind quality control sample that was received as part of a standard analytical request in 2013. The quality control sample contained a mixed population of LEU and HEU particles of known isotopic composition and performance was judged on three criteria.

New Australian Safeguards Support Program tasks in the reporting period

Safeguards Implementation Practices for Establishing and Maintaining a State System of Accounting for and Control of Nuclear Material

The aim of this project is to prepare input for the 'Safeguards Implementation Practices Guides', which are a vehicle for sharing more specific IAEA guidance than is found in the higher level documents already published, and for sharing good practices and lessons learned by states. ASNO is contributing to the drafting and reviewing of these documents as a member of the group tasked by the IAEA with completing the documents.

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 with plans for nuclear power; such as China, Indonesia, Japan, Malaysia, Republic of Korea, Philippines, Thailand, Vietnam, the United States and others. 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.

ASNO staff presented papers at the July 2012 Institute of Nuclear Materials Management Annual Meeting in Orlando, Florida. ASNO's papers are listed in appendix H.

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 provided to professionals in a range of countries over the past 12 months included:

- Commodity Identification Training for the Additional Protocol
- Joint Asia-Pacific Safeguards Network (APSN) and Forum for Nuclear Cooperation in Asia (FNCA) workshop on the Additional Protocol – Hanoi, December 2012
- ASEAN Regional Forum workshop on the Additional Protocol, Jakarta, June 2013

In July 2012 the US Department of Energy led Next Generation Safeguards Initiative (NGSI) held its 4th international meeting in Hanoi, attended by about 25 countries, primarily across the Asia-Pacific, but also including Middle East and South America and Europe, as well as the IAEA and Euratom. The objective of the workshop was to develop and promote a common understanding on implementing comprehensive safeguards agreements and additional protocols.

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), chaired by the Director General ASNO. 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 in areas such as training, professional development and the sharing of experiences. For example, ASNO is coordinating the work of APSN's safeguards infrastructure, implementation and awareness-raising working group.

Delegates at the 3rd Asia-Pacific Safeguards Network Plenary Meeting, Bangkok, Thailand, October 2012 (Image: APSN)

Uranium in Greenland

ASNO along with other Australian agencies involved in the regulation of Australia's uranium industry provided advice on Australian practices to the Danish Government and to a global research project led by the Danish Institute for International Studies (DIIS) on the safety, security and safeguards governing the extraction and exportation of natural uranium.

While a 2009 Self-Government Act provided Greenland full authority over its natural resources, Denmark remains constitutionally responsible for the Kingdom's foreign, defence and security policy and for IAEA safeguards. The current coalition government in Greenland has stated that it intends to lift a 25 year prohibition on mining uranium.

Australian companies are involved in rare earth element (REE) prospects in Greenland. In particular the OECD Report *Uranium 2011: Resources, Production and Demand* reports that the REE Kvanefjeld deposit in south Greenland has an inferred uranium resource of 158 757 t U_3O_8.

Uranium in Mongolia

ASNO participated in a Seminar on Peaceful Use of Nuclear Energy and Nuclear Non-Proliferation on 4–5 September 2012 in Ulaanbaatar, Mongolia. The seminar was co-organised by the Nuclear Energy Agency (NEA) of Mongolia and the Japan Atomic Energy Agency (JAEA) and also included a participant from the International Atomic Energy Agency (IAEA). The primary purpose of the seminar was to discuss regulation

and control of uranium ore concentrate (UOC) with a focus on safeguards and security. Mongolia has significant uranium resources and there is the potential for commercial mining operations in the next few years. ASNO presented on nuclear security and safeguards reporting and verification at uranium mines and on Australia's regulation and control of uranium ore concentrates.

ASNO Assistant Secretary John Kalish participating in the Seminar on Peaceful Use of Nuclear Energy and Nuclear Non-Proliferation in Ulaanbataar, Mongolia, September 2012

Technical visit from Kazakhstan

In June 2013, Australia and the IAEA co-hosted a technical visit on the implementation of nuclear security in the uranium industry for a delegation from Kazakhstan. Senior officials from the Kazakhstan Atomic Energy Committee and Kazakhstan's state nuclear company Kazatomprom visited to learn about Australia's regulatory system for nuclear security at uranium mines and obtain hands-on experience of security at an Australian uranium mine in order to compare with uranium mine security in Kazakhstan. This benchmarking tour formed part of Australia's on-going engagement with the IAEA and other uranium producing states to promote, share and collaboratively develop best practice in uranium mining safeguards and physical protection.

As part of the tour, the delegation spent time in Canberra discussing with ASNO the role of material accountancy in enhancing nuclear security, the difference in threat that Australia and Kazakhstan face, information management and the different elements used in physical protection systems. The delegation then visited the Olympic Dam and Honeymoon uranium mines where representatives of the uranium mines discussed the details of implementing Australian regulations at the mine site. The group also had the opportunity to visit ANSTO's OPAL research reactor, the Bragg Institute and hold discussions with ANSTO's Minerals Division. The visit was valuable in demonstrating different approaches to security and physical protection in the two countries.

OUTPUT 1.5: CWC IMPLEMENTATION

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

Performance Measures

- Australia's obligations under the Chemical Weapons Convention (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 Parties
- Contribute to enhancing regional CWC implementation through targeted outreach

Performance Assessments

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 40 facilities with CWC-relevant chemical production, processing or consumption activities during 2012 (declared in March 2013)
- Article VI declaration of anticipated activities at nine CWC-Scheduled chemical facilities during 2013 (declared in September and October 2012)
- Article X, paragraph 4, declaration of Australia's national programs for protection against chemical weapons (declared in April 2013)
- responses to OPCW Third Person Notes including routine clarification of the operational status of chemical plants
- response to OPCW request for clarification on 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 43 Article VI routine industry inspections in Australia in accordance with the provisions of the CWC. In the current reporting period, ASNO has facilitated two routine OPCW inspections at declared 'Other Chemical Production Facilities' (OCPFs). Both inspections proceeded smoothly and received excellent support and cooperation from industry. 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.

OPCW, ASNO and facility representatives at a routine OPCW inspection at a chemical plant in Victoria (Image: ASNO)

Legislation and Regulation

The permit systems under the *Chemical Weapons (Prohibition) Act 1994* and Regulation 5J of the Customs (Prohibited Imports) Regulations 1956, continued to operate well. Table 13 provides statistics for permits issued during the reporting period (1 July 2012 to 30 June 2013).

TABLE 13: PERMITS FOR CWC-SCHEDULED CHEMICAL FACILITIES AND IMPORTERS

CWC-Scheduled Chemicals	CW(P) Act 1994	Type	Permits at 30 June 2013	New Permits 2012–13	Re-Issued issued Permits	Permits not re-issued 2012– 13	Import Permits 2012–13
Schedule 1	s19(4)	Production (Protective)	1				
	s19(5)	Production (Research)	10		4		0
	s19(6)	Consumption	11	1	2	0	
Schedule 2	s18(1)	Processing	14	1	1	0	59
Schedule 3	s18(1)	Production	3	0	3	0	

The Attorney-General's Department, in consultation with State and Territory Governments has developed a voluntary National Code of Practice for Chemicals of Security Concern (also refer to www.chemicalsecurity.gov.au). The code is the result of an industry and community consultation process held in 2012 to seek industry views on the best way to reduce the risk of terrorist theft of chemicals from the chemicals supply chain. While the code applies to any quantity of 11 chemical precursors to homemade explosives, it is also relevant to other toxic chemicals such as those listed on the CWC Schedules.

ASNO supported Australia's efforts to raise awareness about chemical security by promoting the National Code of Practice both domestically (during industry outreach) and internationally (during the thematic discussions on Chemical Safety and Security in the margins of the 3rd Review Conference).

Cooperation with the OPCW and CWC States Parties

ASNO facilitated the visit to Australia by the OPCW Director-General Ahmet Üzümcü from 24 to 26 July 2012 where he held discussions with the Foreign Minister and a number of Government officials in Sydney and Canberra. Director-General Üzümcü also appreciated meeting with senior representatives from non-government organisations such as the Plastics and Chemicals Industries Association and the Australian Strategic Policy Institute as part of his efforts to strengthen OPCW engagement with civil society on CWC implementation issues. This visit helped reinforce Australia's ongoing engagement with the OPCW and demonstrated its commitment to the CWC.

OPCW Director-General Ahmet Üzümcü and ASNO Director General Robert Floyd with ASNO and DFAT staff at a meeting held during Mr Üzümcü's visit to Australia, July 2012

Director-General Üzümcü's public addresses were well-received. His speech at the Lowy Institute for International Policy, Sydney, focussed on the challenge of chemical weapons disarmament. Director-General Üzümcü also delivered the annual Dr John Gee[31] Memorial Lecture at the Australian National University, Canberra. These presentations raised awareness and understanding of the CWC and the OPCW's role among stakeholders from industry, government and academia.

ASNO continued to provide ongoing technical guidance – and contribute to policy development – in preparation for OPCW Executive Council meetings, industry cluster meetings and informal consultations. Issues under discussion during the reporting period included:

- sequential inspections at mixed plant sites (i.e. sites where more than one type of facility has been declared, such as a Schedule 3 and an OCPF)

31 Dr John Gee (deceased) was a former Australian diplomat who also served as a member of the UN Special Commission to oversee the elimination of Iraq's weapons after the first Gulf War in 1991. Dr Gee worked at the OPCW Prepcom as Director of the Verification Division (1993-1997) and was promoted to the position of OPCW Deputy Director-General (1997 to 2003).

- a proposal to revise the product group codes to encompass chemical activities at OCPFs for declarations purposes
- improving the efficiency and effectiveness of the OPCW Executive Council's working methodologies
- the OPCW programme and budget for 2013

ASNO participated in the 14th Annual Meeting of National Authorities of CWC States Parties held in The Hague from 22 to 24 November 2012. The meeting was attended by 206 participants from 118 States Parties, and included breakout sessions focusing on six different topics, and a session on outreach and education activities. The informative segment of the meeting brought the participants up to date with latest developments in declarations, inspections and international cooperation and assistance, while regional groups met to discuss ways and means to foster sub-regional and regional cooperation for implementation of the Convention.

The 17th Conference of the States Parties took place from 26–29 November 2012 and was attended by delegates from 132 States Parties. The Conference was considered a success in that it endorsed all recommendations of the Executive Council. Australia's delegation was headed by Australia's Permanent Representative to the OPCW, Ambassador Neil Mules, and included representatives from the Department of Defence and the Australian Embassy. Australia's statement to the Conference identified four key areas of focus for the future work of the OPCW:

- Enhanced verification of other chemical production facilities, taking into account relevant advances in science, technology and industry operations
- Promoting full and effective national implementation of Articles VI and VII, including through enhanced education and outreach to research institutions and industry to help prevent chemicals from being diverted for non-peaceful purposes
- Development of chemical security strategies to prevent the deliberate release of toxic chemicals by non-State actors
- Support in assistance and capacity building for protection against chemical weapons, including against the deliberate release of toxic industrial chemicals.

Australian experts from DFAT, ASNO and the Defence Science and Technology Organisation also participated in the 3rd Review Conference (3rd Revcon) for the CWC which took place in The Hague from 8–19 April 2013. ASNO played a key role in support of Australia's efforts to provide advice for the review of the operation of the Convention over the past five years and identifying key positions which were ultimately preserved in the Conference Report (see also Current Topics on page 21).

ASNO continued to work with other States Parties to strengthen implementation of the Convention. At New Zealand's invitation, ASNO visited Wellington (December 2012) to conduct a peer review of its National Authority's administrative arrangements in regards to CWC implementation. ASNO also held bilateral discussions with New Zealand's National Authority during a visit to Canberra in May 2013 on CWC implementation issues of mutual interest.

OPCW, ASNO and UK Government representatives at a practice challenge inspection exercise in the UK

ASNO attended, as both participant and observer, a practice challenge inspection exercise held in the United Kingdom (October 2012) to train OPCW inspectors. The lessons learned will help strengthen participants' ability to conduct this type of inspection, although no challenge inspections have been requested since the Convention entered into force.

Domestic Outreach

To assist ASNO in meeting its CWC reporting obligations, ASNO continued to strengthen its engagement with the chemical industry. As foreshadowed in ASNO's first newsletter (November 2012) for the chemical industry, two seminars were held in Sydney and Melbourne in 2013 to raise awareness among industry stakeholders about how the CWC affects them. Participants were informed about the CWC and obligations for chemical producers and importers under the *Chemical Weapons (Prohibition) Act 1994* and the Customs (Prohibited Imports) Regulations 1956, respectively – legislation administered by ASNO.

ASNO also conducted outreach visits to the Defence Science and Technology Organisation (which hosts Australia's only Schedule 1 facility for protective purposes) and a number of chemical facilities which were relatively unfamiliar with the CWC. Discussions focussed on promoting greater awareness of the CWC, regulatory obligations and preparing declared sites for OPCW inspections. ASNO representatives verified the information provided in their annual notifications.

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

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, an infrasound monitoring station at Davis Base, Australian Antarctic Territory, requires significant planning and will be installed in the coming years. A list of Australia's IMS facilities and their status is at Appendix F. Specific advances during 2012–13 in relation to Australian hosted IMS stations included the certification of the radionuclide monitoring station at Mawson Base, Australian Antarctic Territory.

Legal and Administrative Measures

ASNO continues to administer 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 DFAT, has been administered by ASNO on behalf of DFAT since 1 July 2000. 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 2012, concluding that it remained 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, working with the Department of Defence, continue to hold the question of Australia's future NDC requirements under review.

Nuclear-Test-Ban Verification

On 12 February 2013, the DPRK announced that it had conducted a nuclear test. Seismic waves from the test were detected by global nuclear test monitoring infrastructure, including in Australia. Analysis indicated an explosion with a likely nuclear explosive yield of around 5 kilotons in the vicinity of the P'unggye nuclear test site in north-eastern DPRK (the site of the declared 2006 and 2009 tests). This is

greater than the 2009 test (1–4.6 kilotons) and is many times larger than the first DPRK nuclear test (less than 1 kiloton) in 2006. Even before the DPRK made its public announcement, analysis of the seismic event was underway, offering a strong demonstration of the ability of the CTBT's IMS to detect nuclear explosions without difficulty. The 2013 nuclear test is discussed further in the separate article in the Current Topics section of this report.

While around 87 per cent of CTBT IMS stations are now in place worldwide, detailed preparatory work is continuing to bring the Treaty's verification to a good level of readiness. ASNO contributes to the verification work of the CTBTO in conjunction 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 Mr 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 is conducting a series of field exercises between 2012 and 2014. Three build-up exercises have been conducted in 2012–13 leading to a large scale test of the OSI mechanism in 2014 in Jordan. Mr Coxhead participated in two of the three build-up exercises, playing the role of a senior representative of a fictitious inspected State Party. An article at page 32 in the Current Topics section of this report provides further information.

Experts from Geoscience Australia and ASNO participated in a CTBTO hosted conference entitled CTBT: Science and Technology 2013 (SnT2013), which was fourth in a series of conferences that help establish interactions and partnerships between the scientific and technological community and the CTBTO. Scientists made over 80 oral presentations and over 250 poster presentations at the conference to more than 750 conference participants consisting of scientists, diplomats, scientific representatives to the CTBTO's policy-making organs, representatives of civil society and the media attended.

The conference goals were: capitalise on scientific and technological innovations for verifying CTBT compliance; 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. Australia's scientific contribution to the conference included a poster on techniques to improve seismic location accuracy by Geoscience Australia and several other posters covering background levels and atmospheric transport of radionuclides, the earth's structure under Indonesia and ocean hydro-acoustics co-authored by experts from the Environmental Research Institute of the Supervising Scientist, ANSTO, the Australian National University and the Australian Antarctic Division.

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, three 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. ASNO is working with Geoscience Australia and ARPANSA to develop technical links with several countries in Australia's region. Geoscience Australia officers participated in several capacity building workshops in the South Pacific and Asia. These were aimed at both building capacity and enhancing co-operation between NDCs. While substantial efforts are required in the following years, significant progress has been made by a number of Member States.

Regular cooperation among NDCs offers a further way to enhance their effectiveness. With this in mind, ASNO and the New Zealand Ministry for Foreign Affairs and Trade concluded an MOU in August 2012 that provides a framework for cooperation between NDC agencies in Australia and New Zealand to support the CTBT. Minister for Foreign Affairs Senator Carr welcomed the framework as part of Australia's efforts to promote a permanent and effective ban on nuclear weapon tests. He observed that international cooperation enhances the ability of scientific experts to provide advice to their governments on whether a nuclear test has occurred and that cooperation between Australia and New Zealand can serve as a model for others around the world and will strengthen the CTBT.

ASNO officer, Mr Malcom Coxhead, representing the fictional country of Forestia, at the CTBTO On-Site Inspection exercise in Austria, September 2012

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. As a member of the Australian delegation, an ASNO officer participated in the Nuclear Suppliers Group meetings in Prague 10–14 June, contributing to technical discussions.

Fissile Material Cut-off Treaty

ASNO continued during the year to provide technical advice to the DFAT, including Australia's mission in Geneva, in efforts helping to build confidence and momentum in the CD towards the commencement of FMCT negotiations. In August 2012, ASNO participated in an experts meeting in the margins of the CD that examined some aspects of the verification regime for a future treaty.

In its resolution 67/53, the UN General Assembly requested the Secretary-General to seek the views of Member States on a treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices, and to submit a report on the subject to the General Assembly at its sixty-eighth session. ASNO led the preparation of Australia's submission to the Secretary-General.

OUTPUT 1.8: ADVICE TO GOVERNMENT

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

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 Resources, Energy and Tourism, and the Australian Intelligence Community

Performance Assessment

ASNO has specialist knowledge in complex policy and technical areas dealing with nuclear non-proliferation, and has substantial experience in: verification methods; domestic, bilateral and international safeguards; nuclear technology and the nuclear fuel cycle; nuclear security; and CWC and CTBT verification issues. ASNO draws on this expertise and an international network of contacts in agencies and organisations to provide high quality technical and policy advice to Government and other bodies. ASNO provides the Government with advice on nuclear non-proliferation safeguards, from both international and domestic perspectives, together with expert advice across the range of WMD technologies.

ASNO provided key support to Australia's negotiations with India towards a nuclear cooperation agreement by providing technical advice and analysis.

During the year, ASNO provided advice and analysis on a range of non-proliferation issues and developments. ASNO has analysed and reported on nuclear programs of concern, in particular that of Iran, but also developments in Syria and the DPRK.

ASNO provided special briefing and additional assistance to the Australian Missions to the IAEA and CTBT Organization (in Vienna), to the OPCW (in The Hague) and to the Conference on Disarmament (in Geneva), as well as to Australian missions elsewhere, particularly in Washington, London, Moscow, and Beijing.

ASNO provided advice to the government on the negotiation and implementation of bilateral nuclear cooperation agreements. During the year, this included advice related to an agreement signed with the United Arab Emirates, as well as negotiation of an agreement with India.

ASNO has 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 Industry Framework, a government-industry forum coordinated by the Department of Resources, Energy and Tourism, 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 non-proliferation regimes, and Australia's role in these activities.

Performance Measures

- 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, tertiary institutions and non-governmental institutions, including presentations at various national and international fora. Activities during the year through which ASNO pursued public information objectives included:

- ASNO attended the Australasian Radiation Protection Society conference in October 2012 to present on safeguards permit requirements to current and potential permit holders
- various presentations by the ASNO Director General at the National Security College – a joint venture between the Australian Government and the Australian National University, with the aim of enhancing the functioning of the national security community, strengthening networks of cooperation between practitioners and non-government experts, contributing to the development of a new generation of strategic analysts, achieving effective outreach to business and the wider community
- ASNO gave a presentation on nuclear security summits to William Ross State High School who were the 2012 winners of the Australian Institute for International Affairs and James Cook University Young Diplomats' Program. The year's Young Diplomats' Program was based on the topic 'advancing global nuclear security'.

ASNO produced and distributed its first newsletter to chemical industry stakeholders in November 2012. This provided updates for stakeholders on current events.

ASNO conducted for the first time a series of outreach seminars in Sydney and Melbourne in early 2013 for those affected by the Chemical Weapons Convention, including analytical laboratories, chemical industry and traders of chemicals. This provided information on ASNO's permit requirements and obligations under the Chemical Weapons Convention.

ASNO continued its series of seminars on non-proliferation issues for government officials. The aim of the seminars is to provide clear, understandable and accurate information on concepts relevant to officials involved in Australia's broader non-proliferation and counter-proliferation efforts.

ASNO has an active program of preparing papers and presentations for conferences and professional journals. Many of these are available on ASNO's website. Details can be found under Appendix G.

ASNO's website, 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.

on-Proliferation ***Chemical*** IAEA **Security** CTBTO ***Nuclear*** **Safeguards** ***Chemical*** OPCW
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Chemical ***Nuclear*** **Non-Proliferation** **Security** OPCW **Safeguards** IAEA ***Chemical***

ASNO officer Malcolm Coxhead at the CTBTO on-site inspection exercise in Austria, September 2012 (Image: CTBTO)

MANAGEMENT AND ACCOUNTABILITY

SECTION 5

Safeguards *Nuclear* OPCW **Non-Proliferation** *Chemical* IAEA **Security** CTBTO *Nuclear* CTBTO *Chemical* **Security** **Safeguards** OPCW *Nuclear* **Non-Proliferation** *Chemical* **Non-Proliferation** IAEA *Nuclear* *Chemical* **Security** CTBTO **Safeguards** OPCW **Securi** *Chemical* **Safeguards** OPCW **Security** **Non-Proliferation** *Chemical* IAEA *Nuclear* OPCW *Nuclear* **Non-Proliferation** IAEA *Chemical* **Security** CTBTO *Chemical* **Safeguard** **Security** CTBTO *Chemical* *Nuclear* OPCW **Safeguards** IAEA *Nuclear* CTBTO *Cher* *Nuclear* IAEA **Security** CTBTO *Chemical* *Nuclear* **Non-Proliferation** **Security** OPCW

MANAGEMENT AND ACCOUNTABILITY

Corporate Governance

Portfolio Minister

Director General ASNO

Assistant Secretary ASNO

ASNO Staff

Training and Development

Financial Management

Administrative Budget

Uranium Producers Charge

Australian Safeguards Support Program

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, Senator the Hon Bob Carr.

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 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 14 and the DFAT Annual Report 2012–13.

In 2012–13 ASNO achieved an average staff level of 16.8 (against an approved level of 17.3)

From 1 July 2011, ASNO implemented a revised organisational structure. In order to best draw upon the expertise of ASNO staff and promote efficiencies across thematic work areas. The revised organisational structure is closely aligned with ASNO's outputs and can be found in Figure 6.

FIGURE 6: ASNO'S ORGANISATIONAL STRUCTURE – (AS AT 30 JUNE 2013)

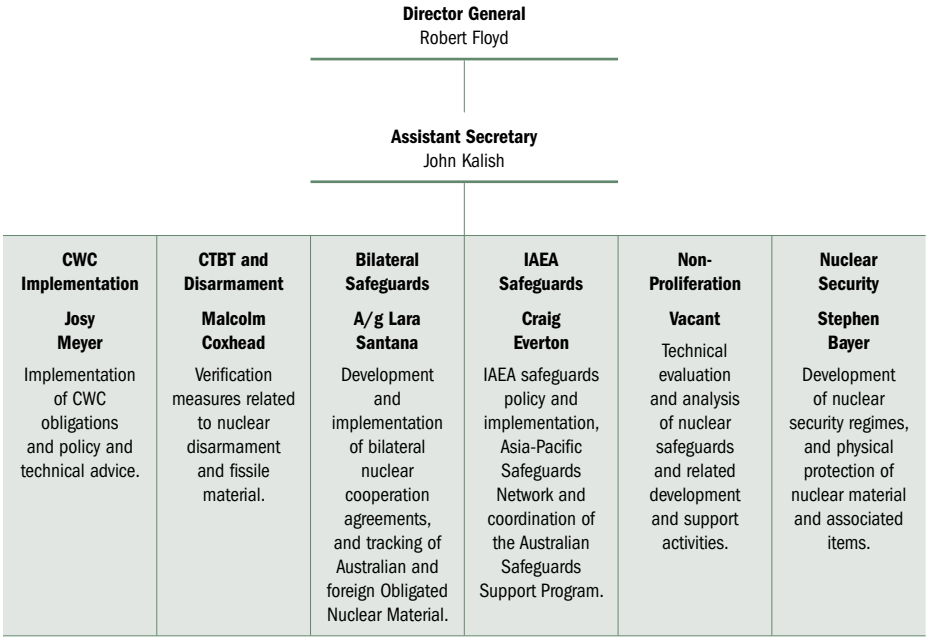

TABLE 14: ASNO STAFF AT 30 JUNE 2013

	Male	Female	Total (Approved)
SES B2	1	0	1 (1)
SES B1	1	0	1 (1)
Executive Level 2	3	2	5 (5)
Executive Level 1	3	1	4 (4)
APS Level 6	0	2	2 (3.5)
APS Level 5	1	1	2 (1.3)
APS Level 4	0	1	1 (1.5)
TOTAL	**9**	**7**	**16 (17.3)**

Training and Development

ASNO's primary training requirements are professional development of specialist skills. ASNO is proactive in managing this training, in part through a schedule of conference programs and formal training coordinated by the IAEA. Further details are in Table 15.

TABLE 15: TRAINING AND DEVELOPMENT ACTIVITIES DURING 2012–13

Training and Development Activity	Person Days
Formal DFAT courses	44
Structured work unit & on-the-job training including planning days	12
Seminars, workshops, conferences, overseas negotiations	44
External formal courses	26
Academic study	0
Other (IAEA Consultancy)	30
TOTAL	**156**

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 16: ASNO ADMINISTRATIVE COSTS[32]

		20011–12	2012–13
Salaries[33]		$2 329 703	$2 382 939
Running Costs	General	$753 469	$705 727
	Seismic monitoring[34]	$595 945	$586 410
	Sub-Total	$1 349 414	$1 292 137
TOTAL		**$3 679 117**	**$3 675 076**

ASNO staff at a meeting in Canberra (Image: ASNO)

32 Excludes GST.
33 Includes Long Service Leave accruals.
34 Undertaken by Geoscience Australia.

Uranium Producers Charge

ASNO is responsible for the implementation of the Uranium Producers Charge. This charge is payable to Consolidated Revenue on each kilogram of uranium ore concentrate production (set in 2010–11 to 10.3077 cents per kilogram). The total charge levied on 1 December 2012 for uranium production in 2011–12 was $672 266.

Australian Safeguards Support Program

The cost of the Australian Safeguards Support Program (ASSP) totalled approximately $200,000 in 2012–13. This amount included direct expenditure by ASNO of about $43,000 relating to services provided to the IAEA, including participation in the Standing Advisory Group on Safeguards Implementation (total includes travel costs and salaries). Expenditure on ASSP projects by ANSTO amounted to approximately $100,000.

Other government agencies contributed services in support of the IAEA through the ASSP valued at approximately $20,000. UWA's operating expenditure for its Network of Analytical Laboratory work includes instrument time, maintenance, administration and staff costs totalling $34,750.

on-Proliferation ***Chemical*** IAEA **Security** CTBTO ***Nuclear*** **Safeguards** ***Chemical*** OPCW
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Chemical ***Nuclear*** **Non-Proliferation** **Security** OPCW **Safeguards** IAEA ***Chemical***

IAEA Deputy Director General, Head of the Division of Safeguards, Herman Nackaerts and ASNO Director-General Robert Floyd receiving a tour of a laboratory at the University of Western Australia, October 2012

APPENDICES, LIST OF REQUIREMENTS, GLOSSARY, INDEX

SECTION 6

Safeguards *Nuclear* OPCW **Non-Proliferation** *Chemical* IAEA **Security** CTBTO *Nuclear* CTBTO *Chemical* **Security** **Safeguards** OPCW *Nuclear* **Non-Proliferation** *Chemical* **Non-Proliferation** IAEA *Nuclear* *Chemical* **Security** CTBTO **Safeguards** OPCW **Securi** *Chemical* **Safeguards** OPCW **Security** **Non-Proliferation** *Chemical* IAEA *Nuclear* OPCW *Nuclear* **Non-Proliferation** IAEA *Chemical* **Security** CTBTO *Chemical* **Safeguard** **Security** CTBTO *Chemical* *Nuclear* OPCW **Safeguards** IAEA *Nuclear* CTBTO *Cher* *Nuclear* IAEA **Security** CTBTO *Chemical* *Nuclear* **Non-Proliferation** **Security** OPCW

APPENDICES

Appendix A World Nuclear Energy, July 2013

Appendix B Australia's Bilateral Nuclear Cooperation Agreements

Appendix C Status of Additional Protocols

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Appendix F Status of CTBT IMS Facilities in Australia

Appendix G Information Publication Scheme Statement

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Appendix A World Nuclear Energy, July 2013

TABLE 17: WORLD NUCLEAR ENERGY, JULY 2013[35]

	Operating Reactors		% of Total Electricity in 2012	Reactors under Construction	
	Total	Capacity (GWe)		Total	Capacity (GWe)
United States*	100	98.6	19.0	3	3.4
France*	58	63.1	74.8	1	1.6
Japan*	50	44.2	2.1	2	2.7
Russian Federation*	33	23.6	17.8	10	8.4
Republic of Korea*	23	20.7	30.4	5	6.3
India	20	4.4	3.6	7	4.8
Canada*	19	13.5	15.3	0	0
China[33]*	18	13.8	2.0	28	27.8
United Kingdom*	16	9.2	18.1	0	0
Ukraine	15	13.1	46.2	2	1.9
Sweden*	10	9.4	38.1	0	0
Germany*	9	12.1	16.1	0	0
Spain*	8	7.6	20.5	0	0
Belgium*	7	5.9	51.0	0	0
Czech Republic*	6	3.8	35.3	0	0
Taiwan[36]*	6	5.0	18.4	2	2.6
Switzerland*	5	3.3	35.9	0	0
Finland*	4	2.8	32.6	1	1.6
Hungary*	4	1.9	45.9	0	0
Slovak Republic*	4	1.8	53.8	2	0.9
Pakistan	3	0.7	5.3	2	0.6
Argentina*	2	0.9	4.7	1	0.7
Brazil	2	1.9	3.1	1	1.2
Bulgaria*	2	1.9	31.6	0	0
Mexico*	2	1.5	4.7	0	0
Romania*	2	1.3	19.4	0	0
South Africa	2	1.9	5.1	0	0
Armenia	1	0.4	26.6	0	0
Iran	1	0.9	0.6	0	0
Netherlands*	1	0.5	4.4	0	0
Slovenia*	1	0.7	36.0	0	0
United Arab Emirates	0	0	0	2	2.7
TOTAL	**434**	**370.4**	**N/A**	**69**	**67.3**

Source: IAEA Power Reactor Information System (PRIS), Reactor Status Reports, www.iaea.org/pris (as of July 2013).

35 Countries having bilateral agreements with Australia covering use of AONM are marked with an asterisk. These countries operate 392 power reactors, which produce around 11 per cent of total world electricity and about 94% of world nuclear energy.

36 Supply of AONM to Taiwan is covered by an agreement between Australia and the United States.

Appendix B Australia's Bilateral Safeguards Agreements

TABLE 18: AUSTRALIA'S BILATERAL SAFEGUARDS AGREEMENTS AT 30 JUNE 2013

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[37]	3 February 2007
Russian Federation	11 November 2010
United States	22 December 2010
Euratom[38]	1 January 2012

Note: The above list does not include Australia's NPT safeguards Agreement with the IAEA, concluded on 10 July 1974. 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.

37 Australia has two agreements with China, one covering nuclear material transfers and one covering nuclear cooperation.

38 Euratom is the atomic energy agency of the European Union. The Euratom agreement covers all 28 member states of the European Union, including Croatia, which joined the European Union on 1 July 2013.

Appendix C Status of Additional Protocols

At 30 June 2013, there were 71 states (plus Taiwan) with significant nuclear activities[39]. 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.

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

At 30 June 2013, there were a total of 120 states with an Additional Protocol (AP) in force, an increase of four over the same time last year. Of the 63 NNWS NPT Parties with significant nuclear activities, 56 had an AP in force (Table 19).

TABLE 19: STATES WITH ADDITIONAL PROTOCOLS IN FORCE AT 30 JUNE 2013

State			
Afghanistan	Cuba	**Indonesia**	Mongolia
Albania	Cyprus	Ireland	Montenegro
Andorra	**Czech Republic**	**Italy**	**Morocco**
Angola	**DR Congo**	**Jamaica**	Mozambique
Armenia	**Denmark**	**Japan**	Namibia
Australia	Dominican Republic	Jordan	**Netherlands**
Austria	Ecuador	**Kazakhstan**	New Zealand
Azerbaijan	El Salvador	Kenya	Nicaragua
Bahrain	**Estonia**	Kuwait	Niger
Bangladesh	Fiji	Kyrgyzstan	**Nigeria**
Belgium	**Finland**	**Latvia**	**Norway**
Botswana	**France**	Lesotho	Palau
Bulgaria	FYROM	**Libya**	Panama
Burkina Faso	Gabon	**Lithuania**	Paraguay
Burundi	The Gambia	Luxembourg	**Peru**
Canada	**Georgia**	Madagascar	**Philippines**
Central African Rep	**Germany**	Malawi	**Poland**
Chad	**Ghana**	Mali	**Portugal**
Chile	**Greece**	Malta	**Republic of Korea**
China	Guatemala	Marshall Islands	**Romania**
Colombia	Haiti	Mauritania	**Russia**
Comoros	Holy See	Mauritius	Rwanda
Congo, Republic of the	**Hungary**	**Mexico**	Seychelles
Costa Rica	**Iraq**	Moldova	Singapore
Croatia	Iceland	Monaco	**Slovakia**

39 '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.

State			
Slovenia	**Switzerland**	Turkmenistan	**United States of America**
South Africa	**Tajikistan**	Uganda	Uruguay
Spain	Tanzania	**Ukraine**	**Uzbekistan**
Swaziland	**Togo**	United Arab Emirates	Vanuatu
Sweden	**Turkey**	**United Kingdom**	**Vietnam**
TOTAL: 120 states (including 56 NNWS with significant nuclear activities), plus Taiwan			

Source: International Atomic Energy Agency (www.iaea.org/OurWork/SV/Safeguards/sg_protocol.html)

At 30 June 2013, 22 states did not have an AP in force but had signed an AP and or had an AP approved by the IAEA Board of Governors. (Table 20).

TABLE 20: STATES WITH AN ADDITIONAL PROTOCOL SIGNED OR APPROVED BUT NOT IN FORCE AT 30 JUNE 2013

State			
Algeria	Djibouti	Kiribati	Timor-Leste
Belarus	Guinea	Liechtenstein	Tunisia
Benin	Guinea-Bissau	**Malaysia**	Zambia
Cameroon	Honduras	Senegal	Vanuatu
Cape Verde	**India (non-NPT)**	**Serbia**	
Côte d'Ivoire	**Iran**[40]	**Thailand**	
TOTAL: 22 states (including 7 NNWS NPT Parties with significant nuclear activities)			

Source: International Atomic Energy Agency (http://www.iaea.org/OurWork/SV/Safeguards/documents/sir_table.pdf)

The remaining six NNWS NPT Parties and two non-NPT states with significant nuclear activities had not signed an AP.

TABLE 21: STATES WITH SIGNIFICANT NUCLEAR ACTIVITIES AND NO ADDITONAL PROTOCOL AT 30 JUNE 2013

State			
Argentina	DPRK[41]	Israel (non-NPT)	Syria
Brazil	Egypt	Pakistan (non-NPT)	Venezuela
TOTAL: 8 states (including 6 NPT Parties)			

Source: International Atomic Energy Agency (http://www.iaea.org/OurWork/SV/Safeguards/documents/sir_table.pdf)

40 Iran implemented its AP 'provisionally' from 2003 but 'suspended' this in 2005.

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

Appendix D IAEA Statements of Conclusions for Australia 2012

Inventory verification inspections carried out by the IAEA at Australian nuclear facilities and locations are shown in Table 8. In addition, the IAEA carries out a range of other verification activities, such as short notice inspections, complementary accesses, design verifications and data collection and analysis.

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 2012 (see Appendix E); and the statements of conclusions of inspections in Australia under Article 91(b) of Australia's NPT Safeguards Agreement and the statement of conclusions the IAEA has drawn from Additional Protocol verification activities under Article 10.c of the Additional Protocol.

The highest level conclusion, known as the 'broader conclusions', the IAEA draws in the Safeguards Statement, is in paragraph 1(a) of the Safeguards Statement that '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 2012. The IAEA has drawn the broader conclusion for Australia every year since 2000.

The IAEA's statements of conclusions of inspections under Article 91(b) for the inspections it carried out in May 2013 were not available at the time of publishing this Annual Report. The 91(b) statements will be published when available on ASNO's web site: www.dfat.gov.au/asno.

The IAEA's Additional Protocol Article 10.c statements for the complementary accesses shown in Table 8 were as follows:

Access pursuant to Article 4.a.(i) did not indicate the presence of undeclared nuclear material or activities at:

- Lucas Heights Science and Technology Centre
- Lucas Heights Science and Technology Centre – Silex
- Ranger Uranium Mine, Jabiru, Northern Territory

Appendix E IAEA Safeguards Statement for 2012

In 2012, safeguards were applied for 179 States[42,43] with safeguards agreements in force with the Agency. The Secretariat's findings and conclusions for 2012 are reported below with regard to each type of safeguards agreement. These findings and conclusions are based upon an evaluation of all the information available to the Agency in exercising its rights and fulfilling its safeguards obligations for that year.

1. One hundred and fourteen States had both comprehensive safeguards agreements and additional protocols in force:
   (a) For 60 of these States[42], 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 54 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 57 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 2012, 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 2012, 13 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 in force based on INFCIRC/66/Rev.2, requiring the application of safeguards to nuclear material, facilities and other items specified in the relevant safeguards agreement. 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 to which safeguards had been applied in selected facilities remained in peaceful activities or had been withdrawn from safeguards as provided for in the agreements.

42 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.

43 And Taiwan, China.

Appendix F Status of CTBT International Monitoring System Facilities in Australia

TABLE 22: STATUS OF AUSTRALIAN CTBT IMS FACILITIES AT 30 JUNE 2013

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 Base, Australian Antarctic Territory	Site survey completed	GA
Radionuclide Stations		
Melbourne[44], 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[45], 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
Radionuclide Laboratory		
Melbourne, VIC	Operational and certified against CTBTO standards	ARPANSA
Hydroacoustic Stations		
Cape Leeuwin, WA	Operational and certified against CTBTO standards	GA

44 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.

45 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 Information Publication Scheme Statement

Agencies subject to the *Freedom of Information Act 1982* (FOI Act) are required to publish information to 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.

Publications, 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, *Revising Australia's Design Basis Threat*, International Regulator's Conference on Nuclear Security, Washington, USA, December 2012
- Stephan Bayer, *Australia's experience in ratifying and implementing the Amendment to the CPPNM*, Regional Workshop on Facilitating Adherence to and Implementation of the 2005 Amendment to the Convention on the Physical Protection of Nuclear Material, Beijing, 2 April 2013
- Stephan Bayer, *Physical Protection of Uranium Ore Concentrates In Australia*, Visit of delegation from the Republic Kazakhstan to Australia, 17 June 2013
- Michael East, *Security Requirements and Implementation*, Presentation at the IAEA Training Meeting on Effective Regulatory and Environmental Management of Uranium Production, 13–17 August 2012, Darwin, Australia
- Michael East, *Safeguards Reporting and Verification at Uranium Mines*, Presentation at the IAEA Training Meeting on Effective Regulatory and Environmental Management of Uranium Production, 13–17 August 2012, Darwin, Australia
- Craig Everton, Rob Floyd, *Fundamentals and Good Practices for Safeguards Regulatory Authorities – an Asia-Pacific Safeguards Network (APSN) Project*, paper for the INMM 52nd Annual Meeting, Orlando, USA, July 2012
- Craig Everton, *Accountancy and Control of Nuclear Material – Regulating Compliance with Australia's Safeguards Obligations to the IAEA*, presentation given at the 37th Annual Conference of the Australasian Radiation Protection Society, Sydney, October 2012
- Craig Everton, *Asia-Pacific Safeguards Network (APSN) – Supporting Additional Protocol Implementation through Regional Cooperation*, International Workshop on the Additional Protocol: Lessons Learned in South-East Asia, Jakarta, Indonesia, June 2013
- Kearyn Ferguson and Josy Meyer, *Australian Safeguards and Non-Proliferation Office, Australia's National Authority for the Chemical Weapons Convention Newsletter*, November 2012

- Kearyn Ferguson, *The CWC and regulatory requirements for Discrete Organic Chemical Production Facilities*, Sydney, 30 January 2013
- Kearyn Ferguson, *The CWC and regulatory requirements for importers of Schedule 2 and Schedule 3 Chemicals*, Sydney, 30 January 2013
- Kearyn Ferguson, *The CWC and regulatory requirements for Schedule 3 and Discrete Organic Chemical Production Facilities*, Melbourne, 31 January 2013
- Rob Floyd, Stephan Bayer, *Nuclear Security Summit: 2014 and Beyond*, paper for the INMM 52nd Annual Meeting, Orlando, USA, July 2012
- Rob Floyd, *Safeguards Legislation and Regulations – Australia's Experiences*, presentation given at the 4th International Meeting on Next Generation Safeguards, Hanoi, Vietnam, July 2012
- Rob Floyd, *Asia-Pacific Safeguards Network (APSN) – Strengthening Safeguards through Regional Cooperation*, presentation given at the ASEAN Regional Forum (ARF) Inter-Sessional Meeting on Non-Proliferation and Disarmament, Manila, Philippines, June 2013
- Rob Floyd, *WMD Proliferation and Australia's National Security*, presentation at the National Security College,EL1 Development Program, Canberra, Australia, August 2012
- Rob Floyd, *Australia's Uranium Export Policy*, presentation given at the 2012 Moscow Non-proliferation Conference: Non-proliferation, Disarmament, and Nuclear Energy
- Rob Floyd, *Challenge of Transparency in Nuclear Security*, presented to the IAEA Senior Regulators Meeting, Vienna, Austria, September 2012
- Rob Floyd, *WMD Proliferation: Practical, Global and Regional Challenge*, presented at the National Security College: SES 1 Development Program, Canberra, Australia, November 2012
- Rob Floyd, *International Assurances of Nuclear Security*, presented at the Nuclear Security Summit Sous Sherpa Meeting, The Hague, April 2013
- Rob Floyd, *Strengthening Safeguards Through Regional Cooperation*, presented at the ASEAN Regional Forum – Intercessional Meeting on Non-Proliferation and Disarmament Asia-Pacific Safeguards Network (APSN), Manila, Philippines, June 2013
- Rob Floyd, *International Assurance of Nuclear Security*, presented at the Nuclear Security Summit Sherpas Meeting, Vienna, Austria, June 2013
- Rob Floyd, *Nuclear Security in Australia*, presented at the International Physical Protection Advisory Service Workshop, Australia, November 2012
- Rob Floyd, *International Assurance of Nuclear Security*, presented at the 2014 Nuclear Security Summit: Challenges and Opportunities. Clingendael – Wilton Park Workshop, The Hague, February 2013
- Rob Floyd, *Nuclear Security Summit: 2014 and beyond*, presented at the Institute of Nuclear Materials Management 53rd Annual Meeting, Florida, USA, June 2012
- John Kalish, *Australia's regulation and control of uranium ore concentrate*, presented at the Mongolia Nuclear Energy Agency – Japan Atomic Energy Agency Seminar on Peaceful Use of Nuclear Energy and Nuclear Non-proliferation, Ulaanbaatar, Mongolia, 4–5 September 2012

- John Kalish, *Security for uranium in mines, mills and transport*, presented at the Mongolia Nuclear Energy Agency – Japan Atomic Energy Agency Seminar on Peaceful Use of Nuclear Energy and Nuclear Non-proliferation, Ulaanbaatar, Mongolia, 4–5 September 2012
- John Kalish, *Safeguards verification and reporting for uranium mines*, presented at the Mongolia Nuclear Energy Agency – Japan Atomic Energy Agency Seminar on Peaceful Use of Nuclear Energy and Nuclear Non-proliferation, Ulaanbaatar, Mongolia, 4–5 September 2012
- John Kalish, Rob Floyd, Stephan Bayer, *The challenge of transparency in nuclear security*, 2012 International Nuclear Non-Proliferation and Security Symposium, Seoul, ROK, 7 September 2012
- Josy Meyer, *The Chemical Weapons Convention – Is Your Organisation Affected*, Directory and Database of Australian and New Zealand Chemical Manufacturers and Wholesalers, 2013–14 Edition
- Josy Meyer, *The CWC and regulatory requirements for producers and users of Schedule 1 Chemicals*, Sydney, 30 January 2013
- Josy Meyer, *The CWC and regulatory requirements for producers and users of Schedule 1 Chemicals*, Melbourne, 31 January 2013
- Josy Meyer, *The CWC and regulatory requirements for users of Schedule 2 Chemicals and importers of Schedule 2 and Schedule 3 Chemicals*, Melbourne, 31 January 2013
- Donald Sorokowski, *Nuclear Security Regulation in Australia*, Presentation to the IAEA Regional Training Course on the Security in Transport of Nuclear Material, December 2012

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 24 June 2013.

Description	Requirement	Location
Letter of transmittal	Mandatory	Page iii
Table of contents	Mandatory	Page v
Index	Mandatory	Page 123
Glossary	Mandatory	Pages 117–122
Contact officer(s)	Mandatory	Page ii
Internet home page address and Internet address for report	Mandatory	Page ii
Review by Statutory officer		
Review by statutory office holder	Mandatory	Pages 3–13
Summary of significant issues and developments	Suggested	Pages 3–13
Overview of department's performance and financial results	Suggested	N/A
Outlook for following year	Suggested	Pages 11–13
Significant issues and developments – portfolio	Portfolio departments – suggested	N/A
Departmental Overview		
Role and functions	Mandatory	Pages 43–48
Organisational structure	Mandatory	Page 96
Outcome and program structure	Mandatory	Page 50
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	Portfolio departments – mandatory	DFAT
Report on Performance		
Review of performance during the year in relation to programs and contribution to outcomes	Mandatory	Pages 55–91
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	Pages 55–91

Description	Requirement	Location
Trend information	Mandatory	Pages 55–91
Significant changes in nature of principal functions/services	Suggested	N/A
Performance of purchaser/provider arrangements	If applicable, suggested	N/A
Factors, events or trends influencing departmental performance	Suggested	N/A
Contribution of risk management in achieving objectives	Suggested	N/A
Social inclusion outcomes	If applicable, mandatory	N/A
Performance against service charter customer service standards, complaints data, and the department's response to complaints	If applicable, mandatory	N/A
Discussion and analysis of the department's financial performance	Mandatory	Page 97
Discussion of any significant changes from the prior year, from budget or anticipated to have a significant impact on future operations	Mandatory	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	Page 95
Senior management committees and their roles	Suggested	N/A
Corporate and operational planning and associated performance reporting and review	Suggested	DFAT
Approach adopted to identifying areas of significant financial or operational risk	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	Page 95
External Scrutiny		
Significant developments in external scrutiny	Mandatory	DFAT
Judicial decisions and decisions of administrative tribunals	Mandatory	DFAT
Reports by the Auditor-General, a Parliamentary Committee or the Commonwealth Ombudsman	Mandatory	DFAT
Management of Human Resources		
Assessment of effectiveness in managing and developing human resources to achieve departmental objectives	Mandatory	DFAT
Workforce planning, staff turnover and retention	Suggested	Page 96

Description	Requirement	Location
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	Page 96
Work health and safety performance	Suggested	DFAT
Productivity gains	Suggested	DFAT
Statistics on staffing	Mandatory	Page 96
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		
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	
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

Description	Requirement	Location
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	Page 110
Spatial reporting – expenditure by program between regional and non-regional Australia	If applicable, mandatory	DFAT
Correction of material errors in previous annual report	If applicable, mandatory	N/A
Agency Resource Statements and Resources for Outcomes	Mandatory	DFAT
List of Requirements	Mandatory	Pages 113–116

GLOSSARY

	Description
Additional Protocol (AP)	An agreement designed to complement a state's Safeguards Agreement with the IAEA in order to strengthen the effectiveness and improve the efficiency of the safeguards system. The model text of the Additional Protocol is set out in IAEA document INFCIRC/540.
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 Obligated Nuclear Material. Australian uranium and nuclear material derived therefrom, which is subject to obligations pursuant to Australia's bilateral nuclear cooperation agreements.
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

	Description
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.
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 Transport and Energy H (DG), is responsible for the application of safeguards to all nuclear material in Austria, Belgium, Bulgaria, 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, 10^9).
GWe	Gigawatts of electrical power.
GWt	Gigawatts of thermal power.

	Description
Heavy Water (D_2O)	Water enriched in the 'heavy' hydrogen isotope deuterium (^2H) which consists of a proton and a neutron. D_2O occurs naturally as about one part in 6000 of ordinary water. D_2O 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.
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 5000 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 identified 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.

	Description
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 a 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.

	Description
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)	On-Site Inspection. A short notice challenge-type inspection provided for in the CTBT as a means for investigation 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) comprise 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.

	Description
Radionuclide	An isotope with an unstable nucleus that disintegrates and emits energy in the process. Radionuclides may occur naturally, but they can also be artificially produced, and are often called radioisotopes. One category of CTBT IMS stations 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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