Australian Government

Australian Safeguards and Non-Proliferation Office

ANNUAL REPORT 2010-2011

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Cover:

Left: The OPAL reactor building, at the Australian Nuclear Science and Technology Organisation (ANSTO). (Photo: Copyright ANSTO)

Centre: IAEA Director General Yukiya Amano addresses the 1285th session of the IAEA Board of Governors, September 2010. (Photo: Copyright IAEA/Dean Calma)

Right: OPCW inspectors in personal protective equipment during the Old Chemical Weapons inspection at Columboola, QLD, September 2010. (Photo: Department of Defence)

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Australian Government

Australian Safeguards and Non-Proliferation Office

11 October 2011

The Hon Kevin Rudd 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 2011. This report is made in accordance with section 51 of the *Nuclear Non-Proliferation (Safeguards) Act 1987*, section 96 of the *Chemical Weapons (Prohibition) Act 1994* and section 71 of the *Comprehensive Nuclear Test-Ban Treaty Act 1998*.

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

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

Yours sincerely

Dr Robert Floyd
Director General

GUIDE TO THE REPORT

This report complies with the formal reporting obligations of the Director General ASNO. It 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:

- a report by the Director General ASNO on key developments in 2010–11 and a preview of the year ahead
- a summary of current major issues
- a 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
- a report on ASNO's performance during 2010–11
- 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 occupational 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 107).

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DIRECTOR GENERAL'S REPORT

DIRECTOR GENERAL'S REPORT

The Year in Review

Nuclear Non-Proliferation and Safeguards Developments

The International Non-Proliferation Environment

The principal challenges for the non-proliferation regime during the year included: the response to the determination by the International Atomic Energy Agency (IAEA) Secretariat that the facility destroyed in Syria in 2007 was very likely an undeclared nuclear reactor; Iran's continuing defiance of United Nations Security Council (UNSC) resolutions; and the ongoing issues related to the Democratic People's Republic of Korea's (DPRK—or North Korea) nuclear weapons program.

As noted in earlier annual reports, in September 2007, Israel destroyed what was reportedly an undeclared, partially constructed nuclear reactor in a remote region within Syria. IAEA efforts to determine whether the building destroyed was a nuclear reactor were completed during the reporting period. In his report to the June 2011 Board of Governors (BOG) meeting, IAEA Director General Amano informed Governors that:

'The Agency regrets that Syria has not cooperated since June 2008 in connection with the unresolved issues related to the Dair Alzour site and the three other locations allegedly functionally related to it. Based on all the information available to the Agency and its technical evaluation of that information, the Agency assesses that it is very likely that the building destroyed at the Dair Alzour site was a nuclear reactor which should have been declared to the Agency.'

Iran continued to expand its uranium enrichment capacity in defiance of resolutions passed by the UNSC that require it to suspend all enrichment activity. At the end of the reporting period Iran announced that it was in the process of moving the production of uranium enriched to just below 20% from the Pilot Fuel Enrichment Plant (PFEP) at Natanz to the yet to be completed Fordow enrichment plant near Qom.

The IAEA repeatedly raised issues related to 'possible military dimensions' of Iran's nuclear program. Iran has maintained that such claims are baseless and have not engaged with the IAEA on the substance of these issues since August 2008. Iran has, to date, failed to address IAEA concerns over reported research and development activities which may assist in the development of nuclear explosive devices.

Iran has continued to defy the UNSC obligation to suspend construction of its heavy water research reactor (which, when completed, could be used to produce plutonium suitable for nuclear weapons). The IAEA remains unable to provide assurances to the international community that there are no undeclared nuclear activities or materials in Iran.

International Atomic Energy Agency Safeguards

In November 2010 at the IAEA Safeguards Symposium, the Deputy Director-General (DDG) for Safeguards, Mr Herman Nackaerts, launched the Department of Safeguards Long Term Strategic Plan (LTSP): 'Preparing for Future Verification Challenges'. A major focus of the LTSP is the further evolution of the IAEA's safeguards system away from the traditional facility-specific criteria-based safeguards approaches that have been the foundation of inspection activities for decades. Under the LTSP , the evolution of the safeguards system will be away from the traditional, rigid and formulaic, criteria-based safeguards approach towards one that is fully information-driven – in other words, making greater use of state-level approaches that use all information available to the IAEA about the state, both facility-specific factors and state-specific factors (see report on the state-level concept at page 15).

At the end of the reporting period, DDG Nackaerts announced a major reorganisation of the Safeguards Department. The reorganisation is intended to support the LTSP and to ensure that departmental resources are allocated in ways that support its longer term aims. While the three safeguards operations divisions (the areas principally responsible for safeguards inspections) are relatively unaffected, there have been major changes in the structure and form of the support divisions.

Under the traditional structure, the operations divisions were seen as having the primary responsibility for safeguards with the role of the other divisions of the department seen as providing support for the operations divisions. The move towards safeguards that are more fully information-driven gives a more prominent role to all-source information analysis and requires skill sets that are primarily found in the support divisions. The new structure recognises all of the divisions as having a role in the State Evaluation process for drawing safeguards conclusions and for planning safeguards implementation. The structure makes it clear that safeguards requires a multi-disciplinary team effort and that the staff of the Safeguards Department are all safeguards practitioners and that this function does not rest solely with the inspectorate activities of the operations divisions.

The changes announced by DDG Nackaerts will unfold over the next few years. ASNO will not only monitor the changes closely, but will also engage in the technical and strategic discussions that will be important to ensuring the best outcomes from these changes.

Regional Safeguards Development

The Asia-Pacific Safeguards Network (APSN) took advantage of a gathering of safeguards authorities in Singapore in late March 2011 to hold an ad hoc meeting on 25 March 2011. The meeting was co-chaired by Director General (DG) ASNO and Mr KOH Kim Hock, Director General of the Environment Protection Division of the Singapore National Environment Agency. ASNO, as APSN secretariat, provided the secretariat functions for the meeting. The meeting was attended by representatives of 13 organisations, departments and agencies with responsibility for safeguards implementation, from nine regional countries, as well as representatives from the IAEA and the European Commission (EC).

The meeting was the first opportunity for the new DG ASNO to meet many of the APSN members to discuss the vision and direction of this developing regional network. The meeting held discussions on APSN's work program and activities, and made several recommendations on the establishment of working groups as well as a steering committee (consisting of Australia, Indonesia, Japan, and the Republic of Korea), for consideration and endorsement by the APSN plenary meeting. The APSN plenary meeting was scheduled to take place in the Republic of Korea, from 5–7 July 2011.

Bilateral Safeguards Developments

On 11 November 2010, Prime Minister Gillard and Russian President Dmitry Medvedev witnessed an exchange of notes, bringing into force the Australia-Russia Nuclear Cooperation Agreement. Subsequently, on 20 June 2011, DG ASNO and Mr Sergey Kirienko, General Director of Rosatom, signed the ASNO-Russia Memorandum of Understanding (MoU) on administrative arrangements underpinning the Agreement.

On 22 December 2010 the revised and expanded bilateral agreement on peaceful uses of nuclear materials and technology with the United States of America entered into force. The new expanded agreement explicitly adopts the Additional Protocol as part of the safeguards framework.

As foreshadowed in last year's annual report, Australia's bilateral safeguards agreement with Euratom (covering the 27 states of the European Union) is set to expire in January 2012. Negotiations were held in the latter half of 2010, and *ad referendum* text was agreed in June 2011. At the end of the reporting period, ASNO and Euratom were working towards signature of the expanded and revised agreement[1].

In March 2011, Foreign Minister Rudd announced that Australia would begin negotiations with the United Arab Emirates (UAE) on developing a bilateral nuclear cooperation agreement. The first round of negotiations was held in May 2011. In 2010, the UAE established contracts with a consortium from the Republic of Korea to build four nuclear power reactors in the UAE.

Domestic Safeguards Developments

During the reporting period, the IAEA conducted two design information verification inspections, three routine inspections and a short notice inspection in Australia, and also undertook three complementary access visits in accordance with Australia's Additional Protocol. The IAEA confirmed that Australia had met all of its IAEA safeguards requirements. ASNO also conducted domestic safeguards inspections of permit holders including ANSTO, Silex Systems Limited, uranium mines, and other holders of nuclear material.

The Fukushima Dai-ichi Nuclear Accident

The accident at the Fukushima Dai-ichi nuclear power plant after the terrible tragedy of the Great Tohoku Earthquake and subsequent tsunami brought the issue of nuclear safety to the fore. It also highlighted the importance of effective communication to

1 The Agreement was subsequently signed by Prime Minister Gillard and European Commission President Barroso on 5 September 2011.

states and relevant organisations (e.g. IAEA) of information on emergency incidents in order to ensure the most effective response possible. The Department of Foreign Affairs and Trade (DFAT) was able to draw upon ASNO as a major source of technical expertise to assist in the initial crisis period and as the accident unfolded.

ASNO provided briefing to Ministers and senior officials on the technical aspects of the accident, placing the reporting in context and ensuring the technical accuracy of the consular advice provided to the public. ASNO ensured staff were available 24 hours a day during the initial two week period of the crisis.

While primary responsibility within the Australian Government on nuclear safety and radiation issues rests with the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), the expertise within ASNO proved to be a very valuable resource for DFAT more broadly and we were able to make a significant contribution to DFAT's responses to the evolving crisis.

Comprehensive Nuclear-Test-Ban Treaty Developments

At 30 June 2011, 182 states had signed the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and 154 had ratified, including 35 of the 44 states which must ratify the Treaty to trigger its entry into force (known as Annex 2 states).

The importance of the CTBT to nuclear disarmament and non-proliferation has been reiterated in a number of political statements during the year. In September 2010 Australia's Minister for Foreign Affairs Mr Rudd chaired a meeting in New York of over 70 countries to promote entry into force of the Treaty. In April 2011 the foreign ministers of Australia and nine other countries reaffirmed the CTBT as a major objective on the multilateral agenda, urged further ratifications and reaffirmed support for the setting-up of an effective monitoring and verification system for the Treaty. Ratification of the CTBT by all of the Nuclear Non-Proliferation Treaty (NPT) nuclear weapon states is widely seen as necessary to stimulate most of the remaining ratifications by Annex 2 states. During an NPT Review Conference follow-up meeting on 30 June – 1 July 2011 the NPT nuclear weapon states recalled their commitment to promote and ensure the swift entry into force of the CTBT and its universalisation.

However, the CTBT will not enter into force until all of the remaining nine Annex 2 states ratify. Among these, the United States and Indonesia have commented publicly on progress towards their respective ratifications, but without setting a timeframe for this goal. The US Administration has announced a campaign to engage the US public and Senate on the Treaty, but the timing of any Senate reconsideration of the CTBT remains to be determined. A bill for ratification of the CTBT was introduced into Indonesia's House of Representatives (DPR) on 1 December 2010 and is being debated within the DPR's Commission I on Foreign Affairs, Defence and Information.

More than 80% of CTBT International Monitoring System (IMS) facilities are now operational. Progress with remaining stations may take some time, however, in some case due to political obstacles, for example where the host country is yet to sign the Treaty. Eighteen of Australia's 21 IMS facilities are operational. Except for the recently completed radionuclide station on Macquarie Island, all have been certified as meeting Treaty requirements. Installation of two more stations commenced in 2011.

Chemical Weapons Convention Developments

Fourteen years after entering into force, the Chemical Weapons Convention (CWC) has 188 States Parties. No new countries have joined the Convention since May 2009. Universal adherence to the CWC is fundamental to ensuring a world free of chemical weapons, but it remains elusive despite on-going diplomatic efforts. There are two countries that have signed, but are yet to ratify the Convention (Israel and Burma) and five yet to accede to it (Democratic People's Republic of Korea, Syria, Egypt, Angola and Somalia).

States Parties together with the Organisation for the Prohibition of Chemical Weapons (OPCW) continue to strive towards achieving the disarmament objective of the CWC. By 30 June 2011, 66% (approximately 47 286 metric tonnes) of all Category 1 and 2[2] chemical weapons that have been declared by seven chemical weapons possessor states had been destroyed.

In the lead up to the final extended chemical weapons destruction deadline of 29 April 2012, ASNO has been working with the Australian Embassy in The Hague to ensure effective transition of the CWC beyond the missed deadlines foreshadowed by Russia and the United States, holders of the largest chemical weapons stockpiles (see report on chemical weapons destruction deadline on page 27).

ASNO supported ongoing efforts by the OPCW Technical Secretariat (TS) to promote the full and effective implementation of the CWC. This is essential to the global chemical weapons ban and to ensuring that the non-proliferation goals of the CWC are realised. In particular, national implementation involves obligations under Article VII to designate a CWC National Authority (185 States Parties have done so) and to establish the necessary legislative and administrative arrangements to enable its implementation and the prosecution of offenders. We are encouraged by the progress made by States Parties in the reporting year towards the implementation of Article VII but note that more work needs to be done. While 137 States Parties have informed the OPCW TS of measures taken in this regard, only 87 States Parties have legislation covering all key areas.

In 2010–2011, ASNO facilitated five routine OPCW inspections, including one Schedule 1 facility and four 'Other Chemical Production Facilities'. The success of these inspections demonstrates Australia's compliance with the Convention, and reflects positively on the cooperation of Australia's chemical industry.

In September 2010, the OPCW inspected and thereby verified Australia's declaration of 144 old chemical weapon (OCW) projectiles of United States origin remaining from WWII, which had been buried on private property in central Queensland. ASNO, together with the Department of Defence, facilitated the inspection, which was the first of its kind in Australia. ASNO worked with Defence officials to submit a destruction and

2 Paragraph 16 of Part IV(A) of the Verification Annex to the CWC determines that for the purposes of destruction of declared chemical weapons they are divided into the following categories: Category 1: chemical weapons on the basis of Schedule 1 chemicals and their parts and components; Category 2: chemical weapons on the basis of all other chemicals and their parts and components; Category 3: unfilled munitions and devices, and equipment specifically designed for use directly in connection with employment of chemical weapons.

disposal plan to the OPCW TS and thereby confirmed that the OCW would be eliminated in accordance with the CWC's requirements. Defence facilitated the destruction of the OCW projectiles inside a purpose-built transportable detonation chamber during April–May 2011 (see report on destruction of OCWs on page 24). Advice and support provided by United States chemical weapons demilitarisation experts was valuable in the preparations for, and in the execution of, destruction activities.

Australia (ASNO, Defence Science and Technology Organisation and officials from the Australian Embassy in The Hague) actively participated in an inaugural Workshop held in The Hague from 24 to 25 November 2010, to promote international cooperation in the peaceful uses of chemistry under Article XI. The Workshop took place on the eve of the year 2011, which the General Assembly of the United Nations[3] has proclaimed as the 'International Year of Chemistry'. Australia continued to engage with the OPCW and other States Parties in The Hague to develop a framework for implementation of the concrete measures identified in the Workshop Report.

Australia, led by staff based in The Hague, concluded its facilitation of the open-ended working group on terrorism (OEWGT) in February 2011 with the delivery of a report to the 63rd session of the Executive Council of the OPCW. During the period of Australia's facilitation, the OEWGT has progressively considered the relevance of the implementation of key articles of the Convention (i.e., Articles IV, V, VII, X and XI) to the OPCW's contribution to the global efforts against terrorism. Australia also participated in the practical exercise entitled "ASSISTEX 3" held in Tunis, Tunisia in October 2010 and a table-top exercise on the preparedness of States Parties to prevent terrorist attacks involving chemicals, which took place in Warsaw, Poland in November 2010.

Other Non-Proliferation Developments

Fissile Material Cut-off Treaty

Calls for the commencement of negotiations on a Fissile Material Cut-off Treaty (FMCT) in the Conference on Disarmament (CD) have grown stronger during the year – highlighted at the UN Secretary General's High Level Meeting on the CD in September 2010. However, the required consensus of CD members to agree to negotiations has continued to be blocked. Australia has been seeking to break the impasse and together with Japan hosted three expert-level meetings in Geneva during the year, to help build confidence and momentum in the CD towards the commencement of FMCT negotiations. ASNO experts participated actively in the meetings. Through the newly established Non-Proliferation and Disarmament Initiative, Australia has worked to build support for progress towards an FMCT including in relation to what could be done if the CD remains unable to agree to start negotiations. At a 30 June – 1 July 2011 meeting in Paris the five NPT Nuclear Weapon States reiterated their support for immediate commencement of negotiations at the CD on an FMCT.

3 The sixty-third session of the General Assembly of the United Nations adopted resolution 63/209 on 19 December 2008, proclaiming 2011 as the International Year of Chemistry.

The Year Ahead

The following developments in the international security environment are likely to impact on ASNO's work during 2011–12:

- IAEA's continuing investigations of undeclared nuclear activities in Syria and related action in the UN Security Council
- Iran's nuclear program and the IAEA's continuing efforts to resolve questions about possible military dimensions
- the evolving international response to the Fukushima Dai-ichi nuclear accident
- international efforts to strengthen nuclear security including through the Nuclear Security Summit
- ongoing efforts to commence negotiations on a Fissile Material Cut-off Treaty (FMCT)
- continued interest in developing nuclear power programs in the Asia-Pacific region and elsewhere
- the work program and further development of the Asia-Pacific Safeguards Network
- changes in the IAEA's safeguards system to one that is fully information-driven
- the inability of some States Parties to complete destruction of their chemical weapon stockpiles by the CWC's final extended deadline of 29 April 2012.

In addressing the challenges posed by the international security environment, ASNO will continue to provide technical analysis and policy advice to the Government in the areas of non-proliferation and disarmament. ASNO will continue to ensure 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 the US-led Next Generation Safeguards Initiative. ASNO will also work on strengthening the IAEA's nuclear security guidelines. Australia looks forward to working closely with the IAEA Secretariat, in these and other areas.

Regionally, ASNO will continue its outreach program to build operational capability in the areas of safeguards and nuclear security and non-proliferation treaty implementation, including through further development of the Asia-Pacific Safeguards Network.

ASNO will manage Australia's network of bilateral safeguards agreements, including the tracking of Australian Obligated Nuclear Material (AONM) around the world. ASNO will finalise and seek signature of a new and extended nuclear cooperation agreement with Euratom and will continue negotiation of an agreement with the UAE.

Domestically, to ensure safeguards and nuclear security requirements are met, ASNO will work with ANSTO and other permit holders, and with industry and relevant regulatory authorities in the establishment of new uranium mines. ASNO will work with

uranium producers and shippers, and other national and foreign government agencies, on international shipping routes and arrangements.

Although US President Obama has made clear his support for the CTBT, Senate approval of ratification requires a two-thirds majority. The US Administration announced in May 2011 that it is preparing to engage the US public and Senate with an education campaign that it expects will lead to ratification of the Treaty. Discussion of the New START treaty in 2010 has given an indication of likely key issues in a debate on CTBT: steps required to ensure the long-term safety and reliability of US nuclear weapons without explosive testing, and the effectiveness of treaty verification. The strength of international support for the CTBT will also be an important consideration – especially by those countries whose ratification will be needed to bring the Treaty into force.

ASNO will continue to work with the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) and Australian agencies to complete the key elements of CTBT verification, the International Monitoring System (IMS) and on-site inspection (OSI) capability. Australia will continue to work towards the establishment of all IMS facilities for which we are responsible. The CTBTO's Preparatory Commission has identified progress towards an effective OSI capability as a priority, driven by plans for a large-scale inspection exercise in 2014. ASNO coordinates whole-of-government efforts to establish and maintain Australia's IMS stations, and has an active and leading role in the Preparatory Commission's work on OSI.

The effort to get negotiations on an FMCT underway will likely remain high on the international agenda in 2011–2012. Most interested countries have said that they prefer the CD as the venue for FMCT negotiation, but some have said that it could become necessary to progress discussions outside the CD. The UN General Assembly is expected to revisit later in 2011 how the impasse may be overcome, and to look at the functioning of the CD more broadly. 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.

At the 30 June – 1 July 2011 meeting in Paris the five NPT Nuclear Weapon States also discussed the political and technical challenges associated with verification in achieving further progress towards disarmament and ensuring non-proliferation. They agreed to continue their discussion of this issue later in 2011 at an expert-level meeting in London. This is a welcome development. ASNO is looking to build Australia's engagement in technical issues related to the verified dismantlement of nuclear weapons (see page 79).

ASNO, with officials from DFAT, will contribute to international efforts to minimise any damage to the Chemical Weapons Convention arising from the failure of some States Parties to complete the destruction of their chemical weapons stockpiles in the prescribed time. Australia will continue to seek the destruction of all remaining chemical weapons in the shortest possible timeframe (see report on the chemical weapons destruction deadline on page 27).

ASNO will 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, with DFAT officials, will support OPCW efforts to promote universal adherence to the CWC and to address chemical terrorism.

Industry outreach on CWC matters is an important element of ASNO's strategy to ensure compliance with domestic legislation. ASNO will work with other Commonwealth Government agencies to review the efficacy of Australia's current CWC implementing legislation and regulations.

ASNO will participate in a Challenge Inspection Exercise, jointly organised by the OPCW Technical Secretariat and the Government of Thailand to be held from 31 October to 4 November 2011 in Thailand. The goal of the exercise is to demonstrate and test the OPCW's preparedness to conduct a Challenge Inspection under Article IX of the Convention and to identify areas for improvement. Australia regards challenge inspections as an important verification mechanism for addressing concerns about possible non-compliance with the CWC.

Dr Robert Floyd
Director General ASNO

Prime Minister Julia Gillard and Russian President Dmitry Medvedev witnessed the exchange of notes that brought the Australia-Russia nuclear cooperation agreement into force on 11 November 2010.

CURRENT TOPICS
SECTION 2

CURRENT TOPICS

Changes to the IAEA's Safeguards System – The State-Level Concept

Fukushima Dai-ichi Nuclear Accident

Building Momentum for a Fissile Material Cut-off Treaty

Nuclear Security Summit: Towards Seoul 2012 and Beyond

International Atomic Energy Agency Fuel Bank

Destruction of Old Chemical Weapons at Columboola

Approaching the Final Destruction Deadline for Chemical Weapon Stockpiles

Australia's Uranium Production and Exports

CURRENT TOPICS

Changes to the IAEA's Safeguards System – The State-Level Concept

Through comprehensive safeguards agreements (CSAs) the IAEA is charged with both the right and obligation to ensure that safeguards will be applied on all nuclear material within the territory of a state for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices. It is a fact of life, however, that the IAEA operates in a budget constrained environment, so in discharging its safeguards obligations it must do so with the goal of maximising both efficiency and effectiveness. This is spelt out in several places in CSAs, as well as in the Additional Protocol (AP).

The perennial challenge for the IAEA is finding the right balance between meeting the expectations of its Member States (and the international community more broadly) 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. As such, IAEA safeguards approaches have, by necessity, evolved over the years in response to changes in the proliferation risk profile of the nuclear fuel cycle, and in verification technologies and techniques.

Since IAEA safeguards verification activities began in the early 1960s the IAEA has sought to use objective criteria to set the form and scope of its verification activities. These criteria became increasingly formalised over time, leading in the late 1980s to the development of a standardised compilation of inspector guidance known as the 'safeguards criteria', focussed at the facility level. The safeguards criteria were intended to demonstrate non-discrimination in the application of safeguards in different states by applying a high degree of uniformity in safeguards application based on types and quantities of nuclear material and facility types. During inspections, decisions regarding nuclear material sampling plans and verification methods were made with reference to the safeguards criteria.

A very significant step in the evolution of safeguards followed the discovery in Iraq in 1991 that, while its declared nuclear material and activities had been accounted for through IAEA verification activities, Iraq had a clandestine nuclear weapons development program supported by an undeclared enrichment program. Given the obligation on the IAEA to ensure that safeguards are applied to all nuclear material (not just declared nuclear material), the discovery in Iraq clearly meant new approaches were required. Accordingly, safeguards were strengthened to equip the IAEA with the tools and information necessary to verify the absence of undeclared nuclear material and activities – a significant component of which was the AP, adopted in 1997.

The AP by itself was not enough for the IAEA to draw conclusions on the absence of undeclared nuclear material and activities; it had to make use of the full range of available information of safeguards relevance in order to build a complete picture

of each state's nuclear activities and capabilities[4]. The process for collecting and evaluating this information was concluded in the early 2000s and is known as 'information-driven safeguards'. With the combination of information-driven safeguards, the verification tools available to the IAEA for states with an AP , and the results from nuclear material inspections (using the safeguards criteria), the IAEA is equipped to draw what is known as the 'broader conclusion' for a state that, not only is all declared nuclear material accounted for, but there are no undeclared nuclear materials or activities. For states without an AP the IAEA is not able to draw the broader conclusion, but information-driven safeguards are still useful for building a fuller picture of the activities and capabilities of such states.

The use of objective facility-specific safeguards criteria had the advantage that inspection results were amenable to quantitative statistical evaluation. As such, inspection reports could be subject to simple forms of quality control to ensure uniformity, and the evaluation of inspection goal attainment produced results that could be communicated to Member States in simple terms. The disadvantage of this approach was that safeguards implementation was very prescriptive. It resulted in inspection resources being concentrated on states with the greatest numbers of facilities, with limited scope to consider the overall risk profiles in determining the distribution of inspection effort. In a world where the quantity of safeguarded nuclear material is increasing, if the IAEA were to continue to follow such prescriptive approaches it may reduce the confidence of its verification conclusions.

The use of safeguards criteria, information-driven safeguards, and (where applicable) the AP had proved very effective over several years and met the needs of the time, but it became increasingly apparent that continuing to use these in the same way was not sustainable. In November 2010 at the IAEA Safeguards Symposium, the Deputy Director-General for Safeguards, Mr Herman Nackaerts, launched the Long Term Strategic Plan (LTSP) for the IAEA Department of Safeguards. A major focus of the LTSP was the further evolution of the IAEA's safeguards system away from the prescriptive criteria-based safeguards approaches focussed at the facility-level, to a state-level concept. The state-level concept is a holistic approach to safeguards implementation using a safeguards system that is fully information-driven – i.e. making greater use of all safeguards-relevant information available to the IAEA, both facility-specific information from reports and inspections, and state-specific information about nuclear activities and capabilities. The state-level concept will be applied not only to safeguards evaluations, but also to planning and in-field implementation (i.e. frequency, intensity and inspection scope).

Elements of a state level concept have been applied by the IAEA for some time. So, how does this differ from the way safeguards have been applied by the IAEA to now? The answer lies in both the breadth of information used and how it will be used. The IAEA plans to diversify the types of information it uses, and take account of a broader range of state-specific factors which have hitherto been under utilised. Examples of factors the IAEA might use include: the effectiveness of the state's accounting and control system; a state's record of adherence to safeguards requirements; a state's

4 This includes: information supplied by the State pursuant to safeguards obligations; information obtained by the IAEA through verification activities; open-source information (e.g. analysis of scientific publications, satellite imagery); and information from third parties.

transparency and cooperation with the IAEA; and characteristics and international inter-dependencies of the state's nuclear fuel cycle. It is important to appreciate that consideration of factors such as these is not new; in fact, some of the factors listed here are described in the model safeguards agreement[5] concluded in 1972 that forms the basis of all CSAs.

Where this state-level concept will also differ from previous practices is in application. The evaluation of all safeguards-relevant information on a state will be used for planning and implementing inspection efforts optimised for each state, rather than letting the numbers and types of nuclear facilities determine this. The safeguards criteria could still be used, but more flexibility may be built in to vary sampling plans and verification methods, allowing more scope for inspectors to focus on other indicators associated with potential diversion paths. This will be complemented by improvements in safeguards evaluations at IAEA headquarters where state evaluations will be more analytical and collaborative, making use of core evaluation groups of inspectors and analysts. As noted by Deputy Director-General Nackaerts the state-level concept will require an evolution in institutional culture from an accounting to an investigative and analytical approach.

The IAEA plans to develop and test a conceptual framework and tools for the evolving state-level concept in 2011 and 2012. The IAEA recognises it will be critical to communicate to Member States why the state-level concept is important and how it will operate. Currently, the reasons for variations in safeguards implementation between states are quite understandable to states, as differentiation is primarily on the basis of quantities and types of nuclear material and facilities. In contrast, the state-level concept will use the same objective processes for all states for evaluating and planning safeguards, but there may be variations (that do not exist currently) between states in the frequency and scope of verification activities. In a world where the quantity of safeguarded material is increasing, business as usual is not sustainable. If the IAEA were to continue to follow the same prescriptive approaches it would be difficult to do so within constrained resources without reducing confidence in its verification conclusions. As noted above, the IAEA is charged with the obligation of ensuring that states honour their safeguards obligations, and to do so in a cost-effective manner whilst maintaining safeguards effectiveness. The improved state-level concept has the potential for significant efficiency gains, while maintaining and perhaps improving safeguards effectiveness.

Fukushima Dai-ichi Nuclear Accident

The Tohoku Pacific Earthquake of magnitude 9.0 struck the north-eastern part of Japan at 2.46 pm on 11 March, 2011. Of the six nuclear reactors at the Fukushima Dai-ichi Nuclear Power Plant, the three reactors operating at the time shutdown automatically and the remaining three were already off-line for maintenance at the time of the earthquake. The back-up diesel generators on-site started emergency operation as soon as off-site power was lost.

5 IAEA, INFCIRC/153, paragraph 81.

The tsunami generated by the massive earthquake breached the 6 metre high sea-wall, intended to protect the power plant from tsunamis, and badly damaged the site. The diesel generators providing emergency power to the reactors were damaged by the resulting inundation. According to the Japanese Nuclear and Industrial Safety Agency all power on-site was lost at 3:41 pm local time. Less than one hour after the earthquake struck the three operating reactors shutdown.

The loss of site power, off-site power and diesel back-up generators was within the design basis accident for the facility, but the assumption was that one of the three sources of power would return relatively quickly. When diesel back-up generators failed catastrophically, battery back-ups powered the operational site pumps for a limited period of time (8-24 hours). As power to the Fukushima Dai-ichi Nuclear Power Plant had not been restored before battery power was expended, all six of the reactors were left without essential power.

The most urgent issues related to the three reactors that had been operating at the time – Units 1, 2 and 3; these reactors required continuous cooling after emergency shut-down to allow for the reactors to cool down. In addition to the reactors, there was the matter of maintaining cooling for the spent fuel ponds associated with each of the six reactors at the site as well as the common spent fuel pool.

The fuel elements containing the pellets of enriched uranium within the pressurised reactor core are clad with a zirconium alloy called Zircaloy. At high temperatures, zirconium reacts aggressively with steam to produce zirconium oxide and hydrogen. In the absence of adequate cooling, temperatures in the reactor pressure vessels increased and pressure built up to unsafe levels. Due to the rapid build-up of pressure, steam was vented from the reactor pressure vessels, without going through a ‘scrubber’ which would have removed the hydrogen, and the entrained hydrogen collected in the upper part of the secondary containment of the reactor building. In units 1 and 3, as the hydrogen reached an elevated concentration in air, it ignited and resulted in explosions that severely damaged the reactor buildings. Vents were opened in the sides of units 5 and 6 to prevent similar explosions from occurring there.

At the end of the reporting period the Tokyo Electric Power Company (TEPCO) and the Japanese government were working to limit further releases of radioactive material. Reactor units 1, 2, and 3, which were operating at the time of the earthquake, had suffered significant core damage and were still not in a state of cold shutdown as of 30 June 2011. Work was ongoing to develop storage for contaminated waste water and to immobilise on-site contamination.

The accident at the Fukushima Dai-ichi Nuclear Power Plant highlighted the need for effective communication to states and relevant organisations (e.g. IAEA) of information on emergency incidents. Furthermore, the information must be adequately detailed and contextualised to allow this information to be interpreted in a way that ensures an appropriate response. Incomplete information and a poor understanding of that information at a time of information overload, as is likely to occur during an emergency, can make it very difficult to isolate the key matters requiring an active response.

The crisis surrounding the Fukushima Dai-ichi reactors was an important time for ASNO as we worked to provide briefings for Ministers and senior officials on the technical aspects of the accident, placing the reporting in context and ensuring the technical accuracy of the consular advice provided to the public. ASNO ensured technical experts were available 24 hours a day during the initial two week period of the crisis.

While primary responsibility within the Australian Government on nuclear safety and radiation issues rests with the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), the expertise within ASNO proved to be a very valuable resource for DFAT more broadly and we were able to make a significant contribution to DFAT's responses to the evolving crisis.

Building Momentum for a Fissile Material Cut-off Treaty

The negotiation of a multilateral Fissile Material Cut-off Treaty (FMCT) is widely seen as one of the crucial steps toward nuclear disarmament, and is a priority for the Australian Government. The central element of an FMCT would be a ban on the production of fissile material for use in nuclear weapons. An effectively verifiable FMCT would have important benefits for international security – by helping to curtail a nuclear arms race, and by reinforcing the international nuclear safeguards system. It would complement the CTBT. The CTBT impedes development of nuclear weapons by prohibiting testing; the FMCT would impose a quantitative cap on the fissile material available for weapons use.

The Conference on Disarmament (CD) is the multilateral forum in which most countries believe an FMCT should be negotiated. However, decisions by the CD require consensus among its Members. Despite strong multilateral support for FMCT negotiations, in the UN General Assembly since the early 1990s and more recently through the consensus outcome of the 2010 Nuclear Non-Proliferation Treaty Review Conference, lack of consensus in the CD on the purpose and form of an FMCT has continued to prevent negotiations. Frustrations with the prolonged impasse in the CD to carry out productive work and desire to find a way forward on an FMCT have grown markedly in recent years.

In this context, Australia, working with Japan, has sought to build momentum towards FMCT negotiations in the CD by arranging a series of expert-level meetings in Geneva to discuss key aspects of a verifiable ban on fissile material production. Three meetings of three days each in February, March and May–June 2011 focussed first on definitions as they would be applied in a treaty, for fissile material and its production, and then on the nature of mechanisms needed to verify a ban on fissile material production for use in nuclear weapons. The first two meetings were chaired by Australia's Permanent Representative to the United Nations and the Conference on Disarmament in Geneva, Ambassador Peter Woolcott. ASNO experts participated actively in the expert meetings, and supported the Australian Permanent Mission in Geneva to facilitate their conduct.

The three expert meetings conducted in 2010–2011 did not seek to negotiate any elements of an FMCT, but rather provided an opportunity for interested countries to exchange views on this important issue. Around two-thirds of the CD's 65 Member States participated in these events.

Different views have been put over the years on what should be included in the definition for fissile material used in an FMCT, and on what nuclear activities are parts of its production. As well as reviewing the various options, the expert discussions provided some indicators on how differing views on definitions might be reconciled. For example, the definition of 'fissile material' could be based on the IAEA's existing definition of 'unirradiated direct-use material', taking into account that activities with some other nuclear materials would be relevant to its production.

In relation to verification, during the expert discussions four particular objectives were commonly raised. These were to verify that production of fissile material is as declared; that fissile material is not diverted for use in nuclear weapons; that there is no undeclared production of fissile material; and that fissile material production facilities formerly used for nuclear weapons purposes are dismantled or converted to permitted uses.

Many participants in the expert meetings expressed the view that safeguards concepts and methods already used by the IAEA in NPT non-nuclear-weapon states could be adapted to verify an FMCT. Main challenges in this task would be to focus routine verification efforts on various nuclear activities based on the risk they may pose to the object and purpose of an FMCT; to ensure that mechanisms for detecting and investigating possible undeclared production of fissile material are effective in all participating states; and to apply verification where nationally sensitive information may be present.

The expert-level meetings have been widely appreciated for helping re-energise discussions and lift the quality of exchanges in the CD on issues relating to the proposed FMCT. They demonstrated to many participants that when discussions are focussed on substantive issues, both the value of the proposed treaty and the confidence brought by new verification measures become clearer.

As Foreign Minister Rudd told the CD on 1 March 2011, "the FMCT is not an end in itself, but a means to a greater end — a world free of nuclear weapons." Australia considers negotiations are now long overdue.

Nuclear Security Summit: Towards Seoul 2012 and beyond

United States President Obama's Prague speech on 5 April 2009 called for a new international effort to secure all vulnerable nuclear material around the world within four years. This effort was the focus of the inaugural Nuclear Security Summit (NSS) held in Washington DC on 12–13 April 2010, attended by 47 states as well as the United Nations, the IAEA and the European Union. This Summit brought together the largest gathering of world leaders convened by a United States President since 1945 and produced a communiqué and work plan that provides a strong mandate for international cooperation to address the threat of nuclear terrorism and the Prague speech goals. ASNO was active in negotiating the communiqué and work plan and preparing Australia for the summit. The then Director General ASNO, John Carlson, was Australia's summit Sherpa. The new DG ASNO, Robert Floyd is Australia's current Sherpa and

ASNO's Stephan Bayer remains Australia's sous-Sherpa. The Republic of Korea has agreed to host a second summit in Seoul, in late March 2012. As was done during the Washington summit, Seoul will also host parallel meetings involving industry and nuclear security experts.

Tangible results

The Washington Summit has already accelerated progress in threat reduction programs with Chile, Kazakhstan, Poland and the Ukraine having secured or returned high enriched uranium (HEU) to suppliers, and Russia shutting down a plutonium production reactor. Not only have once-off actions taken place, but many countries have moved to make solid long-term investments in nuclear security with the establishment of a number of nuclear security centres of excellence including centres in Japan and the Republic of Korea. These are in various stages of development, and the IAEA will hold a meeting seeking to coordinate these centres of excellence in order to maximise their collective input.

Australia is already well advanced in satisfying the summit work plan, having ratified the amendment to Convention on the Physical Protection of Nuclear Material (CPPNM), converted its HEU-based medical isotope production to low enriched uranium (LEU) fuel and targets, implemented rigorous domestic security standards, joined international security partnerships, and maintained regional outreach and capacity building programs, including strong interaction with the IAEA. Australia nuclear agencies also have significant international expertise to offer on nuclear security – they chair the International Technical Working Group on Nuclear Forensics (ANSTO chair) and the Information Exchange Meeting under the Code of Conduct on the Safety and Security of Radioactive Sources (ANSTO chair), and play an active role in developing international nuclear security guidance documents for the protection of nuclear and radioactive materials.

More work to do internationally on treaties

In a welcome development, 13 states (including six from the NSS) have ratified the amendment to the CPPNM since the Washington summit. However, of the 145 signature states to the CPPNM, only 48 have ratified the amendment, being only half of the 96 ratifications required before the amendment will enter into force for each State Party. Less than half of the NSS Participating States have ratified the amendment. Clearly, there is much to be done both inside and outside the NSS to progress this important convention. A commitment by the NSS Participating States to work internationally to reach entry into force of the amendment by 2014 would be a welcome development. Similarly, close to half of the NSS Participating States have not ratified the International Convention for the Suppression of Acts of Nuclear Terrorism, including Australia.

Seoul and beyond

Leaders attending the Seoul summit will seek to re-affirm the commitments made at the Washington summit, but also direct their attention to the recently included programs and initiatives through the intersessional meetings of sherpas and sous-sherpas.

The ongoing success of addressing nuclear security threats depends not on the work of the Participating States alone, but on the participation of all states. Regional outreach by NSS Participating States will be vital. Mechanisms such as the recently formed

Asia Pacific Safeguards Network could usefully assist regional coordination of nuclear security outreach and capacity building. The IAEA must also be adequately resourced and given a clear mandate to continue to play a central role in the international nuclear security architecture.

The upcoming summit in Seoul will be held at the halfway point towards achieving the four-year goals espoused by United States President Obama in Prague. Much more remains to be done by NSS Participating States and the nations of the world to secure nuclear materials.

International Atomic Energy Agency Fuel Bank

On 3 December 2010, the International Atomic Energy Agency (IAEA) Board of Governors authorised the establishment of an IAEA Low Enriched Uranium (LEU) Fuel Bank.[6] The fuel bank, and indeed fuel cycle multilateralisation more broadly, has the potential to reduce the desire and need of some countries to establish indigenous enrichment or reprocessing, and thus reduce the proliferation risk.

A number of countries and organisations, including the US, UAE, EU, Kuwait, Norway and the non-government Nuclear Threat Initiative (NTI), have seen the potential of the fuel bank and contributed money to make it a reality with approximately US$160 million donated to cover initial operating expenses and purchase/delivery of LEU. The NTI were a significant driving force in the creation of the fuel bank with a contribution of US$50 million, contingent on IAEA Member States contributing a further US$100 million.

The concept behind the IAEA Fuel Bank is that there would be a supply of LEU owned and managed by the IAEA suitable for the production of reactor fuel. If an IAEA Member State finds their LEU supply disrupted for predominantly commercial reasons, they can call on the IAEA LEU bank to get additional reactor fuel. The plan is that the fuel bank would maintain enough LEU to meet fuel fabrication requirements for one full core of a 1000 MWe pressurised water reactor, or three annual reloads.

LEU fuel from the fuel bank would only be available to eligible IAEA Member States for power generation at standard market prices, paid in advance. To be eligible, a Member State would need to fulfil the following criteria:

- The Member State would need to experience an LEU supply disruption and be unable to secure LEU from the commercial market, or through State-to-State arrangements, or by any other such means.
- The IAEA would need to reach the conclusion that there has been no diversion of declared nuclear material and there are no issues relating to safeguards implementation in the requesting State.
- The Member State must have a comprehensive safeguards agreement in force, thereby requiring the application of IAEA safeguards to all its peaceful nuclear activities.

6 http://www.iaea.org/Publications/Factsheets/English/iaea_leureserve.html, Factsheet: IAEA, Low Enriched Uranium Reserve, International Atomic Energy Agency.

If these three criteria are met, the Director General of the IAEA will approve the Member State's request for fuel from the bank.

The IAEA fuel bank is not designed to replace traditional supply arrangements, but rather provide assurances to Member States that they will have access to fuel in the event of unforeseen problems with their standard supply chain. However, it may be that other unilateral or multilateral fuel banks are developed to complement, and possibly replace, current supply arrangements.

In advance of the authority to establish a specific IAEA Fuel Bank, on 27 November 2009 the Board of Governors approved a Russian initiative to establish a reserve of LEU to provide to the IAEA for Member States. This is a separate yet complementary scheme whereby the fuel stockpile is owned by the Russian Federation, and will be made available to the IAEA for transfer to the identified Member State when required. On 1 December 2010 the Russian Federal Atomic Energy Agency (Rosatom) announced the fuel bank was stocked with 120 tonnes of LEU, with the fuel stored at the International Uranium Enrichment Centre in Angarsk, Russia.[7]

Obligated Nuclear Material

Fuel banks, and their built in supply conditions, do not impact on uranium suppliers, such as Australia, unless suppliers choose to become party to the fuel bank arrangements. In this regard, one consideration for uranium suppliers, including Australia, will be how obligated material would be tracked through a fuel bank or multinational facility, including the possible impact on bilateral agreements. For instance, would there be a requirement for a bilateral agreement with each of the operating/partner countries as well as the end-user? Or would it be possible to have assurances indirectly via the Member State's agreement with the IAEA?

Nuclear accountancy and associated reporting obligations will need to be agreed so that reporting requirements are consistent regardless of supplier country. There would also need to be agreement on treatment of reporting generated, such as: would the information be available to all Member States, to Member State(s) specifically on their obligated nuclear material, or some other predetermined group? And, what information would be available in each instance? It is likely that agreed reporting obligations will be similar to existing arrangements falling under bilateral agreements.

Where to from here?

It is undesirable for every state that has either a nuclear research or power program to establish its own enrichment and reprocessing facilities. The international community has long recognised the need to reduce the spread of sensitive nuclear technologies (i.e. enrichment and reprocessing); fuel banks – and the underlying fuel assurances that are part of the bank – and multinational enrichment facilities are viable options which have the potential to minimise the spread of enrichment and reprocessing technologies.

7 http://www.iaea.org/newscenter/news/2010/leureserve.html, "Russia Inaugurates World's First Low Enriched Uranium Reserve", International Atomic Energy Agency, 17 December 2010.

Some uranium supplier countries (such as Australia) supply under bilateral safeguards agreements that include assurances and conditions additional to those required under IAEA safeguards agreements, such as requiring supplied nuclear material to be accounted for (or "tracked") separately. If such suppliers were to consider supplying uranium to a multinational facility there are aspects to how the facility would operate that would need to be clarified, such as what forms of assurances which would need to be given before supplying uranium to a fuel bank. Importantly, if and how obligated nuclear material would be accounted for within a multinational facility, whether it is an enrichment facility, a fuel bank or a reprocessing facility, would be an important question to address.

Australia strongly supports the non-proliferation value of fuel cycle multilateralisation. Taking an international approach to the fuel cycle to protect sensitive nuclear technologies and ensure the security of nuclear fuel supply makes a valuable contribution to non-proliferation and there are a number of parallel initiatives looking at achieving exactly this. However, an international fuel bank or a multinational enrichment facility or similar endeavour will only succeed with international support and strict adherence to IAEA safeguards.

Destruction of Old Chemical Weapons at Columboola

Most Australians would not be aware that Australia had chemical weapons on its territory during World War II (WWII), for defence purposes to provide for a response in-kind if that proved necessary. The weapons were never used in warfare. The majority of these munitions were designed to be filled with nitrogen or sulphur mustard or phosgene. All chemical weapons remaining in Australia after WWII were either shipped back to their country of origin (US or UK), dumped at sea, buried underground, or the chemical agents destroyed and the casings mutilated. None of these methods of disposal were prohibited at that time.

The Chemical Weapons Convention (CWC) defines old chemical weapons (OCW) as those chemical weapons manufactured between 1925 and 1946 and that are no longer usable. The CWC does not require States Parties to recover OCW buried prior to 1977 or dumped at sea before 1985. However, if any OCW resurface or are excavated, they must be declared to the Organisation for the Prohibition of Chemical Weapons (OPCW) and destroyed in accordance with the provisions and principles outlined under the CWC.

The OPCW is responsible for the global implementation of the CWC. Its mandate includes verification of States Parties' declarations of OCW and to determine if they meet the definition of OCW under the Convention.

Verification under the CWC requires on-site inspection of OCW munitions and visual examination to ensure that they are not usable as chemical weapons and were not manufactured post-1946. Both criteria are needed to rule out their classification as 'chemical weapons' under the Convention, which would require more stringent reporting and destruction obligations as compared with those required for OCW.

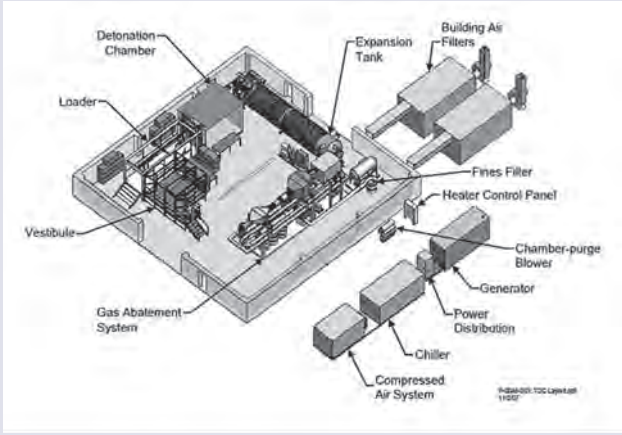
Excavation of 105mm OCW projectiles at Columboola, QLD, 2009 (Photo: Department of Defence).

The 144 OCW projectiles (of US origin) discovered during mining preparations at Columboola, QLD in June 2009, on a former World War II munitions depot site, were suspected of containing the chemical warfare agent sulphur mustard. In addition, their age and condition, uncertainty about explosive components and their location on private property were integral to the manner in which the destruction project evolved, requiring all munitions to remain on-site throughout the entire process.

Defence, in consultation with ASNO, managed the execution of a plan of action to secure, characterise, destroy and dispose of the OCWs. To ensure the safety of people and the environment, the project was conducted in accordance with state, national and international legal requirements (notably those of the CWC). Defence consulted with, and briefed, mine owners and operators, state government and environmental stakeholders and concerned residents in the nearest towns on an on-going basis, and reassured them that safety would be given the highest priority.

Australia's Defence Science and Technology Organisation assisted with specialist tasks, including deployment of its Mobile Analytical Facility for the on-site analysis of soil and other samples to determine the extent of any contamination as well as conducting studies to determine the radius of impact should any of the munitions leak or explode during their removal from the storage site to the destruction location 100 metres away.

The best method for destruction was assessed to be explosive detonation given the possibility of explosive components being present and of breakdown of the sulphur mustard, complicating any removal and subsequent hydrolysis. However, as Australia does not have a chemical weapon destruction facility, a Transportable Detonation Chamber (TDC) was imported from the United States and erected on-site at Columboola for use as a temporary destruction facility.



Simplified process flow diagram for the Transportable Detonation Chamber (TDC) (Image: Copyright CH2MHILL)

Defence was also provided with assistance from the US Government including personnel, equipment and expertise. US experts characterised the munitions' contents and overpacked the munitions into propellant charge cans in preparation for destruction. The results of X-ray and Portable Isotopic Neutron Spectroscopy indicated that 140 of the 144 munitions were filled with sulphur mustard.

US Experts preparing OCW for safe storage before destruction at Columboola (Photo: Department of Defence).

External view of the building containing the Transportable Detonation Chamber at Columboola. (Photo: Department of Defence)

In September 2010, the OPCW conducted an inspection at Columboola. ASNO, together with Defence, facilitated the inspection to verify Australia's declaration. This was the first inspection of its kind in Australia. The proposed destruction method using a TDC was also discussed and confirmed by the OPCW to be in full accordance with the CWC.

Despite the heavy rain and floods in late 2010 and early 2011, the TDC was built on-site over an eight week period. All 144 OCWs were safely destroyed during April and May 2011.

The search for other possible OCW burial sites continues at Columboola and covers a total area of 724 hectares. Once completed, this will open the way for coal-mining operations to commence safely in the area with a high degree of confidence that no other munitions will be encountered.

OPCW Director-General, Ambassador Ahmet Üzümcü with the Minister for Defence, Mr Stephen Smith (Photo: Copyright OPCW).

In June 2011, the Honourable Stephen Smith, Minister for Defence, visited the OPCW headquarters in The Hague where he met with the Director-General, Ambassador Ahmet Üzümcü. Defence Minister Smith confirmed the completion of destruction of the OCW at Columboola and emphasised that the goals of eliminating all chemical weapons and preventing their re-emergence made a vital contribution to global efforts aimed at enhancing peace and security. Director-General Üzümcü commended Australia for its consistent support for the work of the OPCW.

Approaching the Final Destruction Deadline for Chemical Weapon Stockpiles

As the final extended destruction deadline approaches, the Organisation for the Prohibition of Chemical Weapons (OPCW) is sailing in unchartered territory. There are no provisions in the Chemical Weapons Convention (CWC) for the existence of chemical weapons after 29 April 2012, yet possessor states have admitted that destruction of chemical weapon stockpiles will not be complete by this date.

A fundamental objective of the CWC is the complete elimination of all existing chemical weapons (i.e. demilitarisation). Complementary to this is the prevention of their re-emergence (i.e. non-proliferation). The CWC entered into force on 29 April 1997 and prescribed that all chemical weapons must be destroyed within ten years, that is, by 29 April 2007. However, provisions were made in an Annex to the CWC allowing for a maximum five-year extension to 29 April 2012. The CWC does not contain any provisions to address the existence of chemical weapons after that date.

Seven States Parties have declared their possession of chemical weapons. By late 2010, for category one chemical weapons[8], the United States had destroyed approximately 84% of its chemical weapon stockpile and Russia had destroyed approximately 49% of its stockpile. Iraq has faced technical issues during the demilitarisation process. Completion of destruction activities in Libya has been delayed. Albania, India and one other State Party, have completed their demilitarisation programmes. All declared chemical weapon stockpiles have been secured, inventoried and verified by the OPCW. All declared chemical weapon production facilities have been inactivated and are subject to systematic verification through on-site inspection and monitoring by the OPCW.

The largest chemical weapons possessor states, the United States and Russia, have confirmed that they will be unable to complete the destruction process by the extended deadline of 29 April 2012. The commitment of these States to the task is clear, however, persistent technical problems, environmental issues and funding shortfalls have brought delays.

OPCW consultations related to the possessor states' inability to meet the deadline have been underway since 2009. Initial discussions concluded that a technical change to the CWC would not gain the support of all States Parties. Subsequent discussions have focussed on expanding confidence-building and transparency measures, and establishing a 'planned completion date' specific to each possessor state. A draft decision has been proposed which incorporates these measures while allowing for the continuation of the CWC's current provisions for destruction. However, it is unfortunate that early agreement on a course of action has eluded States Parties. Discussions and consultations will continue with the aim of finalising a decision for approval by the Sixteenth Session of the Conference of the States Parties in December 2011.

Missing the destruction deadline is not likely to have serious international peace and security implications provided there is provision for continued verification of destruction facilities and stockpiles. It is of paramount importance that possessor states destroy their chemical weapons stockpiles as quickly as possible. Failure of States Parties to reach agreement on the way forward may impact the OPCW and State Parties' responsiveness to other important issues of relevance to the CWC.

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$80 per kilogram uranium were estimated to be 1 223 000 tonnes U as at December 2009, which represents 46% of world resources in this category.

8 Paragraph 16 of Part IV(A) of the Verification Annex to the CWC determines that for the purposes of destruction of declared chemical weapons they are divided into the following categories: Category 1: chemical weapons on the basis of Schedule 1 chemicals and their parts and components; Category 2: chemical weapons on the basis of all other chemicals and their parts and components; Category 3: unfilled munitions and devices, and equipment specifically designed for use directly in connection with employment of chemical weapons.

This is based on estimates for Australia by Geoscience Australia in *Australia's Identified Mineral Resources 2010* and for other countries as reported by the OECD Nuclear Energy Agency in 'Uranium 2009: Resources, Production and Demand'. In 2010, the Ranger and Olympic Dam mines were, respectively, the world's second largest (6% of world uranium production) and seventh largest (4% of world uranium production) uranium producers.[9] Overall, Australia is the third largest uranium producer after Kazakhstan and Canada.

TABLE 1: UOC EXPORT AND NUCLEAR ELECTRICITY STATISTICS

Item	Data
UOC Exports	
Total Australian UOC exports 2010–11	6950 tonnes
Value Australian UOC exports	A$610 million
Australian exports as % world uranium requirements[10]	~8.7%
No. of reactors (1000 MWe) these exports could power[11]	~33
Power generated by these exports	~230 TWh
Expressed as percentage of total Australian electricity production[12]	~88%

Worldwide, uranium mining currently provides about 70% of global industry requirements, with the balance coming from down-blending of excess weapons material, stockpiles and reprocessing. In 2011 world uranium consumption is expected to increase as the commissioning of new nuclear generating capacity in China, India, the Russian Federation and Taiwan is expected to more than offset lower consumption in Japan and Germany associated with the closure of nuclear capacity following the Fukushima Dai-ichi nuclear accident. Over the longer term uranium spot prices are expected to be strong due to the forecast increase in nuclear power worldwide, and uncertainty surrounding the possible extension of the 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.

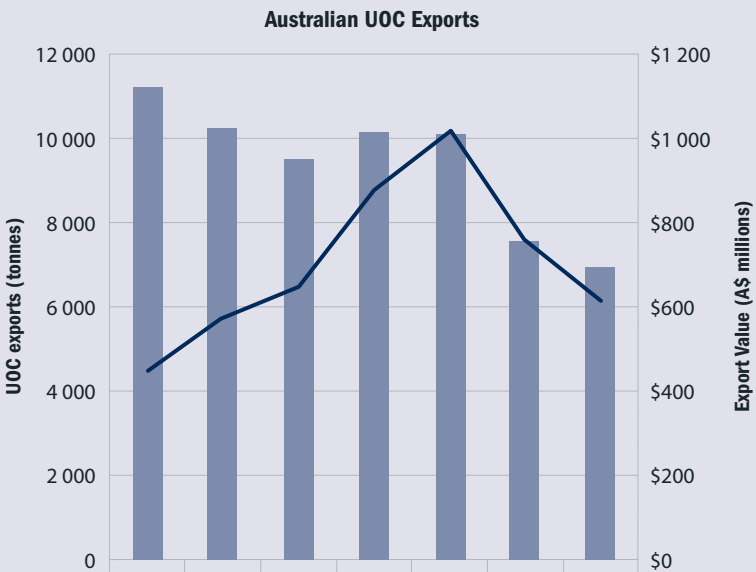
9 Australian production compared with data on global uranium producers from the World Nuclear Association's World Uranium Mining (April 2011)—www.world-nuclear.org/info/inf23.html.

10 Based on 2011 world requirements of 68 971 tonnes uranium (World Nuclear Association's World Uranium Mining, July 2011).

11 Based on a comparison of TWh of nuclear electricity generation and uranium required, for countries eligible to use AONM. Source: World Nuclear Association's "World Nuclear Power Reactors and Uranium Requirements", http://www.world-nuclear.org/info/reactors0711 (1 July 2011).

12 Australia's gross electricity generation in 2010–11 is estimated to be 260 TWh. Source: Australian Energy, National and State Projections to 2029–30—Statistical Tables, ABARE Research Report March 2010.

FIGURE 1: QUANTITY AND VALUE OF AUSTRALIAN UOC EXPORTS



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

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), have an Additional Protocol in force and are within Australia's network of bilateral safeguards agreements. These bilateral safeguards 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 safeguards 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 of Australia's safeguards 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 (NNWS), 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 (NWS), 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% or more in the isotope ^{235}U and reprocessing[13]
- 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
- 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).[14]

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.

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

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

Australia's uranium transhipment security policy

For countries with which Australia does not have a bilateral safeguards agreement, 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:

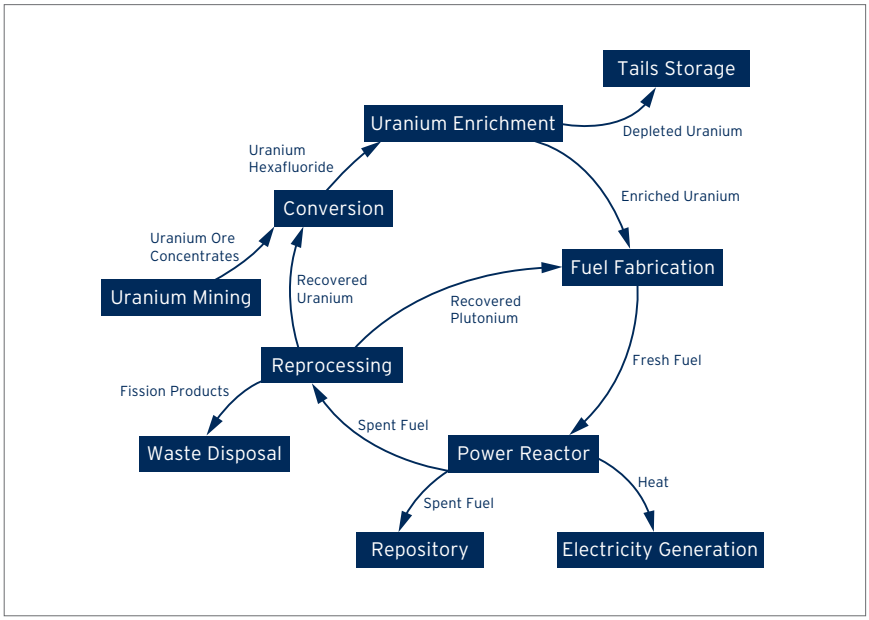
- a party to the Convention on the Physical Protection of Nuclear Material (CPPNM)
- has adopted the IAEA's Additional Protocol on strengthened safeguards
- and acts in accordance with these agreements;

then arrangements on appropriate security can be set out in an instrument with less than treaty status[15]. 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.

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

FIGURE 2: CIVIL NUCLEAR FUEL CYCLE



A characteristic of the nuclear fuel cycle is the international interdependence of facility operators and power utilities. It is unusual for a country to be entirely self-contained in the processing of uranium for civil use. Even in the nuclear-weapon states, power utilities will often go to other countries seeking the most favourable terms for uranium processing and enrichment. It would not be unusual, for example, for a Japanese utility buying Australian uranium to have the uranium converted to uranium hexafluoride in Canada, enriched in France, fabricated into fuel in Japan and reprocessed in the United Kingdom.

The international flow of nuclear material means that nuclear materials are routinely mixed during processes such as conversion and enrichment and as such cannot be separated by origin thereafter. Therefore, tracking of individual uranium atoms is impossible. Since nuclear material is fungible—that is, any given atom is the same as any other—a uranium exporter is able to ensure its exports do not contribute to military applications by applying safeguards obligations to the overall quantity of material it exports. This practice of tracking quantities rather than atoms has led to the establishment of universal conventions for the industry, known as the principles of equivalence and proportionality. The equivalence principle provides that where AONM loses its separate identity because of process characteristics (e.g. mixing), an equivalent quantity of that material is designated as AONM. These equivalent quantities may be derived by calculation, measurement or from operating plant parameters. The equivalence principle does not permit substitution by a lower quality material. The proportionality principle provides that where AONM is mixed with other nuclear material and is then processed or irradiated, a corresponding proportion of the resulting material will be regarded as AONM.

Director General ASNO, Robert Floyd and Director General, State Atomic Energy Corporation (ROSATOM), Sergey Kirienko concluding the Exchange of Letters on Administrative Arrangements under the Australia-Russia Nuclear Cooperation Agreement.

OVERVIEW OF ASNO
SECTION 3

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 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 (CPPNM).

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 safeguards agreements with other countries and Euratom
- operating Australia's bilateral safeguards 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 (PTS). 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 the Treaty 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, ASNO gathers information from chemical industry including traders, universities and research institutions to compile declarations that Australia must submit to the OPCW. ASNO has the right to conduct compliance inspections of relevant facilities in Australia, but such powers are exercised only in exceptional circumstances. ASNO conducts outreach activities, including site visits, to promote compliance and to check the accuracy of information provided by industry.

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

ASNO promotes effective international implementation of the CWC, particularly in Australia's region. It works with the OPCW and other States Parties in the formulation of verification policy and by providing practical implementation assistance and advice.

Key CWC functions are:

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

Chemical production facility and ASNO representatives with the OPCW Inspection Team during a routine industry inspection at a declared chemical facility in NSW, May 2011.

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 to provide a legal framework for the mandatory provision of data to ASNO by facilities which produce or use chemicals as specified by the CWC, so that ASNO can lodge declarations with the OPCW
- provides for routine inspections of declared facilities and challenge inspections of any facility or other place in Australia by OPCW inspectors to verify compliance with the CWC, and for inspections by ASNO to verify compliance with the CWP Act
- provides for procedures should another State Party seek clarification concerning compliance with the CWC at any facility or other place or by any person in Australia.

Regulations under the CWP Act prescribe procedures and details of other arrangements provided for in the CWP Act. In particular, the Regulations define conditions that are to

be met by holders of permits issued under the CWP Act, and for granting privileges and immunities to OPCW inspectors when in Australia to carry out inspections.

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

The CWP Act was amended on 6 April 1998. The amendments refine administration of the CWP Act by simplifying compliance obligations for facilities requiring permits, clarifying the legislative basis for Australia to implement some of its obligations under the CWC, correcting drafting errors and improving certain procedures, including those related to secrecy. For consistency, concomitant Regulations were amended on 17 December 1998.

On 4–5 December 2006, two minor technical amendments to the text of the Verification Annex of the Convention accepted by Australia were set out in the Regulations. At the same time, a second amendment to the Regulations took effect to ensure that facilities producing or using highly toxic Part A Schedule 2 chemicals in low concentrations are captured under the permit system prescribed under the CWP Act.

Minor amendments were made to the CWP Act on 10 April 2007, as part of the *Non-Proliferation Amendment Act 2007*. Amendments included repealing subsection 8(2) thereby removing the requirement that approved forms or procedures made pursuant to the CWP Act are disallowable instruments. Approved forms or procedures under the CWP Act specify matters that are essentially administrative in character, and do not fit the definition in section 5 of the *Legislative Instruments Act 2003*.

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.

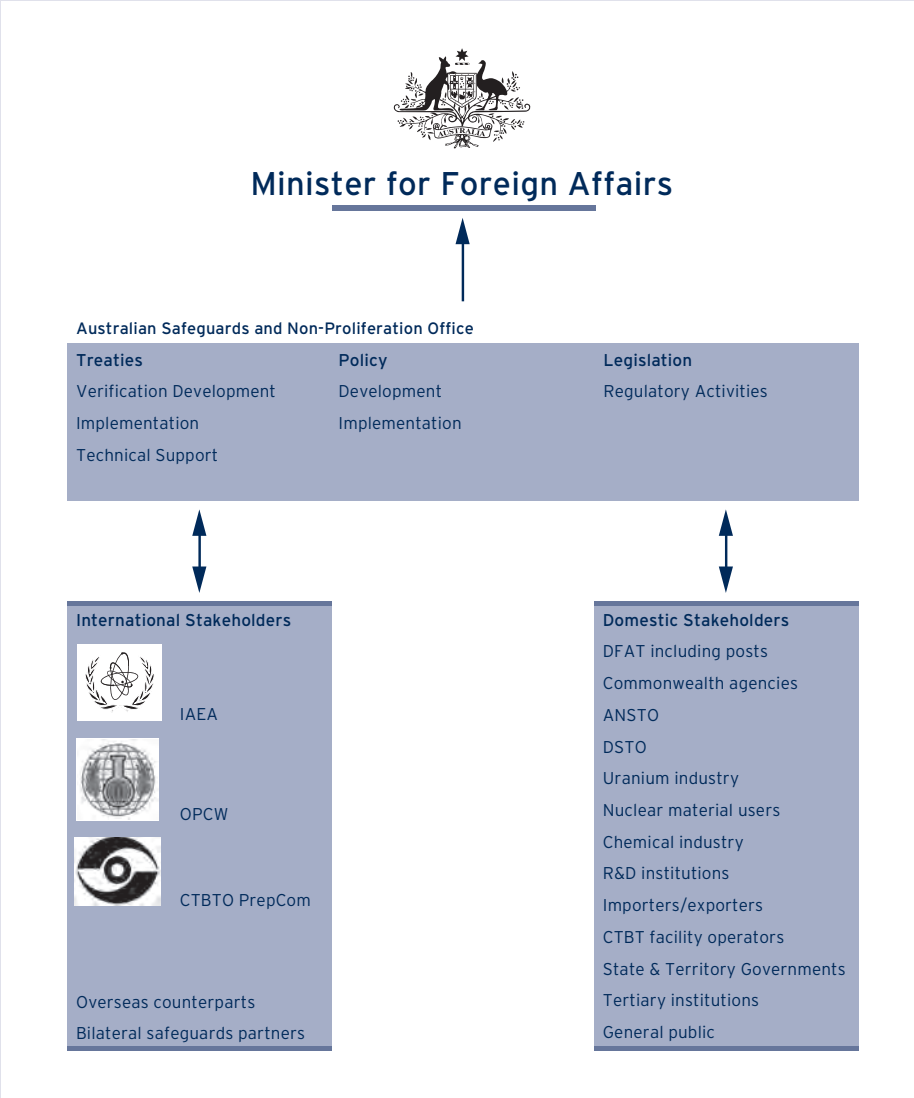
The SPNFZ Treaty has three protocols. Under Protocol 1 the US, UK and France, are required to apply the basic provisions of the Treaty to their respective territories in the zone established by the Treaty. Under Protocol 2, the US, France, UK, Russia and China agree not to use or threaten to use nuclear explosive devices against any party to the Treaty or to each others' 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 United Kingdom 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 have been submitted to the US Senate for advice and consent 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 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 Treaty inspections and to investigate possible breaches of the SPNFZ Act.

Operating Environment

FIGURE 3: ASNO'S OPERATING ENVIRONMENT



Outcomes and Outputs Structure

FIGURE 4: ASNO'S OUTCOMES AND OUTPUTS STRUCTURE

Outcome 1:	**Australian and international security protected and advanced through activities which contribute to effective regimes against the proliferation of nuclear and chemical weapons.**	
	Output 1.1	Operation of Australia's national system of accounting for, and control of, nuclear material, items and facilities.
	Output 1.2	Protection of Australia's nuclear facilities, nuclear material and nuclear items against unauthorised access and sabotage. 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.

Ambassador and Permanent Representative to the United Nations in Geneva and to the Conference on Disarmament, Peter Woolcott (second from the right) chairing expert discussions on a possible Fissile Material Cut-off Treaty assisted by ASNO's Malcolm Coxhead.

PERFORMANCE
SECTION 4

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

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. In particular, ASNO regularly 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. The high number of reports attributed to 'other locations' relates to holdings of chemical salts, mainly held by universities, and depleted uranium shielding held by industrial radiographers.

TABLE 2: ASNO REPORTS (LINE ENTRIES) TO THE IAEA, 2005–11, BY FACILITY

Facility	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11
ANSTO research laboratories	451	454	550	588	607	989
HIFAR (defuelled 2007)	36	66	27	117	8	0
ANSTO vault storage	18	18	18	27	22	26
Moata (defuelled 1995)	83	9	11	10	8	0
OPAL reactor	28	67	60	106	196	381
Silex laboratories	35	39	68	4	13	0
Other locations	2 258	3 252	3 024	3 286	2 948	2 940
TOTAL	**2 909**	**3 905**	**3 758**	**4 138**	**3 802**	**4 336**

TABLE 3: ASNO REPORTS (LINE ENTRIES) TO THE IAEA, 2005–11, BY DATA TYPE

Type of Data	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11
Inventory Change Report	407	839	488	589	459	838
Physical Inventory Listing	1 200	1 232	1 476	1 550	1 584	1 541
Material Balance Report	160	152	152	152	136	132
Concise Note	1 142	1 682	1 642	1 847	1 623	1 825
TOTAL	**2 909**	**3 905**	**3 758**	**4 138**	**3 802**	**4 336**

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 in enriched uranium, from the import of fresh fuel for the OPAL reactor, and a decrease in natural uranium (other than UOC) from the export to the US for recycling for non-nuclear purposes.

TABLE 4: NUCLEAR MATERIAL IN AUSTRALIA AT 30 JUNE 2011

Category	Quantity	Intended End-use
Source Material		
Uranium Ore Concentrates (UOC)	353 tonnes	Export for energy use pursuant to bilateral agreements
	6 tonnes	Storage
Natural Uranium (other than UOC)	4 483 kg	Research and shielding
Depleted Uranium	14 742 kg	Research and shielding
Thorium Ore Residues	59 tonnes	Storage/disposal
Thorium (other than Thorium Ore Residues)	1 973 kg	Research, industry
Special Fissionable Material		
^{235}U	142 050 grams	Research, radioisotope production
^{233}U	4 grams	Research
Plutonium (other than ^{238}Pu)	1 243 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 2011

Category	Quantity	Intended End-use
Associated Material		
Deuterium and heavy water	28.8 tonnes	Research, reactors
Nuclear grade graphite	83.3 tonnes	HIFAR, Moata and storage
Associated Equipment[16]		
HIFAR[17]	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[18]	1	Reactor
OPAL control rods	13	Reactor components
OPAL control rod drives	6	Reactor components
Silex equipment	–	Enrichment R&D

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 6: STATUS OF SAFEGUARDS PERMITS AND AUTHORITIES AT 30 JUNE 2011

Permit or Authority	Current Total	Granted	Varied	Revoked	Expired
Possess nuclear material	93	3	4	1	0
Possess associated items	14	0	0	0	1
Transport nuclear material	24	0	1	0	0
Transport associated items	0	0	0	0	0
Establish a facility	0	0	0	0	0
Decommission a facility	2	0	0	0	0
Communicate information contained in associated technology	10	0	0	0	1
TOTAL	**143**	**3**	**5**	**1**	**2**

16 The Moata reactor has been removed from this table for the first time as it is now decommissioned and ANSTO has surrendered the facility licence to ARPANSA. The IAEA is yet to designate the facility as decommissioned for safeguards purposes, but ASNO anticipates that this designation will be made over the coming year.

17 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.

18 Includes, inter alia, the reactor reflector vessel and core grid.

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*. Three permits were revoked or expired where the permit holder no longer held nuclear material or associated items. In the past year, five permits were varied as a result of changes to organisational details and approved locations. One of the permits for possession of nuclear material issued was to NT Energy Pty Ltd, a wholly owned subsidiary of Energy Metals Limited (EME). EME has announced plans to purchase UOC from existing Australian uranium mines, for supply (under its export permission granted pursuant to Regulation 9 of the Customs (Prohibited Exports) Regulations 1958) to China for civil nuclear-power use. Any export of UOC under this export permission will be subject to the Australia-China Nuclear Transfer Agreement.

ASNO Inspections

During the reporting period, ASNO carried out 13 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 inspection effort at ANSTO increased from 17% of total inspection effort in 2009–10 to 51% in 2010–11. This increase is due in part to a detailed audit during the reporting period of ANSTO's associated technology holdings.

FIGURE 5: NUCLEAR INSPECTIONS BY ASNO, 2010–11, BY TYPE OF PERMIT HOLDER

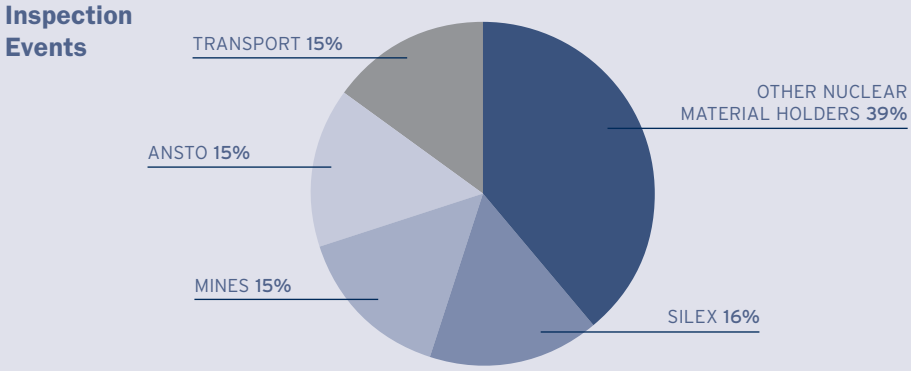
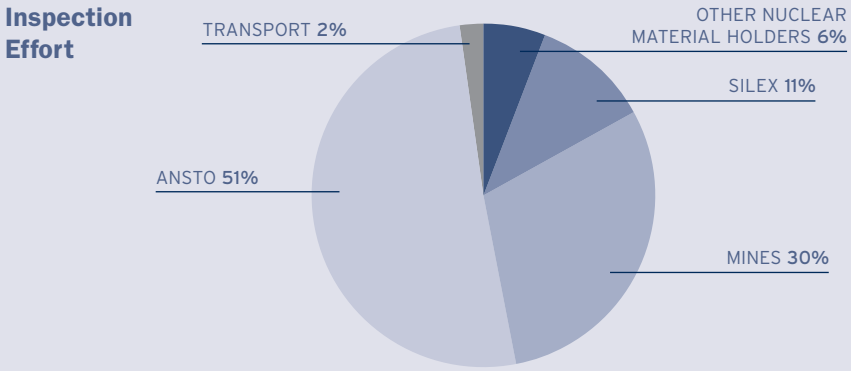


FIGURE 6: NUCLEAR INSPECTIONS BY ASNO, 2010–11, BY EFFORT FOR EACH TYPE OF PERMIT HOLDER



IAEA Inspections

ASNO ensured that all of Australia's obligations with respect to IAEA inspections were met. During the reporting period, the IAEA conducted two design information verification inspections, three routine nuclear material inventory verification inspections and a short notice inspection. The IAEA exercised its complementary access rights in accordance with the Additional Protocol on three occasions. Details are provided in Table 7.

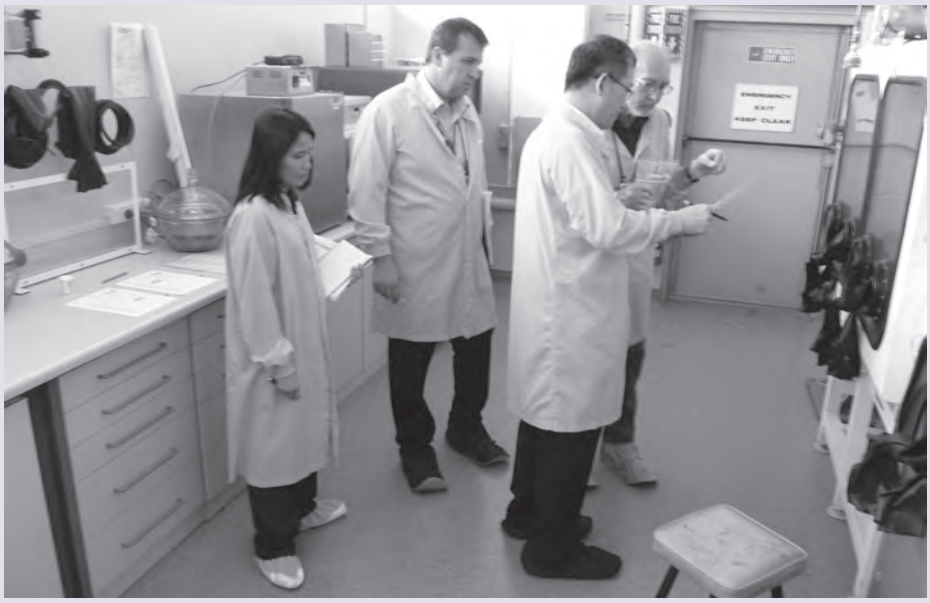
TABLE 7: IAEA SAFEGUARDS INSPECTIONS AND COMPLEMENTARY ACCESSES 2010–11

Date	Facility	Material balance area	Type
2–3 August 2010	OPAL reactor	AS-F	Short Notice Inventory Verification Inspection
4 August 2010	ANSTO's R&D Laboratories	AS-C	Complementary Access
6 August 2010	Royal Melbourne Institute of Technology	AS-E	Complementary Access
22–23 March 2011	ANSTO's R&D Laboratories	AS-C	Routine Inventory Verification Inspection
	OPAL reactor	AS-F	Design Information Verification Inspection
28 March 2011	On Site Technologies Pty Ltd	AS-E	Routine Inventory Verification Inspection
30 March 2011	Beverley Mine		Complementary Access

The routine Inventory Verification Inspection in material balance area AS-E (an IAEA designation) was the first such inspection since 2005. Under the safeguards arrangements between Australia and the IAEA, the IAEA conducts these inventory verification inspections in AS-E around once every five years. It selects one location for inspection as representative of the material balance area, and uses its conclusions from this inspection to draw overall safeguards conclusions for the entire material balance area. The reason for this approach is due to the relatively small amount and low strategic significance of nuclear material in AS-E.

The IAEA reported the outcomes of its safeguards inspections and complementary access in Australia, including comments on any inventory differences, in statements summarised in Appendix D. These statements confirm that all of Australia's IAEA safeguards obligations were discharged satisfactorily and that relevant records had been maintained in accordance with prescribed practice.

During the reporting period, some small inventory differences were reported to the IAEA. These were due to re-measurements of batches, rounding and correction of double-counted batches at various locations (e.g. hospitals and universities); there were no inventory differences at facilities of Lucas Heights. Details are provided in Table 8.



ASNO and IAEA inspectors with ANSTO representatives during a routine inspection in March 2011

TABLE 8: INVENTORY DIFFERENCES RECORDED DURING 2010–11

Material Balance Area	Difference between Book and Physical Inventory	Comment
HIFAR (defuelled) MOATA Reactor (defuelled) ANSTO research laboratories ANSTO vault storage OPAL reactor Silex laboratories	none	Book inventory equalled the Physical Inventory
Other locations	0.01 kg Natural uranium	Rounding, re-measurement and correcting double-counted batches.
	0.55 kg Depleted uranium	
	0.12 kg Thorium	

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 those facilities were in accordance with Australia's obligations under the CPPNM, IAEA guidelines, and relevant bilateral safeguards 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.

Domestic Security of Australian uranium

ASNO visited the Beverley uranium mine in South Australia during the reporting period, thus completing a bench-marking exercise of all Australian uranium mines. On the basis of this exercise, recommendations were made for each mine to improve, inter alia, written security plans, CCTV detection capabilities and security procedures during non-operational hours. These recommendations will be followed up on a progressive basis in the coming reporting period.

ASNO and mine staff at a physical security inspection of the Honeymoon mine.

On 1 March 2011, ASNO evaluated security arrangements at the Honeymoon mine against its security plan and ASNO's permit requirements. After satisfactorily addressing all of ASNO's recommendations, ASNO granted the Uranium One/Mitsui joint venture a permit to possess nuclear material for the purpose of operating a uranium mine on 13 May 2011. This was the first uranium mine approved by ASNO for operation since the Beverley mine began full operations in 2000. As of the end of the reporting period, the mine was still undergoing final commissioning and had not yet produced any UOC. The Honeymoon mine is located in South Australia, near the NSW border, and will be Australia's second in-situ recovery mine. It is expected to produce about 400 tonnes of uranium per year.

Exports of Australian uranium

Reporting by conversion facilities, safeguards authorities and shipping agencies confirmed that all AONM transferred from Australia safely reached its destination. The physical protection measures specified for these transfers effectively contributed to this outcome.

ASNO continued to require exporters to adopt and report on specific procedures to ensure appropriate levels of physical protection for uranium ore concentrates (UOC) shipments from Australia to the port of unloading overseas. These procedures 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.

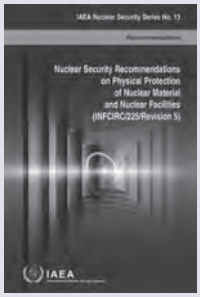
As noted in the previous reporting period, ASNO continued to monitor the international maritime security environment, particularly the region around the Gulf of Aden, and continued work with industry, other Government agencies, and overseas counterparts on available shipping services.

Nuclear Security at Lucas Heights

In September 2010 ASNO, in consultation with ARPANSA, approved the de-designation and final removal of the security fence that encompassed the shut-down HIFAR reactor (so called 'HIFAR protected area'), spent fuel ponds and other associated facilities. As the HIFAR reactor was shut-down in 2007 and all its used fuel been exported overseas, the inventory of nuclear material within the security fence had dropped from security Category II to security Category III according to the IAEA guidance document INFCIRC/225, thus not requiring a formal protected area. After ANSTO had upgraded security arrangements on some of the individual buildings still holding nuclear material within the HIFAR security fence, ASNO was satisfied that the HIFAR protected area fence could be removed.

In early 2011, ASNO approved the security arrangements for ANSTO's recently constructed new nuclear material store, which will eventually consolidate materials from existing nuclear material stores at Lucas Heights.

IAEA Nuclear Security Series



In January 2011, the IAEA published the first three recommendations-level documents of the IAEA's nuclear security series namely: *Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Rev. 5); Nuclear Security Recommendations on Radioactive Material and Associated Facilities; and Nuclear Security Recommendations on Nuclear and other Radioactive Material out of Regulatory Control.* ASNO was strongly involved in the development of INFCIRC/225/Rev. 5, participating in six expert consultancy meetings and two open-ended meetings since July 2008. INFCIRC/225 is mandated under Australia's nuclear cooperation agreements to be used for the protection of obligated nuclear material. As current security requirements are based on revision 4 of INFCIRC/225, ASNO will conduct a gap analysis in order to address any required improvements in nuclear security arrangements, particularly at Lucas Heights.

Nuclear Security Summit

The Republic of Korea announced that it will hold the second Nuclear Security Summit in Seoul, March 2012, following the Washington summit held in April 2010. Separate experts and industry meetings on nuclear security are also planned to take place in parallel to the summit. In the interim, ASNO attended intersessional summit meetings in Buenos Aires, Vienna and Seoul. At the Buenos Aires meeting of sherpas, Australia led by presenting a reporting matrix of its progress against the Washington summit communiqué and work plan. In Vienna, sous-sherpas discussed nine nuclear security related non-papers that will be used to formulate tangible outcomes for the 2012 ROK summit. In Seoul, sous-sherpas began drafting a new communiqué for the 2012 summit. The next intersessional meeting was set to be held in Helsinki, in early October 2011. On taking up the position of Director General ASNO, Dr Robert Floyd also took on the role of Australia's summit Sherpa, while Dr Stephan Bayer remained as Australia's sous-Sherpa.

Stephan Bayer, Australia's sous-Sherpa, at the Nuclear Security Summit sherpa meeting in Buenos Aires.

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 offenses 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 17 June 2011, 49 states had ratified the amended CPPNM, requiring 47 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 all State Parties 'to make every effort to adopt appropriate measures to ensure the protection of radioactive materials'. Australia signed the Convention on 14 September 2005, but has not yet ratified it – appropriate domestic legislation is being drafted in order that the treaty can be ratified. Many of Australia's domestic obligations under the Convention are already satisfied by existing laws and practices.

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 2011 has 82 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.

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. The IAEA validated through its transit matching system that, as at 7 May 2011, there were no unconfirmed nuclear material shipments to or from Australia. Based on the IAEA's Safeguards Statement for 2010, and 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 2010–11. A copy of the IAEA's Safeguards Statement for 2010 is located in Appendix E.

TABLE 9: SUMMARY OF AONM BY CATEGORY, QUANTITY AND LOCATION AT 31 DECEMBER 2010[19]

Category	Location	Tonnes[20]
Depleted Uranium	Canada, European Union, Japan, Republic of Korea, United States	107 117
Natural Uranium	Canada, China, European Union, Japan, Republic of Korea, United States	22 936
Uranium in Enrichment Plants	European Union, Japan, United States	26 805
Low Enriched Uranium[21]	Canada, European Union, Japan, Mexico, Republic of Korea, Switzerland, United States, Taiwan	14 843
Irradiated Plutonium[22]	Canada, China, European Union, Japan, Mexico, Republic of Korea, Switzerland, United States	137
Separated Plutonium[23]	European Union, Japan	1.6
TOTAL		**171 840**

TABLE 10: SUPPLY OF AUSTRALIAN URANIUM TO CUSTOMERS DURING 2010—AS DELIVERED TO CUSTOMERS' CONVERTER ACCOUNTS

Region	Tonnes UOC (U_3O_8)	% of Total
North America	2 816	36.1
Europe	2 196	28.2
Asia	2 781	35.7
TOTAL	**7 793**	**100.0**

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

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

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

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

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

23 Separated plutonium is plutonium recovered from reprocessing, before return to reactors for re-use in reactors for further power generation. This plutonium is used for reactor fuel after being mixed with uranium — termed mixed oxide (MOX) fuel. A significant proportion of Australian obligated separated plutonium is stored as MOX. Separated plutonium holdings fluctuate as plutonium is fabricated as MOX fuel and returned to reactors. On return to reactors the plutonium returns to the 'irradiated plutonium' category. During 2010 0.5 tonnes Australian-obligated plutonium was fabricated into MOX fuel and transferred to reactors.

TABLE 11: SUMMARY OF AONM TRANSFERS, 2010[24]

	Destination	U (tonnes)
Conversion	Canada	860
	China	431
	European Union[25]	1 358
	United States	3 277
Enrichment	European Union	747
	United States	70
Fuel Fabrication	Japan	264
	Republic of Korea	131
	United States	243
	European Union	14
Reactor Irradiation	Japan	<1
	Taiwan	33

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.

Bilateral Agreements

Reporting

Reports from ASNO's counterpart organisations were mostly 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 11 are based on ASNO's analysis of all available information at the time of publication.

Australia-Russia Nuclear Cooperation Agreement

On 11 November 2010, Prime Minister Gillard and Russian President Dmitry Medvedev witnessed the exchange of notes, bringing into force the bilateral nuclear cooperation agreement.

24 Figures are for transfers completed between jurisdictions from 1 January to 31 December 2010. Figures do not include transfers of AONM made within the fuel cycle of a state (or of Euratom), return of heels (residual UF6 remaining in cylinders), or damaged product.

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

Subsequently, on 20 June 2011, DG ASNO and the Director General of ROSATOM signed the ASNO-ROSATOM Memorandum of Understanding (MoU) on administrative arrangements. Under the Australia-Russia nuclear cooperation agreement the MoU is one of the requirements that needs to be in place before uranium supply can commence.

Australia-United States Cooperation Agreement

On 22 December 2010, Australia and the United States of America brought into force a new agreement that cements cooperation between the two countries in the area of peaceful uses of nuclear material and technology. The new expanded agreement explicitly adopts the Additional Protocol as part of the safeguards framework and provides a basis for strengthened bilateral cooperation on nuclear policy and safeguards.

Australia-Euratom Cooperation Agreement

The current nuclear safeguards agreement between Australia and the European Atomic Energy Community (EURATOM) entered into force on 15 January 1982 and is due to expire on 15 January 2012. Australia and EURATOM have been in negotiations regarding a new agreement over the past year, with ad referendum text now agreed.

Australia-United Arab Emirates Bilateral Negotiations

The Australian Government has begun negotiating a bilateral nuclear safeguards agreement with the UAE. The agreement will meet or exceed Australia's strict safeguards and non-proliferation policy requirements on uranium supply. In that regard, the UAE's proposed civil nuclear power development model is responsible and transparent, and it is hoped that this would be an example for others in the region.

Multilateral Meeting on Nuclear Safeguards Agreements

In October 2010, Australia participated in a meeting with Canada, the European Union and the US on bilateral nuclear safeguards agreements. The group has met annually since January 2008, and has included a 'document of common understandings' with regard to administration of obligation accounting and transfers of nuclear and non-nuclear material, equipment, components or technology pursuant to bilateral safeguards agreements. The document describes content of 'administration arrangements' that outline the practical application of nuclear safeguards agreements. The group is also planning to provide outreach to countries inexperienced in tracking nuclear material obligations and universalising best practice.

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 part in the development and effective implementation of international safeguards during the reporting period. ASNO remained actively engaged with the IAEA at both management and operational levels, and participated in the Australian delegation to the IAEA Board of Governors meetings in September 2010, March 2011 and June 2011. ASNO also participated in the 2010 IAEA General Conference. As a result, ASNO continued to be well informed of developments and emerging issues in safeguards. This active engagement with the IAEA ensured that ASNO's work program remained relevant to the international non-proliferation agenda.

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. The IAEA has noted that inadequately developed State Systems of Accountancy and Control (SSAC) in some states is an ongoing safeguards implementation issue. ASNO has sought to address this important matter by working with regional and international counterparts to develop the skills and capacity of regional safeguards authorities through training and support.

ASNO is in the process of developing an SSAC good practices paper with the Asia-Pacific Safeguards Network (APSN), which will serve as a valuable resource for other SSACs in the region and internationally. The paper will describe the safeguards implementation experiences and lessons learnt from the perspective of the community of Asia-Pacific nations that make up APSN. It is intended that this paper will serve as an example to promote good safeguards implementation practices internationally and will complement and support the work in the IAEA to develop new safeguards implementation guidelines.

Contribution to DFAT policy development and diplomatic activity

A number of major safeguards issues arose during the year, and ASNO has been well-placed to contribute to policy development and diplomatic activities by providing analysis and advice.

ASNO has a close and supportive working relationship with the Australian Mission in Vienna, particularly with the Australian Ambassador in the role of Australian Governor on the IAEA Board of Governors. ASNO plays a major role in providing the Mission with timely and comprehensive advice on IAEA reports and briefing materials. ASNO analyses are frequently shared with the IAEA Secretariat and with like-minded governments represented in Vienna and other key capitals and are held in high regard for their specialist expertise in examining often complex safeguards issues.

Issues dealt with by ASNO included:

- Syria's reported undeclared reactor program
- Iran's safeguards breaches, including analysis of nuclear developments in Iran and advice to the Minister of Foreign Affairs on handling these issues in the IAEA Board of Governors and elsewhere
- assessment of nuclear developments in the DPRK
- development of the Safeguards Resolution for the IAEA General Conference.

IAEA Standing Advisory Group on Safeguards Implementation

SAGSI is the international group of experts appointed by and advising the IAEA Director General on safeguards issues. During the reporting period Dr Craig Everton served on SAGSI.

Topics examined by SAGSI during the year included:

- the long-term strategic plan of the IAEA Department of Safeguards, including the conceptual framework for making the IAEA safeguards system fully information-driven (see report on IAEA's state-level concept on page 15)
- knowledge management in the IAEA Department of Safeguards
- review of the new Guidelines for States Implementing Safeguards Obligations under Comprehensive Safeguards and the Additional Protocol
- the safeguards significance of uranium derived from non-conventional sources (e.g. mineral sands with low absolute uranium concentrations)

- the safeguards significance of high purity uranium ore concentrate production
- new cost calculation methodology for safeguards
- changes to the annual IAEA Safeguards Implementation Report (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

ASNO is in discussion with the IAEA about the next assignment to be undertaken under this important and long-standing task. Historically, projects under this task have made a significant contribution to the effectiveness of safeguards and they have also represented major professional development exercises for ASNO staff.

Support for information review and evaluation

ASNO has worked with the IAEA's Division of Safeguards Information Management (SGIM) to improve access to open source information on nuclear activities and developments.

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

While the project is ongoing there was no significant progress during the reporting period. Discussions were held with the IAEA Task Officer on the best way to advance this project.

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

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

Updates to fuel cycle manuals

In 2008, the IAEA proposed a task related to updating elements of the basic fuel cycle training manuals used in the training of IAEA inspectors. The IAEA requested Australian help with the preparation of a new manual relating to the mining and milling of uranium.

ASNO has provided the IAEA an initial draft of material that could be used to produce the manuals.

Geoscience Australia is currently producing text for inclusion in the manual. During the reporting period a substantial block of text relating to types of uranium ore and uranium deposit types was conveyed to the Agency. Other work is ongoing.

Proliferation Analysis Workshop

The third annual Proliferation Analysis Workshop was conducted by the ASSP from 21 to 23 June 2011 in Vienna. The workshop participants were drawn from the support and operations divisions of the IAEA Safeguards Department.

The Australian team consisted of one analyst from the Department of Defence, one from the Office of National Assessments and one from ASNO. The Australian Permanent Mission to the IAEA provided active support and assistance for the running of the workshop.

The focus of the workshop was on 'tradecraft' for proliferation analysis. Participants explored not just analytical tools available, but also the techniques for combining information from disparate sources to provide an overall picture of the objects of study.

The IAEA considers that these workshops enhance the analytical culture, information exchange and capabilities both in support and operations Divisions.

New Australian Safeguards Support Program tasks in the reporting period

Network of analytical laboratories

The University of Western Australia commenced a major program to become a member of the IAEA's network of analytical laboratories. A first set of reference samples from the IAEA was analysed during the reporting period and the results were conveyed to the IAEA. Work on this new project is ongoing.

All-source information analysis for safeguards purposes

ASNO, through the ASSP, has previously undertaken a number of consultancy tasks for the IAEA supporting the implementation and evolution of safeguards information analysis methodologies and practices. In June 2011, this collaboration was restarted with Mr Michael East of ASNO undertaking a four week consultancy with the Division of Safeguards Information Management.

Cooperation with other States Parties

ASNO actively strengthened contacts with other safeguards agencies and international safeguards practitioners, including from China, Indonesia, Japan, Republic of Korea, Thailand, Vietnam and the United States.

ASNO has been working with its Philippine counterpart (the Philippine Nuclear Research Institute, PNRI) on ratification and implementation of the Additional Protocol (AP) to its safeguards agreement with the IAEA since March 2002. The Philippines ratified the AP during the previous reporting period and was required to submit its initial report under the AP in August 2010. ASNO's Mr Russell Leslie provided direct support to PNRI in

ensuring that the initial declaration under the AP included the full range of materials, equipment and activities. This tranche of assistance was the culmination of eight years of close cooperation between ASNO and PNRI.

ASNO staff presented papers at the July 2010 Institute of Nuclear Materials Management (INMM) Annual Meeting in Baltimore and at the May 2011 Budapest European Safeguards Research and Development Association (ESARDA) safeguards meeting.

International Outreach

ASNO continued its international outreach activities to assist countries in the region with the fulfilment of their non-proliferation and physical protection obligations. Assistance and training have been provided to professionals in a range of countries over the past 12 months including lecturing and assisting in international State System of Accountancy and Control training courses in Tokai, Japan (December 2010) and Oak Ridge, USA (April 2011) and in a Commodity Identification Training course in Pattaya, Thailand, August, 2010.

ASNO is working with DFAT and the IAEA towards achieving actions agreed at the 2010 NPT Review Conference including having all States Parties to the NPT conclude and bring into force Comprehensive Safeguards Agreements and Additional Protocols and, for those states with limited nuclear activities, amendments to Small Quantities Protocols. Towards achieving that end, the Australian delegation to the Pacific Island Forum Regional Security Meeting (Suva, Fiji, 2 June 2010) made a presentation on non-proliferation-related follow-up actions from the NPT Review Conference of particular relevance to Forum Island Countries. The meeting encouraged Pacific Island Forum Members to take steps to bring into force Comprehensive Safeguards Agreements, Additional Protocols and new Small Quantities Protocols.

ASNO has also taken steps, in cooperation with the IAEA, to work with some African countries to promote effective safeguards, nuclear security and export control oversight, particularly in those African countries with developing uranium mining interests. ASNO is also engaging with Australian uranium mining companies operating in Africa to help with promoting these activities.

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

Participants at the ad hoc meeting of the Asia-Pacific Safeguards Network (APSN), Singapore 25 March 2011.

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. Accurate and timely annual declarations and notifications were provided to the OPCW as follows:

- Declaration of imports and exports of CWC-Scheduled chemicals and of the 39 facilities with CWC-relevant chemical production, processing or consumption activities during 2010 (declared in March 2011)
- Article VI declaration of anticipated activities of seven CWC-Scheduled chemical facilities during 2011 (declared in September and October 2010)
- Article X, paragraph 4, declaration of Australia's national programs for protection against chemical weapons (declared in April 2011)
- Verification Annex, Part IV(B) submission of the destruction and disposal plan for 144 old chemical weapon (OCW) projectiles, of United States origin, buried after WWII at Columboola, QLD
- Verification Annex, Part IV(B) notification of the completion of destruction activities for 300 250 pound empty OCW munitions discovered at Marrangaroo, NSW
- Verification Annex, Part IV(B) declaration of the discovery and request for retention (for educational and display purposes) of an empty WWII 75 mm projectile previously held at a Defence Artillery Museum, Manly, NSW
- Responses to OPCW Third Person Notes including routine clarification of the operational status of chemical plants
- Routine responses to OPCW notifications and amendments/corrections to inspector details and deletions or additions to the OPCW inspectorate.

Facility and ASNO/DFAT representatives with the OPCW Inspection Team during a routine industry inspection at a chemical plant in NSW, December 2010.

Since 1997, the OPCW has conducted 37 Article VI routine facility inspections in Australia in accordance with the provisions under the CWC. In the reporting period, a subsequent inspection of a Schedule 1 facility and four inspections of 'Other Chemical Production Facilities' were conducted. All inspections proceeded smoothly. The OPCW Inspection Team verified Australia's declarations as well as the absence of undeclared CWC-Scheduled chemical production, in accordance with the inspection mandates. ASNO facilitated these inspections and received excellent support and cooperation from industry.

ASNO, together with Defence, facilitated an OPCW inspection in September 2010 at Columboola, QLD, the site where 144 WWII old chemical weapon projectiles (containing sulphur mustard) were discovered in June and July 2010. The OPCW verified Australia's declaration, in particular that the quantities, types and calibres of the munitions were consistent with the declaration (see report on OCWs destruction on page 24). The OPCW confirmed Australia's assessment that the OCW were not usable as chemical weapons.

OPCW inspectors preparing to verify OCW munitions at Columboola. Image courtesy of Defence.

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 12 provides statistics for permits issued as of 30 June 2011 and permit activities during the reporting period.

TABLE 12: PERMITS FOR CWC-SCHEDULED CHEMICAL FACILITIES AND IMPORTERS

CWC-Scheduled Chemicals	CW(P) Act 1994	Type	Permits at 30 June 2011	New Permits issued 2010–11	Re-Issued Permits 2010–11	Permits not re-Issued 2010–11	Import Permits 2010–11
Schedule 1	s19(4)	Production (Protective)	1				0
	s19(5)	Production (Research)	9	1	1		
	s19(6)	Consumption	8	1			
Schedule 2	s18(1)	Processing	12		4		58
	s18(1)	Consumption				1	
Schedule 3	s18(1)	Production	3				

Cooperation with the OPCW and CWC States Parties

ASNO continued to provide ongoing technical and policy guidance to Australia's representatives at its embassy in The Hague in preparation for OPCW Executive Council meetings, industry cluster meetings and informal consultations. Issues under discussion during the reporting period included:

- Article VI revised policy guidelines (Industry Inspections)
- enhancing the site selection methodology for Other Chemical Production Facilities
- the OPCW tenure policy
- CWC universality
- the final extended destruction deadlines for chemical weapons (see report on chemical weapons destruction deadline on page 27)
- Article X of the CWC (Assistance and Protection)
- Article XI of the CWC (Economic and Technical Development).

A revised policy for Article VI inspections has been proposed and continues to be discussed during informal consultations at the OPCW. Increased numbers of declared facilities in Asia and Latin America have resulted in an increase in the number of States Parties and facilities eligible to receive inspections under the CWC. An enhanced site selection methodology (SSM) for Other Chemical Production Facilities will be considered by the Executive Council in July 2011. Australia supports increased numbers of inspections to ensure that verification of new and existing facilities is based on the risk posed to the object and purpose of the CWC, while satisfying the requirement for equitable geographical distribution of inspections.

The OPCW tenure policy has, and is, undergoing review. This is, in part, due to the winding down of some chemical weapon destruction activities and the future monitoring and verification requirements for chemical weapon stockpiles remaining beyond April 2012. The OPCW is a non-career organisation and as such the total length of service for Technical Secretariat staff is seven years, unless extensions have been granted by the Director General of the OPCW. The staffing cycle and a likely decrease in chemical weapon destruction-related activities have required a review of the tenure policy. Australia supports a tenure policy that ensures the preservation and expansion of knowledge, competence and professionalism.

Australian experts from ASNO and Defence Science and Technology Organisation attended the following meetings held in The Hague: the Article XI Workshop (24-25 November 2010), the 12th Annual Meeting of CWC National Authorities (27-28 November 2010); and the 15th Conference of the States Parties (30 November to 4 December 2010). The Conference granted Libya an extension of the intermediate deadlines for the destruction of its Category 1 chemical weapons (C-15/DEC.3, dated 30 November 2010).

Australia worked to enhance the OPCW's role in reducing the threat of, and in preparing to respond to, chemical terrorism. Australia concluded its facilitation of the open-ended working group on terrorism (OEWGT) in February 2011 with the delivery of a report to the 63rd session of the Executive Council. During the period of Australia's facilitation, the OEWGT has progressively considered the relevance of the implementation of key articles of the CWC (i.e. Articles IV, V, VII, X and XI) to the OPCW's contribution to the global efforts in this field. Australia also participated in a practical exercise ASSISTEX 3 in Tunis, Tunisia in October 2010 and a table-top exercise on the preparedness of States Parties to prevent terrorist attacks involving chemicals which took place in Warsaw, Poland in November 2010.

Upon request, the United States Government provided advice on destruction options for the 144 World War II old chemical weapon projectiles (of US origin) discovered on private property in Columboola Queensland. In September 2010, US experts visited Australia to characterise the projectiles, using Portable Isotopic Neutron Spectroscopy analysis and X-ray spectroscopy. 140 of the OCW munitions were found to contain chemical warfare agent (sulphur mustard). From 6 April to 18 May 2011, all of these projectiles were destroyed in a Transportable Detonation Chamber, the components of which were imported from the United States (see report OCWs destruction on page 24).

To further demonstrate Australia's firm commitment to the CWC and the work of the OPCW, in April 2011 Dr Robert Floyd, Director General, ASNO, visited the OPCW headquarters in The Hague and held discussions with the Director-General, Ambassador Ahmet Üzümcü. Dr Floyd and Mr Peter Hooton, Assistant Secretary, Arms Control and Counter-Proliferation Branch, together with Embassy officials represented Australia at a seminar on "The OPCW's Contribution to Security and Non-Proliferation of Chemical Weapons" held on 11-12 April 2010.

Domestic Outreach

ASNO undertook consultation and outreach with several facilities to strengthen collaboration with industry. The outreach visits focussed on promoting greater awareness of the CWC, regulatory obligations and preparing industrial sites for possible OPCW inspections.

ASNO continued participating in relevant meetings of the National Government Advisory Group on Chemical Security with other Australian Government representatives.

ASNO continued to monitor Australian Bureau of Statistics (ABS) chemical trade data and liaised with Customs to reduce the occurrence of misclassified chemicals. Customs has taken measures to address this issue by ensuring that correct codes are applied to chemical trade. Such measures help detect unauthorised trade and improve the accuracy of trade statistics for CWC-Scheduled chemicals published by the ABS.

As part of outreach efforts to ensure traders of CWC-Scheduled chemicals apply the correct tariff and Australian Harmonised Export Commodity Classification codes, ASNO distributed copies of its industry brochures and a CD for chemical traders. Copies of these publications are available on request or from ASNO's website (www.dfat.gov.au/cwco).

OPCW, Facility and ASNO representatives during a routine industry inspection at a declared chemical plant in NSW, December 2010.

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), 17 are in place and certified as operating to CTBTO technical specifications. One more facility, the Macquarie Island radionuclide station, is operating in testing and evaluation mode pending certification. A list of Australia's IMS facilities and their status is at Appendix F.

Specific advances during 2010–11 in relation to Australian hosted IMS stations included:

- the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) completed construction of a radionuclide monitoring station on Macquarie Island. The station is operational, but is yet to be certified against CTBTO standards. During the year, ASNO consulted with the Tasmanian Government and ARPANSA on an MOU on use of land for the Macquarie Island station. An MOU was settled at 30 June 2011, subject to final signature
- ARPANSA commenced construction of a further radionuclide monitoring station at Mawson Base, Australian Antarctic Territory, with completion expected in early 2012
- construction of an infrasound monitoring station on the Cocos Islands was advanced during the year by Geoscience Australia, with the station expected to be operational in late 2011.

Installation of the final Australian IMS station, at Davis Base, Australian Antarctic Territory, requires considerable planning and preparations, and could take several years, to complete.

Legal and Administrative Measures

ASNO continues to fund 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 during the year. It was found that the arrangement remains adequate for Australia's requirements at this time.

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, have continued during the year a review of Australia's future NDC requirements.

Nuclear Test Ban Verification

While more than 80% of CTBT IMS stations are now in place worldwide, further preparatory work is needed to bring the Treaty's verification to a good level of readiness. ASNO continues to contribute to the verification work of the CTBTO in conjunction with Australia's permanent Mission in Vienna, and 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. Mr Coxhead contributed also to work on OSI as co-chair of workshops meeting in Vienna in November 2010, and in May 2011 as part of an Expert Advisory Mechanism on planning for a major inspection exercise in 2014.

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 these activities, and during the year four Australians participated.

ASNO experts participated also in a CTBTO hosted conference entitled CTBT: Science and Technology 2011 in Vienna, Austria in June 2011. Around 750 scientists, diplomats, scientific representatives to the CTBTO's policy-making organs, representatives of civil society and the media attended, with participants discussing advances in science and technology relevant to the Treaty's verification system and explored scientific applications of the CTBT verification infrastructure. Australia's scientific contribution to the conference, focussed on the atmospheric transport of radionuclides following the Fukushima Dai-ichi Nuclear Power Plant accident, with a poster co-authored by experts at ARPANSA and Geoscience Australia.

The role of the CTBT's IMS in responding to events such as the Fukushima Dai-ichi nuclear accident was a major theme of the Conference. Presenters from nuclear safety agencies in several countries provided a detailed account of how IMS data had been used in preparing public health advisories, and for analysing the sequence of events at Fukushima Dai-ichi. Presenters also drew lessons that should help to improve the future operation of the CTBT's verification system.

Outreach

DG ASNO visited Indonesia in late March 2011 and met with officials from the Ministry of Foreign Affairs, the Nuclear Energy Regulatory Agency (BAPETEN) and members of Indonesia's Parliament to discuss its proposed ratification of the CTBT. A bill for ratification is now being debated within Commission I (Foreign Affairs, Defence and Information) of Indonesia's House of Representatives. DG ASNO met key Commission I members to discuss the CTBT ratification bill and related issues.

ASNO's Malcolm Coxhead leading discussion on operational procedures for on-site inspection for the CTBT (Photo: Copyright CTBTO).

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

Fissile Material Cut-off Treaty

To help build confidence and momentum in the Conference on Disarmament (CD) towards the commencement of FMCT negotiations, the permanent missions of Australia and Japan to the CD arranged for three 'side-event' meetings during the year for delegations and capital-based experts to discuss aspects of an FMCT. In hosting the events, Australia and Japan were motivated by UN Secretary General Ban Ki-moon's call to the CD on 26 January 2011 for 'a basic process to educate each other and build trust which will inform and facilitate the formal process once the CD adopts its work programme'. Three-day meetings were held in February, March and May–June 2011, attracting participation by a significant number of CD Member States. The meetings examined possible definitions for fissile material relevant to a treaty and possible mechanisms for verifying an obligation to not produce such material for nuclear weapons. Reports on the discussions will be provided to CD plenary meetings. ASNO experts participated actively in each of the meetings, and ASNO has supported Australia's mission in Geneva in planning and reporting for the meetings.

The side events provided the opportunity for detailed, expert discussions in the CD on issues relating to the proposed FMCT. The CD's extended impasse has eroded knowledge and capacity within CD delegations and the meetings encouraged participation by capital-based experts. The side events clarified where substantive differences remained notably on definitions, verification mechanisms, scope of an FMCT and institutional issues. In this way, the side events provided a renewed understanding of the challenges to be faced in negotiating the proposed FMCT.

ASNO provided further expert support to DFAT on FMCT issues during the year, including in relation to initiatives pursued through the newly established Non-Proliferation and Disarmament Initiative.

Verification for Nuclear Disarmament

New mechanisms will be needed to verify future nuclear disarmament steps. ASNO's 2007–08 and 2008–09 Annual Reports described work by the UK and Norway to develop concepts and tools for verifying the dismantlement of nuclear weapons, and reported on a Workshop in Canberra in 2008 that examined how Australia might contribute. As a next step in developing Australia's engagement in this work, ASNO arranged a further expert-level exchange at Aldermaston in the UK in June 2011. Experts from ASNO and ANSTO reviewed UK research efforts and the UK's work with Norway to develop methods and tools for inspection of weapon dismantlement, and discussed opportunities for Australia to engage further.

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.

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, the DPRK and Burma. In connection with Australia's bilateral nuclear safeguards agreements, ASNO has provided advice on new agreements with the United States and Russia, both of which entered into force during the year and continued to advise on the development of a renewed agreement with Euratom. ASNO also advised on the development of a new bilateral safeguards agreement with the United Arab Emirates and commenced negotiations on a treaty in May 2011. ASNO prepared approximately 15 ministerial submissions during the year, and provided submissions and oral briefing for Ministers, departments and Parliament on specific issues.

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

ASNO has worked closely with other departments on a range of issues, including destruction of old chemical weapons, piracy in the Gulf of Aden, and to ongoing development of CTBT verification. 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:

- the annual conference of the Australasian Institute of Mining and Metallurgy (AusIMM) in June 2011
- a strategic policy workshop entitled Australia's Nuclear Choices – Australia's uranium trade: the foreign and domestic challenges of a contentious export. The workshop is part of a larger collaboration on nuclear policy between the Griffith Asia Institute, Australian National University, Lowy Institute for International Policy and Department of Defence.

At the AusIMM conference ASNO gave two presentations: a keynote presentation by DG ASNO on Australia's uranium export policy; and a parallel session presentation by Mr Michael East (Safeguards Officer) on IAEA safeguards verification at uranium mines.

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 included as a public information source.

President of KINAC, Mr Chang Sang-ku (fourth from the right) and Director General ASNO, Dr Robert Floyd (fourth from the left) along with other representatives from KINAC and from the Australian Embassy in Seoul after discussions on nuclear safeguards and non-proliferation.

MANAGEMENT AND ACCOUNTABILITY
SECTION 5

MANAGEMENT AND ACCOUNTABILITY

Corporate Governance

Portfolio Minister

Director General ASNO

Assistant Secretary ASNO

ASNO Staff

ASNO Administrative Review

Training and Development

Financial Management

Administrative Budget

Uranium Producers Charge

Australian Safeguards Support Program

Environmental Management System (EMS)

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, Mr Kevin Rudd MP.

Director General ASNO

The Director General ASNO reports directly to the Minister for Foreign Affairs and Trade. 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.

Mr John Carlson held the position of Director General ASNO from 31 August 1998 to 30 September 2010, having previously held the position of Director of Safeguards since 1989. Upon the expiration of Mr Carlson's appointment Dr John Kalish acted as Director General ASNO until the appointment of the new Director General.

Dr Robert Floyd was appointed as the new 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 13 and the DFAT Annual Report 2010–11.

In 2010–11 ASNO achieved an average staff level of 14.8 (against an approved level of 17).

ASNO Administrative Review

In 2009 ASNO commenced a detailed review of administrative processes and implementation of a Quality Management System (QMS) to ensure ASNO processes are fully accountable, effective and efficient and meet ASNO's goals and responsibilities. The review of ASNO's processes included accounting for AONM, the nuclear permit system, inspections, reporting to the IAEA and ultimately all of ASNO's functions. ASNO continued with steps to implement a QMS which will be fully implemented during 2011–12.

FIGURE 7: ASNO'S ORGANISATIONAL STRUCTURE — (AS AT 30 JUNE 2011)

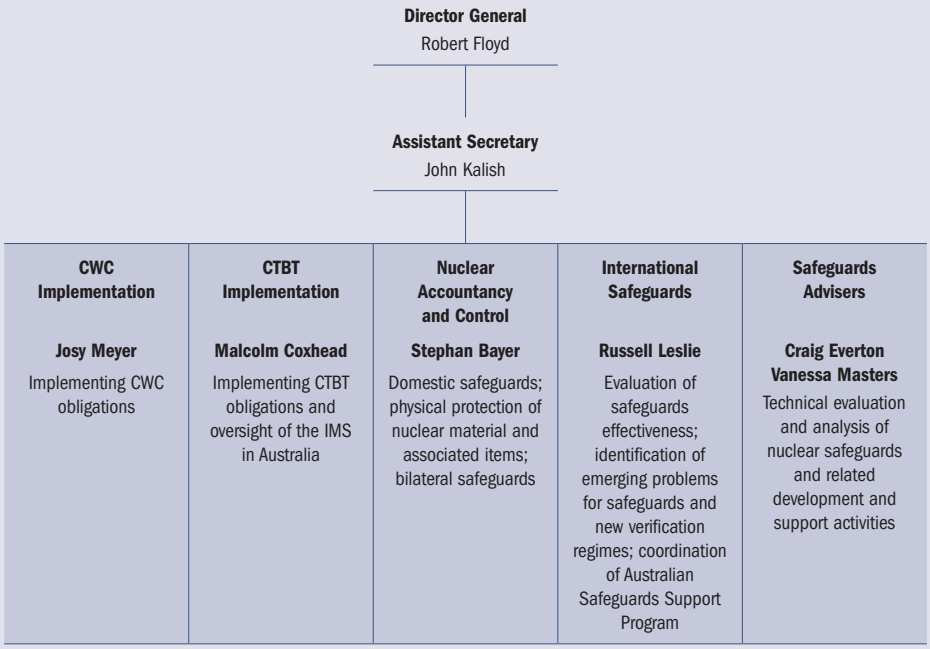


TABLE 13: ASNO STAFF AT 30 JUNE 2011

	Male	Female	Total (Approved)
SES B2	1	0	1 (1)
SES B1	1	0	1 (1)
Executive Level 2	4	2	6 (6)
Executive Level 1	2	1	3 (2)
APS Level 6	1	3	4 (4)
APS Level 5	0	1	1 (1)
APS Level 4	0	1	1 (2)
TOTAL	**9**	**8**	**17(17)**

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. Further details are in Table 14.

TABLE 14: TRAINING AND DEVELOPMENT ACTIVITIES DURING 2010–11

Training and Development Activity	Person Days
Formal DFAT courses	21
Structured work unit & on-the-job training including planning days	17
Seminars, workshops, conferences, overseas negotiations & IDCs	60
External formal courses	17
Academic study	82
Other (IAEA Consultancy)	4
TOTAL	**201**

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 15: ASNO ADMINISTRATIVE COSTS[26]

		2009–10	2010–11
Salaries[27]		$1 996 176	$2 229 456
Running Costs	General	$400 085	$502 885
	Seismic monitoring[28]	$587 108	$590 337
	Nuclear & radiological security enhancement for Asia and the Pacific	$259 901	$259 901
	Sub-Total	$1 247 094	$1 353 123
TOTAL		**$3 243 270**	**$3 582 579**

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 UOC production (set in 2010 to 9.4893 cents per kilogram). The total charge levied on 1 December 2010 for uranium production in 2009–10 was $574 761.

Australian Safeguards Support Program

The cost of the Australian Safeguards Support Program (ASSP) totalled approximately $170 000 in 2010–11. This amount included approximately $70 000 of direct expenditure by ASNO 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 $20 000. UWA has invested considerable capital expenditure for the Network of Analytical Laboratories qualification process, including the refurbishment of a sample preparation and storage room dedicated to IAEA Network of Analytical Laboratories purposes, instrument time and staff costs totalling $44 153. Other Australian government agencies contributed services in support of the IAEA through the ASSP valued at approximately $38 000.

26 Excludes GST.

27 Includes Long Service Leave accruals.

28 Undertaken by Geoscience Australia.

Environmental Management System (EMS)

Under coverage of the Department of Foreign Affairs and Trade, ASNO has continued its Environmental Management System (EMS). Negative impacts on implementing the environment are being reduced further with improvements in methods of waste recycling and the re-use of materials. ASNO also provides specialist advice on the licensing, storage and disposal requirements for radioactive sources. In May 2009, DFAT was audited by an accredited certifying body, NCS International (NCSI), against the International Standard for Environmental Management Systems, ISO 14001:2004. Following this, DFAT received certification to the International Standard in June 2009 for a further three year period. The Department of Foreign Affairs and Trade, including ASNO remains focused on its Environmental Management System (EMS).

An ASNO inspection of port facilities used for the export of Australian uranium ore concentrate.

APPENDICES, LIST OF REQUIREMENTS, GLOSSARY, INDEX

SECTION 6

Appendices

Appendix A World Nuclear Energy, June 2011

TABLE 16: WORLD NUCLEAR ENERGY, JUNE 2011[29]

	Operating Reactors		% of Total Electricity in 2010	Reactors under Construction	
	Total	Capacity (GWe)		Total	Capacity (GWe)
United States*	104	101.2	19.6	1	1.2
France*	58	63.1	74.1	1	1.6
Japan*	50	44.2	29.2	2	2.7
Russian Federation*	32	22.7	17.1	11	9.2
Germany*	17	20.5	28.4	0	0
Republic of Korea*	21	18.7	32.2	5	5.6
Ukraine	15	13.1	48.1	2	1.9
Canada*	18	12.6	15.1	0	0
China*	14	11.1	1.8	27	27.2
United Kingdom*	19	10.1	15.7	0	0
Sweden*	10	9.3	38.1	0	0
Spain*	8	7.6	20.1	0	0
Belgium*	7	5.9	51.1	0	0
Taiwan[30]	6	5.0	19.3	2	2.6
India	20	4.4	2.9	5	3.6
Czech Republic*	6	3.7	33.3	0	0
Switzerland*	5	3.3	38.0	0	0
Finland*	4	2.7	28.4	1	1.6
Bulgaria*	2	1.9	33.1	2	1.9
Brazil	2	1.9	3.1	1	1.2
Hungary*	4	1.9	42.1	0	0
Slovak Republic*	4	1.8	51.8	2	0.8
South Africa	2	1.8	5.2	0	0
Romania*	2	1.3	19.5	0	0
Mexico*	2	1.3	3.6	0	0
Argentina*	2	0.9	5.9	1	0.7
Slovenia*	1	0.7	37.3	0	0
Netherlands*	1	0.5	3.4	0	0
Armenia	1	0.4	39.4	0	0
Pakistan	2	0.4	2.6	1	0.3
Iran	0	0	0	1	0.9
TOTAL	**440**	**374.3**	**(est) 13.0**	**65**	**62.9**

Source: IAEA Power Reactor Information System (PRIS) (www.iaea.or.at/programmes/a2/)

29 Countries having bilateral agreements with Australia covering use of AONM are marked with an asterisk. These countries operate 365 power reactors, which produce around 13% of total world electricity and about 88% of world nuclear energy.

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

Appendix B Australia's Bilateral Safeguards Agreements

TABLE 17: AUSTRALIA'S BILATERAL SAFEGUARDS AGREEMENTS AT 30 JUNE 2011

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
Euratom[31]	15 January 1982
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[32]	3 February 2007
Russian Federation	11 November 2010
United States	22 December 2010

Note: Australia also has an Agreement with Singapore concerning cooperation on physical protection of nuclear materials, which entered into effect on 15 December 1989.

31 The Euratom agreement covers all 27 member states of the European Union. The agreement is due to expire on 15 January 2012. At the end of the reporting period, a revised and expanded agreement was under negotiation. The new agreement was subsequently signed on 5 September 2011 and is awaiting entry into force.

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

Appendix C Status of Additional Protocols

At 30 June 2011, there were 70 states (plus Taiwan) with significant nuclear activities[33]. Of these states, five were nuclear weapon states (NWS), 62 were non-nuclear-weapon states (NNWS) party to the NPT, and four were non-NPT Parties.

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

At 30 June 2011, there were a total of 109 states with an Additional Protocol in force, an increase of eight over the same time last year. Of the 62 NNWS NPT Parties with significant nuclear activities, 48 had an Additional Protocol in force (Table 18).

TABLE 18: STATES WITH ADDITIONAL PROTOCOLS IN FORCE AT 30 JUNE 2011

State			
Afghanistan	Ecuador	**Libya**	**Portugal**
Albania	El Salvador	Lithuania	**Republic of Korea**
Angola	**Estonia**	Luxembourg	**Romania**
Armenia	Fiji	Madagascar	**Russia**
Australia	**Finland**	Malawi	Rwanda
Austria	**France**	Mali	Seychelles
Azerbaijan	FYROM	Malta	Singapore
Bangladesh	Gabon	Marshall Islands	**Slovakia**
Belgium	**Georgia**	Mauritania	**Slovenia**
Botswana	**Germany**	Mauritius	**South Africa**
Bulgaria	**Ghana**	Mexico	**Spain**
Burkina Faso	**Greece**	Monaco	Swaziland
Burundi	Guatemala	Mongolia	**Sweden**
Canada	Haiti	Montenegro	**Switzerland**
Central African Rep	Holy See	Morocco	**Tajikistan**
Chad	**Hungary**	Mozambique	Tanzania
Chile	Iceland	Netherlands	**Turkey**
China	**Indonesia**	New Zealand	Turkmenistan
Colombia	Ireland	Nicaragua	Uganda
Comoros	**Italy**	Niger	**Ukraine**
Costa Rica	**Jamaica**	**Nigeria**	United Arab Emirates
Croatia	**Japan**	**Norway**	**United Kingdom**
Cuba	Jordan	Palau	Uruguay
Cyprus	**Kazakhstan**	Panama	**USA**
Czech Republic	Kenya	Paraguay	**Uzbekistan**

33 '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			
DR Congo	Kuwait	**Peru**	
Denmark	**Latvia**	**Philippines**	
Dominique Republic	Lesotho	**Poland**	
TOTAL: 109 states (including 48 NNWS with significant nuclear activities), plus Taiwan			

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

At 30 June 2011, 31 states did not have an Additional Protocol (AP) in force but had signed an AP and or had an AP approved by the IAEA Board of Governors. During the period from 1 July 2010 to 30 June 2011 a further four states either signed or had the Board of Governors approve an AP, two of which also brought their AP into force during the period (Table 19).

TABLE 19: STATES WITH AN ADDITIONAL PROTOCOL SIGNED OR APPROVED BUT NOT IN FORCE AT 30 JUNE 2011

State			
Algeria	Côte d'Ivoir	Kiribati	Thailand
Andorra	Djibouti	Kyrgyzstan	Timor-Leste
Bahrain	The Gambia	Liechtenstein	Togo
Belarus	Guinea	Malaysia	Tunisia
Benin	Honduras	Moldova	Vanuatu
Cameroon	**India** (non-NPT)	Namibia	Vietnam
Cape Verde	**Iran (1)**	Senegal	Zambia
Congo, Rep of	**Iraq**	**Serbia**	
TOTAL: 31 states (including 8 NNWS NPT Parties with significant nuclear activities)			

Source: International Atomic Energy Agency (http://www.iaea.org/OurWork/SV/Safeguards/documents/sir_table.pdf)
Note: (1) Iran implemented its AP 'provisionally' from 2003 but 'suspended' this in 2005.

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

TABLE 20: STATES WITH SIGNIFICANT NUCLEAR ACTIVITIES AND NO AP AT 30 JUNE 2011

State			
Argentina	**DPRK**[34]	**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)

34 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 2010

Inventory verification inspections carried out by the IAEA at Australian nuclear facilities and locations are shown in Table 7. In addition, the Agency carries out a range of other verification activities, such as short notice inspections, complementary accesses, design verifications and increased data collection and analysis.

The IAEA provides statements of conclusions of inspections under Article 91(b) of Australia's NPT Safeguards Agreement. Table 21 summarises the latest available Article 91(b) statements arising from physical inventory inspections.

TABLE 21: IAEA CONCLUSIONS OF INSPECTIONS IN AUSTRALIA

Verification Activity	Applicable Facilities	End Date of Material Balance Period	Conclusion
Examination of records	OPAL R&D Laboratories	24/03/2011 22/03/2011	'The records satisfied the Agency requirements.'
Examination of Reports to the Agency	OPAL R&D Laboratories	24/03/2011 22/03/2011	'The reports satisfied the Agency requirements.'
Verification of Domestic and International Transfers	OPAL	24/03/2011	'The domestic and international transfers declared by the operator were verified and the results satisfied the Agency requirements.'
Verification of Physical Inventory	OPAL R&D Laboratories	24/03/2011 22/03/2011	'The physical inventory declared by the operator was verified and the results satisfied the Agency requirements.'
Confirmation of the Absence of Unrecorded Production of Direct-Use Material from Material Subject to Safeguards	OPAL	24/03/2011	'The absence of unrecorded production of plutonium from nuclear material subject to safeguards was confirmed by the Agency in accordance with its requirements.'
Verification Activities for Timely Detection	OPAL R&D Laboratories	24/03/2011 22/03/2011	The verification activities for timely detection during the material balance period satisfied the Agency requirements.'

The IAEA provides statements of conclusions for states in which strengthened safeguards are in force. These statements are provided under Article 10.c. of the Additional Protocol to Australia's NPT Safeguards Agreement. The Statement for 2010 concluded as follows:

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

- Olympic Dam Mine, South Australia - AS-2010/001
- Lucas Heights Science & Technology Centre, Building 21 and Hut 36 - AS-2010/002
- Royal Melbourne Institute of Technology, Victoria - AS-2010/003.

Appendix E IAEA Safeguards Statement for 2010

The following is extracted from the IAEA's Annual Report for 2010.

In 2010, safeguards were applied for 175 States [35] with safeguards agreements in force with the Agency. The Secretariat's findings and conclusions for 2010 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. Ninety-nine States had both comprehensive safeguards agreements and additional protocols in force:

   (a) For 57 of these States[36], 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 42 of the 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 68 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 2010, 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 2010, 17 non-nuclear-weapon States party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) had not yet brought comprehensive safeguards agreements with the Agency into force 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, which require 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.

35 The 175 States do not include the Democratic People's Republic of Korea (DPRK), where the Secretariat did not implement safeguards and, therefore, could not draw any conclusion.

36 And Taiwan, China.

5. Five nuclear-weapon States had voluntary offer safeguards agreements and additional protocols in force. Safeguards were implemented with regard to declared nuclear material in selected facilities in all five States. For these five 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.

Appendix F Status of CTBT International Monitoring System Facilities in Australia

TABLE 22: STATUS OF AUSTRALIAN CTBT IMS FACILITIES AT 30 JUNE 2011

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	Construction underway in 2011	GA
Davis Base, Australian Antarctic Territory	Site survey completed	GA
Radionuclide Stations		
Melbourne[37], 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[38], NT	Operational and certified against CTBTO standards	ARPANSA
Cocos Islands	Operational and certified against CTBTO standards	ARPANSA
Macquarie Island, TAS	Operational, yet to be certified against CTBTO standards	ARPANSA
Mawson, Australian Antarctic Territory	Construction underway in 2011	ARPANSA
Radionuclide Laboratory		
Melbourne, VIC	Operational and certified against CTBTO standards	ARPANSA
Hydroacoustic Stations		
Cape Leeuwin, WA	Operational and certified against CTBTO standards	GA

37 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.

38 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 Freedom of Information Statement

This statement is provided in accordance with section 8 of the *Freedom of Information Act 1982* (FOI Act). The following section 8 statement covers the period for 1 July 2010 to 30 April 2011 inclusive.

The FOI Act extends the right to obtain access to documents in the Government's possession. Access is limited only by exemptions that, for example, protect essential public interests and the private and business affairs of people about whom departments and statutory authorities collect and hold information.

Members of the public seeking access to documents should lodge a formal FOI request. This must be made in writing and include a contact name, address to which notifications can be sent, telephone number and fax number (if available). All enquiries should be directed to:

Director
Freedom of Information and Privacy Law Section
Domestic Legal Branch
Department of Foreign Affairs and Trade
R.G. Casey Building, John McEwen Crescent
BARTON, ACT 0221

E-mail: foi@dfat.gov.au

From 1 May 2011 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, given in Part II of the FOI Act has replaced the former requirement to publish a section 8 statement in an annual report. An agency plan showing what information is published in accordance with IPS requirements is accessible from http://www.dfat.gov.au/foi/ips.html

Documents

ASNO produces a wide range of documents in administering its responsibilities including:

- Submissions to the portfolio minister, Cabinet, the Director General ASNO and other government agencies
- Records of parliamentary related business such as responses to parliamentary questions on notice, briefings for parliamentary delegations and parliamentarians, possible parliamentary questions, written submissions to parliamentary committees and responses to questions from parliamentary committee inquiries
- Records of technical and other reports, literature, media reports and journals relevant to ASNO's responsibilities
- Replies to ministerial and departmental correspondence
- Papers prepared in whole or in part by ASNO officers for presentation at conferences and meetings
- Texts of speeches and press statements on issues related to ASNO's responsibilities

- Briefs, reports and documents on international and Australian aspects of policy relevant to ASNO's safeguards, CWC and CTBT responsibilities
- Annual Reports
- Treaties, memoranda of understanding and other agreements between the Australian Government and other governments
- Documents relating to program and financial management, contracts and tenders
- Reviews, evaluations and audit reports on management systems, controls and the efficiency and effectiveness of development programs and activities
- Minutes and working documents of the working groups, committees and organisations to which ASNO is party
- Guidelines, policies and procedures relating to strategies and corporate planning, project planning and implementation, including risk assessment and fraud prevention
- Materials relating to staff development, training, personnel management and general administration
- Customer feedback surveys.

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, *Regulation of nuclear material and associated items under the Safeguards Act*, Presentation to ARPANSA staff 26th July 2010.
- John Carlson, *Strengthening Safeguards through Regional Cooperation: Establishment of the Asia-Pacific Safeguards Network*, Annual Meeting of the Institute of Nuclear Materials Management, Baltimore, Maryland, USA, 11–15 July 2010.
- Russell Leslie, Craig Everton and John Carlson, *Revisiting the Practices and Technical Objective of Safeguards*, Annual Meeting of the Institute of Nuclear Materials Management, Baltimore, Maryland, USA 11–15 July 2010.
- Craig Everton, Stephan Bayer and John Carlson, *Developments in the IAEA's Nuclear Security Series and Physical Protection Guidance Document INFCIRC/225*, Annual Meeting of the Institute of Nuclear Materials Management, Baltimore, Maryland, USA, 11–15 July 2010.
- John Carlson, *Strengthening the NPT and IAEA Safeguards: Recommendations of the International Commission on Nuclear Non-Proliferation and Disarmament*, Annual Meeting of the Institute of Nuclear Materials Management, Baltimore, Maryland, USA, 11–15 July 2010.
- Stephan Bayer, *Nuclear Terrorism Threats*, presentation made at the meeting of the National Counter Terrorism Committee CBRN Subcommittee Secretariat, 31 August 2010.

- Craig Everton, *Initiatives and Technologies for Next Generation Safeguards - Australian Experiences and Perspectives*, 6th International Workshop on Nuclear Energy and Non-Proliferation in East and Southeast Asia, Gyeongju, Republic of Korea, 27–29 October 2010.
- Robert Floyd, *WMD: Challenges for Australia's national interests and security,* National Security College - Australian National University, 5 May 2011.
- Craig Everton, Russell Leslie, Stephan Bayer and Michael East, *Transparency and other State-Specific Factors: Exploration of Ideas for Evolving the IAEA's System of State-Evaluations and Safeguards Implementation*, 33rd ESARDA Annual Meeting, Symposium on Safeguards and Nuclear Material Management, Budapest, Hungary, 16–20 May 2011.
- Robert Floyd, *Australian Uranium Export Policy*, presented at The Australasian Institute of Mining and Metallurgy International Uranium Conference 2011, Perth, 8–9 June 2011.
- Michael East and Stephan Bayer, *IAEA Safeguards Verification at Uranium Mines*, presented at The Australasian Institute of Mining and Metallurgy International Uranium Conference 2011, Perth, 8–9 June 2011.

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 8 July 2011.

Description	Requirement	Location
Letter of transmittal	Mandatory	Page iii
Table of contents	Mandatory	Page v
Index	Mandatory	Page 118
Glossary	Mandatory	Page 111
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	Page 3
Summary of significant issues and developments	Suggested	Page 3
Overview of department's performance and financial results	Suggested	N/A
Outlook for following year	Suggested	Page 9
Significant issues and developments – portfolio	Portfolio departments – suggested	Pages 15–33
Departmental Overview		
Role and functions	Mandatory	Page 37
Organisational structure	Mandatory	Page 88
Outcome and program structure	Mandatory	Page 44
Where outcome and program structures differ from PB Statements/PAES or other portfolio statements accompanying any other additional appropriation bills (other portfolio statements), details of variation and reasons for change	Mandatory	N/A
Portfolio structure	Mandatory for portfolio departments	DFAT AR
Report on Performance		
Review of performance during the year in relation to programs and contribution to outcomes	Mandatory	Pages 49–83
Actual performance in relation to deliverables and KPIs set out in PB Statements/PAES or other portfolio statements	Mandatory	DFAT AR
Where performance targets differ from the PBS/ PAES, details of both former and new targets, and reasons for the change	Mandatory	N/A

Description	Requirement	Location
Narrative discussion and analysis of performance	Mandatory	Pages 49–83
Trend information	Mandatory	Pages 49–83
Performance of purchaser/provider arrangements	If applicable, suggested	N/A
Significant changes in nature of principal functions/ services	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 90
Discussion of any significant changes from the prior year or from budget.	Suggested	N/A
Agency resource statement and summary resource tables by outcomes	Mandatory	DFAT AR
Developments since the end of the financial year that have affected or may significantly affect the department's operations or financial results in future	If applicable, mandatory	N/A
Management Accountability		
Corporate Governance		
Agency heads are required to certify that their agency comply with the Commonwealth Fraud Control Guidelines.	Mandatory	DFAT AR
Statement of the main corporate governance practices in place	Mandatory	DFAT AR
Names of the senior executive and their responsibilities	Suggested	Page 87
Senior management committees and their roles	Suggested	N/A
Corporate and operational planning and associated performance reporting and review	Suggested	DFAT AR
Approach adopted to identifying areas of significant financial or operational risk	Suggested	DFAT AR
Policy and practices on the establishment and maintenance of appropriate ethical standards	Suggested	DFAT AR
How nature and amount of remuneration for SES officers is determined	Suggested	Page 87
External Scrutiny		
Significant developments in external scrutiny	Mandatory	DFAT AR
Judicial decisions and decisions of administrative tribunals	Mandatory	DFAT AR
Reports by the Auditor-General, a Parliamentary Committee or the Commonwealth Ombudsman	Mandatory	DFAT AR

Description	Requirement	Location
Management of Human Resources		
Assessment of effectiveness in managing and developing human resources to achieve departmental objectives	Mandatory	DFAT AR
Workforce planning, staff turnover and retention	Suggested	Page 88
Impact and features of enterprise or collective agreements, individual flexibility arrangements (IFAs), determinations, common law contracts and AWAs	Suggested	DFAT AR
Training and development undertaken and its impact	Suggested	Page 89
Occupational health and safety performance	Suggested	DFAT AR
Productivity gains	Suggested	DFAT AR
Statistics on staffing	Mandatory	Page 88
Enterprise or collective agreements, IFAs, determinations, common law contracts and AWAs	Mandatory	DFAT AR
Performance pay	Mandatory	DFAT AR
Assets Management		
Assessment of effectiveness of assets management	If applicable, mandatory	DFAT AR
Purchasing		
Assessment of purchasing against core policies and principles	Mandatory	DFAT AR
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. (Additional information as in Attachment D to be available on the Internet or published as an appendix to the report. Information must be presented in accordance with the pro forma as set out in Attachment D.)	Mandatory	DFAT AR
Australia National Audit Office Access Clauses		
Absence of provisions in contracts allowing access by the Auditor-General	Mandatory	DFAT AR
Exempt Contracts		
Contracts exempt from the AusTender	Mandatory	DFAT AR
Financial Statements		
Financial Statements	Mandatory	DFAT AR

Description	Requirement	Location
Other Mandatory Information		
Occupational health and safety (section 74 of the Occupational Health and Safety Act 1991)	Mandatory	DFAT AR
Freedom of information for the period 1 July 2010 to 30 April 2011 inclusive (see terms of subsection 8(1) of the Freedom of Information Act 1982 as it existed prior to 1 May 2011)	Mandatory	Page 104
Advertising and Market Research (Section 311A of the Commonwealth Electoral Act 1918) and statement on advertising campaigns	Mandatory	DFAT AR
Ecologically sustainable development and environmental performance (Section 516A of the Environment Protection and Biodiversity Conservation Act 1999)	Mandatory	DFAT AR
Grant programs	Mandatory	DFAT AR
Disability reporting – explicit and transparent reference to agency-level information available through other reporting mechanisms	Mandatory	DFAT AR
Correction of material errors in previous annual report	If applicable, mandatory	N/A
List of Requirements	Mandatory	Page 107

GLOSSARY

Additional Protocol (AP)	An agreement designed to complement a state's Safeguards Agreement with the IAEA in order to strengthen the effectiveness and improve the efficiency of the safeguards system. The model text of the Additional Protocol is set out in IAEA document INFCIRC/540.
ANSTO	Australian Nuclear Science and Technology Organisation
APSN	Asia-Pacific Safeguards Network
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ASSP	Australian Safeguards Support Program
Australian Obligated Nuclear Material (AONM)	Australian Obligated Nuclear Material. Australian uranium and nuclear material derived therefrom, which is subject to obligations pursuant to Australia's bilateral safeguards agreements.
BAPETEN	Indonesian Nuclear Energy Regulatory Agency (Badan Pengawas Tenaga Nuklir)
BWC	Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction. Also known as the Biological Weapons Convention.
Challenge Inspection	(For CWC purposes) An inspection, requested by a CWC State Party, of any facility or location in the territory or in any other place under the jurisdiction or control of another State Party.
Complementary Access	The right of the IAEA, pursuant to the Additional Protocol, for access to a site or location to carry out verification activities.
Comprehensive Safeguards Agreement (CSA)	Agreement between a state and the IAEA for the application of safeguards to all of the state's current and future nuclear activities (equivalent to 'full scope' safeguards) based on IAEA document INFCIRC/153.
Concise Note	Supplementary explanatory notes on formal reports from a national safeguards authority to the IAEA.
Conversion	Purification of uranium ore concentrates or recycled nuclear material and conversion to a chemical form suitable for isotopic enrichment or fuel fabrication.
CPPNM	Convention on the Physical Protection of Nuclear Material
CTBT	Comprehensive Nuclear-Test-Ban Treaty
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization. The Vienna-based international organisation established at entry into force of the CTBT to ensure the implementation of its provisions.
Customs	Australian Customs & Border Protection Service
CWC	Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction. Also known as the Chemical Weapons Convention.

CWC Scheduled Chemicals	Chemicals listed in the three Schedules to the Chemical Weapons Convention. Some are chemical warfare agents and others are dual-use chemicals (that can be used in industry or in the manufacture of chemical warfare agents).
Department of Defence	Australian Department of Defence
Depleted Uranium (DU)	Uranium with a ^{235}U content less than that found in nature (e.g. as a result of uranium enrichment processes).
DFAT	Department of Foreign Affairs and Trade
Direct-Use Material	Nuclear material defined for safeguards purposes as being usable for nuclear explosives without transmutation or further enrichment, e.g. plutonium, HEU and ^{233}U.
Discrete Organic Chemical (DOC)	Any chemical belonging to the class of chemical compounds consisting of all compounds of carbon, except for its oxides, sulphides and metal carbonates, identifiable by chemical name, by structural formula, if known, and by Chemical Abstracts Service registry number, if assigned. Long chain polymers are not included in this definition.
DOE	United States Department of Energy
DPRK	Democratic People's Republic of Korea
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.
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.
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.
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.
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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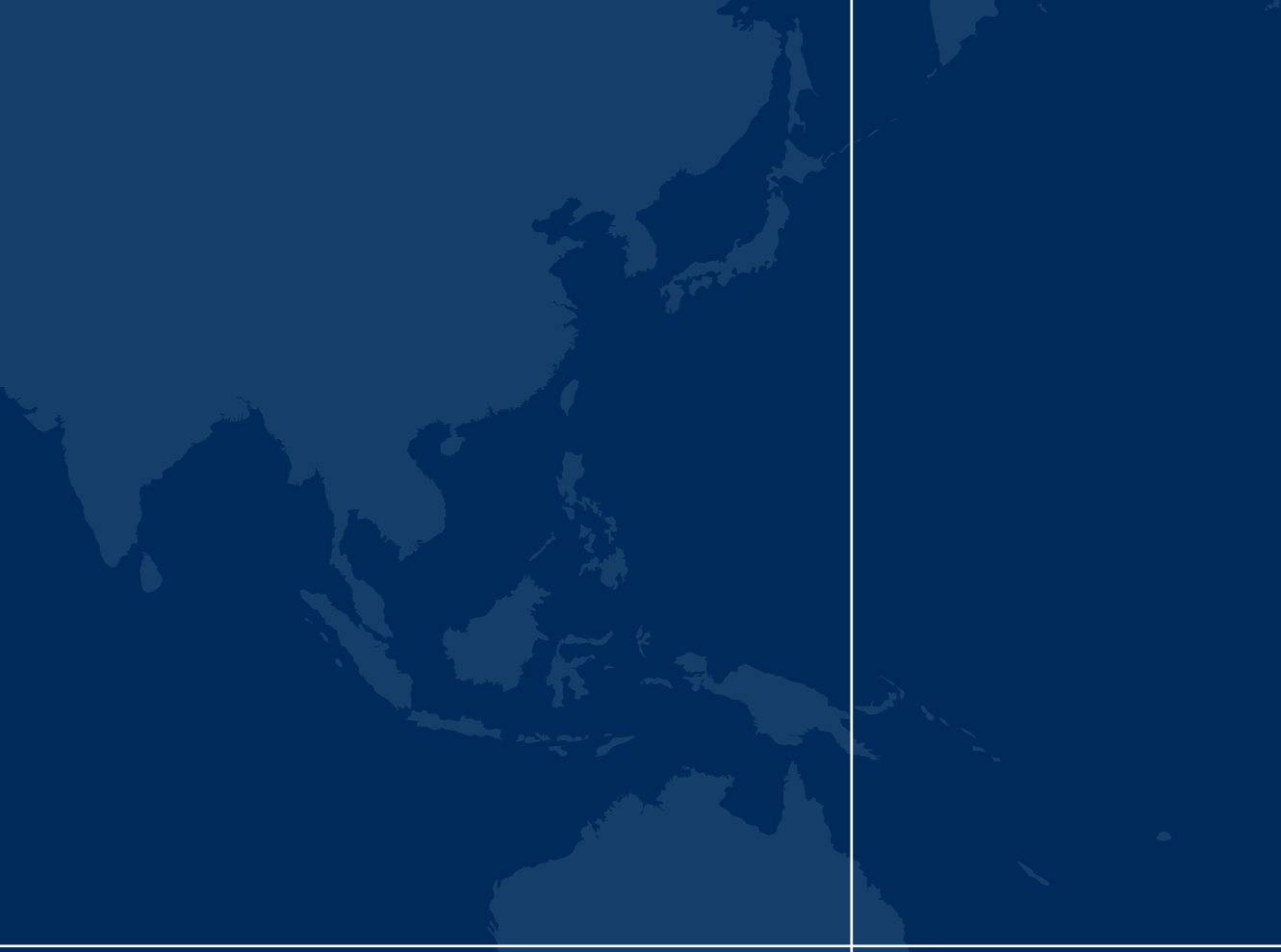

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