AUSTRALIAN SAFEGUARDS AND NON-PROLIFERATION OFFICE

ANNUAL REPORT 2006-2007

Director General ASNO

Produced by:	Australian Safeguards and Non-Proliferation Office (ASNO)
Contact officer:	Director General ASNO
Location:	RG Casey Building, John McEwen Crescent BARTON ACT 0221, Australia
Telephone:	+61 (2) 6261 1920
Facsimile:	+61 (2) 6261 1908
Media enquiries:	+61 (2) 6261 1555
E-mail:	asno@dfat.gov.au
Home page:	http://www.asno.dfat.gov.au
Annual Report:	http://www.asno.dfat.gov.au/annual_reports.html

Cover: Following rail transport from Adelaide, a container of uranium is unloaded at the Berrimah Freight Terminal, Darwin;

Fission chamber in the Neutron Guide Hall at the Australian Nuclear Science and Technology Organisation;

International Atomic Energy Agency (IAEA) inspectors at the Australian Nuclear Science and Technology Organisation;

Ammonium Nitrate Prilling Tower and Air Delivery System, Orica Pty Ltd, Yarwun Ammonium Nitrate Complex, Queensland, Australia

ISSN 1442 7699
ISBN 9781 921244537

Australian Government

Australian Safeguards and Non-Proliferation Office

16 October 2007

The Hon. Alexander Downer MP
Minister for Foreign Affairs
Parliament House
CANBERRA ACT 2600

Dear Mr Downer

I submit my Annual Report on the operations of the Australian Safeguards and Non-Proliferation Office (ASNO) for the financial year ended 30 June 2007. 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. In particular, all requirements were met under Australia's safeguards agreement with the International Atomic Energy Agency and under the Chemical Weapons Convention, and good 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, and, other than the incident referred to at page 41 of this report, ASNO found no unauthorised access to, or use of, nuclear materials or nuclear items in Australia.

As outlined in this Report, ASNO continued our 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
John Carlson

John Carlson
Director General

Table of Contents

List of Figures

List of Tables

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 2006-07 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 2006-07
- 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
- performance against the Commonwealth Disability Strategy
- advertising and market research
- ecologically sustainable development and environmental performance.

A checklist of information included against annual report requirements is set out in the Compliance Index (page 83).

Director General's Report

THE YEAR IN REVIEW

Nuclear Safeguards Developments

The International Non-Proliferation Environment

The actions of Iran and the Democratic People's Republic of Korea (DPRK – or North Korea) remain at the centre of international concerns about nuclear proliferation. Both cases highlight risks from the proliferation of sensitive nuclear technology (SNT), that is, uranium enrichment and reprocessing.

Iran continues to expand its enrichment activities in defiance of resolutions passed by the United Nations Security Council. In October 2006 the DPRK conducted a nuclear test explosion. However, in February 2007, in the Six-Party talks, the DPRK committed to fully declare and verifiably dismantle its nuclear programs, and by mid 2007 it had begun to freeze activities at its principal nuclear site, Yongbyon.

In the case of both Iran and the DPRK, enrichment capabilities were developed in secret, in violation of treaty commitments, and included procurement through the black market. A commercial project developed in full compliance with safeguards commitments would not normally give rise to the same concerns – but these cases have focused attention on the potential risks to the non-proliferation regime posed by the spread of SNT.

It is neither necessary nor cost effective for every country with a nuclear power program to have uranium enrichment and reprocessing facilities. Because these technologies can be used for military as well as civil purposes, possession of such capabilities can give rise to international concerns, especially if in regions of tension. For this reason, as well as the technical complexity and high development cost, most countries have not attempted to establish SNT capabilities. Moreover, for the majority of countries development of SNT would not make any economic sense. Several recent initiatives focus on how to create conditions of supply such that countries have no need to develop national SNT facilities.

There are several proposals for 'assured supply' of nuclear fuel, the most comprehensive being the Global Nuclear Energy Partnership (GNEP) initiative launched by the United States. Under the GNEP concept, fuel user countries would be guaranteed nuclear fuel for the life of their reactors (some 60 years), on a 'cradle-to-grave' basis. Spent fuel could be transferred to a country with an advanced nuclear program, operating fast neutron reactors, through which the spent fuel could be recycled, optimising energy production and reducing waste materials to shorter-lived materials that are easier to manage. Recycling would use new advanced fuel treatment technologies that, unlike reprocessing, avoid production of separated plutonium. Thus fuel users would avoid the substantial capital costs (and possibly political risks) of pursuing enrichment and/or reprocessing capability. Reprocessing in its current form would be phased out.

Other proposals include international fuel supply centres, through which enrichment facilities would be operated by groups of countries rather than as national projects. The technology holder would retain sole control of the technology. The involvement of several countries, and appropriate treaty arrangements, would help ensure sensitive facilities were not misused.

Russia has advanced such a concept – an international centre involving enrichment and related services to be established in Russia under IAEA monitoring. Interested states could join, securing a share of product and economic benefits, but without having access to the technology. Further development of this concept was endorsed by the 2006 G8 Summit in St Petersburg.

There is on-going work seeking to establish a political framework in which decisions on transfers of SNT would be more stringently regulated. In 2004 the United States proposed that members of the Nuclear Suppliers Group (NSG) should refrain from transferring enrichment (and reprocessing) equipment and technology to any country that does not already have 'full-scale functioning' facilities. Subsequently, the G8 agreed that SNT be transferred '*only pursuant to criteria consistent with global non-proliferation norms and to those states rigorously committed to these norms.*' The NSG – of which Australia is a member – has been discussing what such criteria might involve. While details of the NSG's deliberations are not publicly available, possible criteria could include: a state's safeguards record and whether it has ratified an Additional Protocol; whether there is a clear economic rationale for the project concerned; whether there is multination or regional involvement in the project; and the implications of the project for international and regional security.

Nuclear supply to India

Since the announcement by President Bush and Prime Minister Singh on 22 July 2005 of the US-India civil nuclear cooperation initiative, there has been further development on the scope for nuclear cooperation with India, the most significant of which occurred outside the period of this Annual Report, namely: the signing on 3 August 2007 of the Agreement for Cooperation between the Government of India and the Government of the United States of America concerning Peaceful Uses of Nuclear Energy.[1]

International Atomic Energy Agency (IAEA) Safeguards

The application of strengthened IAEA safeguards worldwide is an important objective for Australia. Good progress was made in this direction during the year. A major aspect of this is ensuring that the IAEA is appropriately funded to meet its mandated responsibilities. In this respect budget pressures on the IAEA continue to be an issue for safeguards implementation, and it is important that the budget be regularly reviewed. Australia is an active participant in the Agency's budget review process, including in the review for the 2008-09 biennium.

Many IAEA Member States continue to adhere to the idea of a zero growth budget, and/or call for internal efficiencies and improved productivity within the IAEA Secretariat. Budget discussions may be complicated by competing priorities of particular political or regional groupings within the IAEA. For example, members of the Non-Aligned Movement (NAM) or the G77 may seek to ensure that any increase in safeguards expenditure is 'balanced' by increases in expenditure for technical cooperation and/or promotion of nuclear energy. Just outside the period covered by this report, in July 2007 the IAEA Board of Governors agreed to recommend to the IAEA General Conference a once-off real increase of 1.4% in 2008 and 1.9% in 2009 to shore up ageing infrastructure and fund additional safeguards activities.

At 30 June 2007, the number of states implementing the Additional Protocol (AP), which gives the IAEA rights to additional information and increased access, grew to 82[2] from 76 a year prior. A further 39 states had signed APs, or had APs approved by the IAEA Board of Governors. Of the 66 non-nuclear-weapon states (NNWS)[3] with significant nuclear activities party to the NPT, 48 had an AP in force, and 11 had signed an AP or had an AP approved by

1. On 16 August 2007 the Prime Minister, Mr John Howard, announced a change to Australia's uranium export policy, allowing for supply of Australian uranium to India, subject to a number of conditions.
2. In addition AP measures are implemented in Taiwan, China.
3. Plus Taiwan, China.

the Board. Australia believes that the Additional Protocol is now firmly established as the safeguards standard for states with comprehensive safeguards agreements, i.e. NNWS party to the NPT, and requires adherence to the AP as a condition for supplying uranium to such states.

In implementing the Additional Protocol, by the end of 2006 the IAEA had made whole-of-state evaluations for 32 states, an increase of 33% over 2005. The IAEA reported in its *Safeguards Statement* for 2006 that it had found no indication of diversion, or undeclared nuclear materials or activities in any of these states.

In December 2006 I retired as Chair of the Standing Advisory Group on Safeguards Implementation (SAGSI), the international group of experts advising the IAEA Director General on safeguards issues, a position which I had held since 2001. In 2007 Dr Annette Berriman (ASNO's Safeguards Advisor) was appointed to SAGSI. During the year SAGSI continued its major contribution to developing new safeguards approaches and procedures to enhance the safeguards regime.

Regional Safeguards Developments

In June 2007 ASNO organised an informal meeting of senior officials from the Asia-Pacific region to discuss the possible establishment of an Asia-Pacific safeguards association. The purpose of the association would be to support safeguards authorities in the region by: identifying training, professional development and related needs; coordinating bilateral and multilateral cooperation and assistance; facilitating joint projects; and providing a forum for exchange of views and sharing of experience. The association would contribute to capacity-building in regional countries, and promote the most effective cooperation between national safeguards authorities and IAEA safeguards.

I co-chaired this meeting with my Indonesian counterpart, Mr Sukarman Aminjoyo, Chairman of BAPETEN. Overall, participants were supportive of the concept of an association and of exploring the idea further. A further meeting is expected to be held in the first half of 2008.

Regional outreach on non-proliferation issues is increasingly one of ASNO's core business functions and serves two important Australian priorities. The first is providing assurance that regional counterpart organisations are able to fulfil their obligations under the NPT and Convention on the Physical Protection of Nuclear Material (CPPNM). The second is that the provision of training to others is an effective means of attaining and maintaining safeguards expertise within ASNO's staff. The outreach program currently accounts for approximately 20% of ASNO's operational expenditure. A more detailed discussion of ASNO's outreach program can be found under 'Current Topics'.

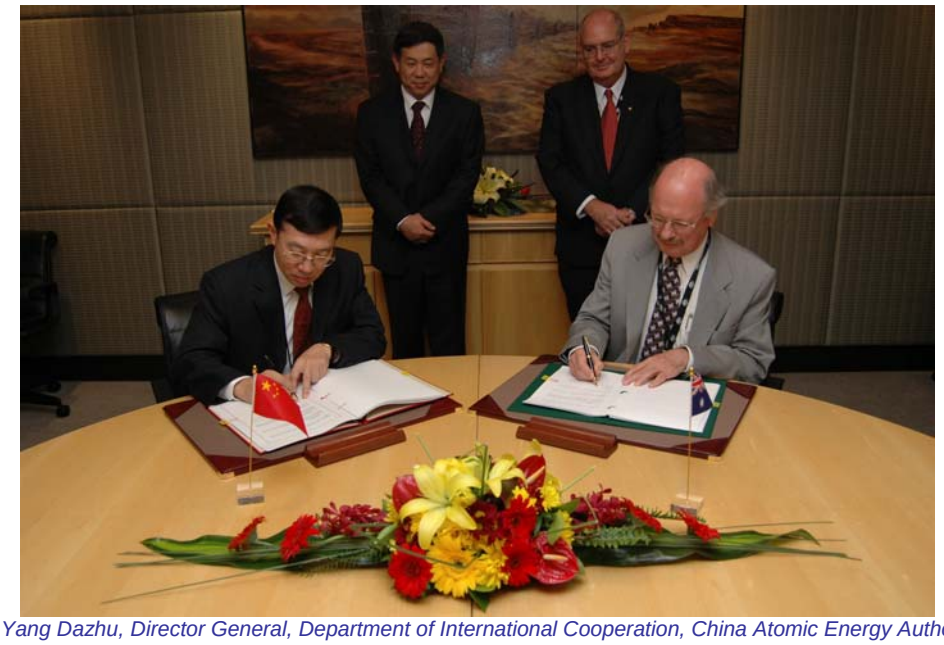
Bilateral Safeguards Developments

In early 2007 Australia and Russia began negotiations to conclude a new nuclear cooperation agreement.[4] Australia's current safeguards agreement with Russia, concluded in 1990, provides only for processing of Australian uranium in Russia on behalf of third countries. The new agreement will bring the Russian agreement into line with Australia's other bilateral safeguards agreements. It will allow for the use of Australian uranium in Russian nuclear power plants, and provide for cooperation in a range of peaceful nuclear activities. I led the Australian side for the negotiation of this agreement, which was well advanced at the end of the reporting period.[5]

Following the signing of two safeguards agreements with China in April 2006, binding treaty action was taken upon recommendation of the Parliamentary Joint Standing Committee on Treaties. The agreements entered into force on 3 February 2007. The Administrative

4. Media release: 'Negotiations to Expand the Australia-Russia Nuclear Safeguards Agreement', 27 April 2007.
5. The Agreement was signed outside the reporting period, on 7 September 2007.

Arrangement pursuant to the Nuclear Material Transfer Agreement was concluded between ASNO and its counterpart, the China Atomic Energy Authority, on 24 November 2006. Thus the framework for Australian uranium producers to commence exports to China is in place, however timing and quantities of exports are commercial matters for the producers and Chinese power utilities.



Dr Yang Dazhu, Director General, Department of International Cooperation, China Atomic Energy Authority and Director General John Carlson signing the Administrative Arrangement to the nuclear transfer agreement with China, 24 November 2006

Domestic Safeguards Developments

In 2006-07 the House of Representatives Standing Committee on Industry and Resources study into the strategic importance of Australia's uranium resources; the Uranium Industry Framework; and the Prime Minister's Uranium Mining, Processing and Nuclear Energy Review (UMPNER) Taskforce, all reported their findings. ASNO contributed submissions and other evidence and briefings to these reviews. In response to these reports, on 28 April 2007 the Prime Minister, the Hon John Howard MP, announced a new strategy for the future development of uranium mining and nuclear power in Australia, in order to increase uranium exports and to prepare for a possible expansion of the nuclear industry. Subsequently an IDC (interdepartmental committee), chaired by the Department of Industry, Tourism and Resources, was established to develop the strategy further. ASNO participated in the work of this IDC.

In April 2007, amendments to the *Nuclear Non-Proliferation (Safeguards) Act 1987* came into force. These implement new requirements in the CPPNM amendment agreed in July 2005, and regulate (with respect to nuclear safeguards) the decommissioning of a nuclear facility. Australia will ratify the amendment to the CPPNM following the promulgation of regulations under the *Extradition Act 1988*, and the finalisation of administrative processes for ratification. The amended CPPNM will become binding for those States Parties which ratify it once two-thirds of States Parties have ratified.

ASNO has worked with other key agencies to complete the Council of Australian Governments (COAG) review of hazardous goods – chemicals, biological agents and radiological materials. The review examined the regulation, reporting and security surrounding the storage, sale and handling of such goods. The aim of this review was to

minimise the risk of these materials being used for terrorist purposes. The report on radiological materials was completed in April 2007 in which, inter alia, it recommended that there be increased security inspection at uranium mines and locations where nuclear material is held, and streamlining of State/Commonwealth security regulation of nuclear materials. The report on hazardous chemicals is still in development.

A major task for ASNO was working with ANSTO on certification of the security systems and safeguards arrangements for ANSTO's new OPAL reactor, at Lucas Heights, which was officially opened by the Prime Minister in April 2007.

During the reporting period, the IAEA conducted four design information verification inspections, four routine inspections and a short notice inspection, and also undertook three complementary accesses in accordance with the Additional Protocol. The IAEA confirmed that Australia had met all of its IAEA safeguards requirements.

Chemical Weapons Convention Developments

ASNO promoted a number of international events to mark the 10th anniversary of the entry into force of the Chemical Weapons Convention (CWC) and of the establishment of the Organisation for the Prohibition of Chemical Weapons (OPCW). The efforts and dedication of the OPCW's Director-General and Technical Secretariat have been acknowledged by many States Parties, including Australia, for their role in ensuring the success of the Convention as an outstanding example of an effective multilateral instrument for disarmament and non-proliferation. Despite this decade of progress, much work still needs to be done towards achieving full universality and comprehensive implementation of the Convention.

ASNO continues to meet Australia's CWC obligations through strong interagency coordination and industry cooperation, and robust implementing legislation. A decade of implementation experience has proven useful when sharing lessons with other countries.

Australia has intensified efforts to promote effective and universal implementation of the Convention in the region, in order to reduce the risk that chemical weapons will be developed or acquired by states, or by non-state actors. To this end, ASNO delivered presentations at the 4th Regional Meeting of National Authorities of CWC States Parties in Asia, held in Jakarta in September 2006. More significantly, Australia jointly hosted with Japan and Indonesia an Industry Workshop on Implementing the CWC. This was held in Jakarta in February 2007. ASNO also worked with Malaysia on its preparations to receive OPCW inspections.

During the reporting period, the OPCW conducted four routine inspections of declared industrial chemical facilities in NSW, Queensland and Western Australia, as well as one such inspection at Australia's Schedule 1 defence facility for protective purposes. Two of the three visits by OPCW inspectors saw the conduct of sequential inspections. The OPCW is increasingly grouping inspections of two declared facilities, one after the other, during a single mission. The inspections may be within one country, or within a region. Australia supports OPCW efforts to increase numbers of routine inspections especially at Other Chemical Production Facilities, the majority of which have yet to be inspected by the OPCW. Sequential inspections are a cost-effective way to improve the coverage and intensity of CWC verification.

Further discussion about the achievements of the CWC, and a look ahead to the second Review Conference in April 2008, is under 'Current Topics'.

Comprehensive Nuclear-Test-Ban Treaty Developments

At 30 June 2007, 177 states had signed the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and 138 had ratified. Ten of the 44 states which must ratify the Treaty to trigger its entry into force (EIF) have yet to do so.

During the year Australia continued in its role as coordinator of international efforts to promote the entry into force of the CTBT. In September 2006, the Minister for Foreign Affairs, the Hon Alexander Downer MP, chaired a ministerial-level conference in New York, which led to 72 states endorsing a joint ministerial statement in support of the treaty. Encouraging countries in Australia's region has been a particular focus of efforts to promote ratification. ASNO assists DFAT in these tasks.

The underground test of a nuclear weapon by the DPRK in October 2006 reinforced the importance of bringing the CTBT into force. It also highlighted the capability of the International Monitoring System (IMS) to detect and characterise even small events. Further information on this event and its detection is under 'Current Topics'.

During the year the CTBT Organization's Provisional Technical Secretariat (PTS) certified one more of Australia's IMS facilities as meeting Treaty requirements. Of Australia's 21 IMS facilities 17 have now been completed and certified. The remaining four stations are yet to be installed, in remote locations – Antarctica, Macquarie Island and the Cocos Islands.

The CTBT provides for possible on-site inspection (OSI) if concerns arise about a possible nuclear explosion. Through ASNO, Australia is playing an important role developing this aspect of CTBT verification. Mr Malcolm Coxhead, Head, CTBT Implementation Section, has, since 2004, led efforts to produce an operational manual for the conduct of OSI under the CTBT. During the year an important result was achieved with the settlement by States Signatories of a Test Manual containing procedures for use and evaluation at a major inspection exercise to be held in Kazakhstan in 2008. The Test Manual is the first consolidated and usable result from nearly 10 years of negotiations.

Following the Indian Ocean tsunami in late 2004, CTBT signatories agreed to release IMS data, on a trial basis, to regional tsunami warning centres. With the trial completed, signatories agree during the year on permanent arrangements. Australia is using these arrangements to obtain additional seismic data to strengthen our national tsunami warning system.

Other Non-Proliferation Developments

ASNO worked closely with colleagues from the International Security Division (ISD) and the staff of various Australian missions in Europe to make a strong contribution to the continuing effectiveness of the Australia Group (AG). ASNO's Assistant Secretary, Mr Andrew Leask, chaired the important implementation meeting and achieved a number of key outcomes at the Plenary in 2007.

Mr Leask participated in the Australian delegation taking part in meetings of the Global Initiative to Combat Nuclear Terrorism (GICNT) which were held in Ankara, Turkey (February 2007) and Astana, Kazakhstan (June 2007). ASNO delivered presentations at the regional GICNT meeting that was held in Sydney in May 2007 (hosted by ISD).

ASNO contributed to various interdepartmental working groups relating to United Nations Security Council (UNSC) resolutions against Iran (resolutions 1696, 1737 and 1737) and DPRK (resolution 1718). ASNO's involvement included the provision of technical advice on potential export of items that would need to be considered in the context of sanctions and in providing analysis of the rationale for the sanctions.

ASNO has been active across a range of tasks designed to counter terrorist activities and strengthen the international non-proliferation regimes. ASNO has strengthened its permit systems and participated in various Government working groups and committees, including the Chemical, Biological, Radiological and Nuclear (CBRN) Strategy Group. During the year, ASNO worked on non-proliferation issues with the Australian Vice-Chancellors' Committee and Sydney University.

THE YEAR AHEAD

The following developments in the international non-proliferation environment are likely to impact on ASNO's work during 2007-08:

- developments with Iran's nuclear program, including the IAEA's efforts to verify the extent of the program and to establish if there are further undeclared nuclear activities, diplomatic efforts to find resolutions of outstanding issues and, if these efforts are unsuccessful, development of further sanctions against Iran's nuclear and missile programs
- international efforts to limit the spread of sensitive nuclear activities, specifically enrichment and reprocessing technology
- continued discussion of multilateral fuel cycle approaches and attempts to develop a framework for assurance of supply of nuclear fuel for power reactors – including further evolution of the GNEP concept
- following agreement reached in the Six-Party talks, activities by the IAEA to monitor the shut down and freeze of DPRK nuclear facilities and, in the next phase, disabling of nuclear facilities and verification of the DPRK's declaration on its nuclear activities
- development of new IAEA safeguards arrangements for India, and consideration by the Nuclear Suppliers Group of arrangements to allow supply to India's nuclear power program
- attempts to establish a work program for the Conference on Disarmament (CD) in Geneva, breaking a 12 year deadlock and commencing negotiation of a Fissile Material Cut-Off Treaty (FMCT).

A particular challenge for the IAEA will be the continued loss of expertise due to the retirement of key staff. The retirement of several Division Directors from the Safeguards Department is likely. This loss of key expertise and corporate memory will be difficult for the IAEA, coming as it does in a period of intense pressure for improved performance and difficult verification issues relating to non-compliance with safeguards obligations by Iran and DPRK.

The CTBT Preparatory Commission (PrepCom) has had to apply strict austerity measures for the coming year due to shortfalls in the regular payments made by States Signatories. While Australia and many countries have paid their assessed contributions in full, several are in arrears. The financial deficit will hamper progress in completing the CTBT's verification regime over the coming years. ASNO will nevertheless continue to support work to establish and operate Australian monitoring stations for the CTBT, as well as work to negotiate arrangements for the conduct of on-site inspections.

Bilaterally, ASNO will work to complete ratification of the new nuclear agreement with Russia and to bring it into operation, including the conclusion of a Memorandum of Understanding on administrative arrangements. ASNO will also actively be involved with the revision of IAEA nuclear security related guidelines, including INFCIRC/225/Rev.4, and the implementation of updated security requirements for uranium mines.

Domestically, ASNO will participate in the interdepartmental process developing regulatory arrangements for an expanding nuclear industry in Australia.

The CWC will be reviewed for the second time in April 2008. ASNO will support the preparatory work of the open-ended working group for the Second Review Conference (Revcon) and, where possible, contribute ideas for increasing the effectiveness of the Convention. There are unlikely to be any radical recommendations resulting from the Revcon. On the whole, the Convention is judged to have worked well over its 10 years, and within reasonable budgets.

Sustained effort is required to promote universality and to ensure full and effective implementation of all the provisions of the Convention, through the continuation of the action plans resulting from the First Review Conference in 2003. To this end, ASNO will continue to assist requesting countries in the region by sharing lessons learned from its implementation experiences.

It is encouraging that Albania has completed destruction of its entire CW stockpile[6], the only one out of six declared chemical weapons (CW) possessor states to have done so. However the anticipated slow pace of destruction of the 67% of remaining declared CW agent stockpiles, due to valid technical, regulatory, legal or financial constraints, is an issue that will continue to resonate on the Executive Council agenda because of concerns about whether the Convention's final 2012 deadline will be met by the two largest possessor states.

John Carlson
Director General ASNO

6. Just outside the reporting period, on 11 July 2007.

CURRENT TOPICS

GLOBAL NUCLEAR ENERGY PARTNERSHIP

The Global Nuclear Energy Partnership (GNEP) is a United States-led initiative with important non-proliferation objectives. GNEP promotes the development of new fuel cycle technologies and institutional arrangements to minimise proliferation concerns from the wider use of nuclear power.[7]

With the resurgence of nuclear power in the energy planning of a growing number of countries around the world, several proposals and initiatives are under development to minimise potential proliferation risks. While there are no proliferation risks with nuclear power as such, technologies required for production of nuclear fuel and spent fuel management – namely uranium enrichment and reprocessing – in the wrong hands could be diverted to produce fissile material for nuclear weapons. It is now widely recognised that the global extent of enrichment and reprocessing capabilities should be carefully managed, and a number of countries are looking at how to address this.

Addressing this concern is the main purpose of the GNEP initiative, a comprehensive package drawing together a number of themes:

- Expanding the use of nuclear power to help meet growing energy demand in an environmentally sustainable manner, while furthering non-proliferation objectives
- Establishing proliferation-resistant technologies for recycling spent nuclear fuel without separating plutonium, together with advanced reactors that consume transuranic elements from spent fuel – thereby optimising utilisation of uranium resources; reducing the volume and isolation period of high level waste; and avoiding the proliferation risks of current reprocessing and fast breeder reactor technologies
- Providing reliable access to nuclear fuel and fuel services – 'cradle to grave' arrangements, with fuel supply for the life of a reactor, together with arrangements for spent fuel to be recycled in countries with advanced fuel cycles. Countries using nuclear power will be able to avoid the substantial capital and political costs of establishing their own enrichment and reprocessing capabilities.

In January 2007, the US Department of Energy (DOE) released the 'Global Nuclear Energy Partnership Strategic Plan'. The plan calls for the cooperation of industry and government, both in the US and internationally, to develop technologies and set in place facilities and processes to implement the aims of GNEP. It outlines key evaluation criteria for GNEP fuel cycles, technology requirements (particularly for US facilities) and provides a two year 'Technology Action Plan'.

Under the Strategic Plan, an advanced fuel cycle research facility would be established at one of the existing DOE laboratories to undertake development of the underlying technologies to support GNEP concepts. The US plans to establish a nuclear fuel recycling centre, undertaking development of advanced spent fuel recycling practices which would:

- separate components of spent fuel
- produce actinide-based fuels[8]

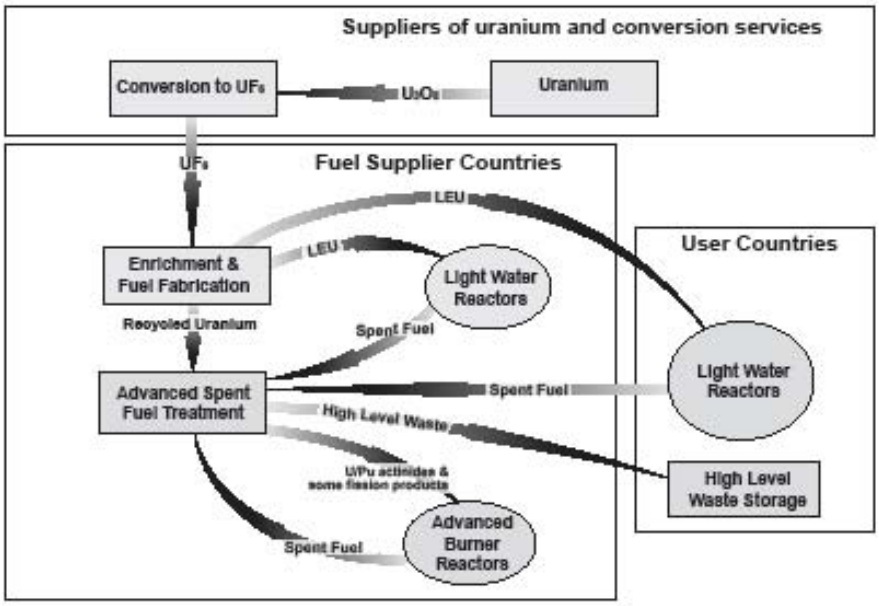
---

7. An outline of GNEP was given in ASNO's 2005-06 Annual Report, pages 11-14. See also the US Department of Energy website, www.gnep.energy.gov.
8. Advanced recycling reactors are planned to be developed to burn the actinide-based fuels produced by the advanced nuclear fuel recycling centre.

- not produce separated plutonium
- consume existing stocks of civil plutonium
- reduce existing stocks of civil spent fuel
- lead to a reduction in the volume of nuclear waste and the storage times for such waste.

Senior energy officials from China, France, Japan, Russia and the US met in May 2007 to discuss GNEP and nuclear energy cooperation. The IAEA attended as an observer. A joint statement was released supporting nuclear energy cooperation and recognising the need to coordinate GNEP with other international initiatives and approaches. Technical challenges were recognised, particularly in the areas of proliferation resistant fuel cycle approaches and reactor technologies. The statement also recognised the need for broader cooperation and partnership with nations which are using, or plan to use, nuclear power.

Figure 1: GNEP Concept



Parallel developments

Currently there are several initiatives, in areas such as fuel supply assurances and development of further controls on sensitive nuclear technologies, which complement the objectives of GNEP, and over time might be expected to reinforce or merge with GNEP.

One is the 'Concept for a Multilateral Mechanism for Reliable Access to Nuclear Fuel' (RANF), proposed by France, Germany, the Netherlands, Russia, the UK and the US in June 2006. This focuses on assurances for reliable supply of enrichment services or enriched uranium for countries not pursuing national enrichment or reprocessing projects. This has been followed by a US-Russia initiative, developing the fuel assurance concept further, launched just outside the reporting period (July 2007).

The technological aspects of GNEP had been anticipated by Russia's BREST reactor concept. This proposes the use of a fast neutron reactor, in conjunction with 'dry' processing of spent fuel, to enable recycle of plutonium without separation, and to transmute minor

actinides and fission products – bringing both non-proliferation and waste management benefits.[9]

Another interesting development is the international fuel cycle centre being established by Russia at Angarsk, Siberia. This follows the proposal made by President Putin in January 2006 for the establishment of a system of international centres providing fuel cycle services, including enrichment, on a non-discriminatory basis and under IAEA monitoring. Russia is inviting multination participation in the Angarsk fuel cycle centre, and already Kazakhstan has joined.

For a further outline of the various proposals in this area, see ASNO's 2005-06 Annual Report, pages 8-11, and the paper presented by Mr Carlson to the Carnegie Center, Moscow, on 29 May 2007.

Some implications for Australia

As a major supplier of uranium to the world market, a potential user of nuclear power and a strong proponent of non-proliferation, Australia has a close interest in GNEP. The Government has been considering whether Australia should join the Partnership. A decision had not been taken at the time this report was written.

Spent fuel take-back Some people have expressed concern that GNEP would oblige uranium suppliers such as Australia to take back spent fuel or nuclear waste. This is not the case. As outlined above, with GNEP technologies spent fuel will not be 'waste', but a valuable energy resource with the potential to multiply significantly the amount of energy derived from a given quantity of uranium. Spent fuel would be transferred to a country with advanced fuel cycle technologies, able to recycle the spent fuel and to treat the eventual high level waste.

Australia does not have these technologies – in fact, if Australia proceeds with nuclear power, we will be a 'user' country, taking advantage of the GNEP arrangements to have our own spent fuel managed by a country with an advanced nuclear program. The eventual high level waste is likely to be returned to the user country – as is the case now with waste from reprocessing. However, GNEP technologies will result in high level waste that will be more easily manageable – the period that most high level waste must be isolated from the environment will be very substantially reduced, from some 10,000 years to around 300-500 years.

Uranium market GNEP could result in a significant restructuring of the world's uranium and nuclear fuel markets. Today, power utilities typically conclude contracts at each point of the nuclear fuel cycle: uranium producers, conversion facilities, enrichment facilities, fuel fabrication facilities, and sometimes reprocessing facilities. GNEP however contemplates a vertically integrated approach under which nuclear power utilities may negotiate nuclear fuel supply as a single package (including fuel supply and spent fuel treatment services), backed up by government-level assurances of long-term supply, based on internationally agreed criteria for the non-proliferation and safeguards compliance requirements that make countries eligible for assurances.

Governments will need to determine what arrangements could provide the supply assurances that GNEP requires (to create an environment whereby user countries are able to rely on enrichment and reprocessing services provided by suppliers), without impacting on the commercial market that drives and encourages investment. At present governments of uranium supplying countries are not in a position to guarantee specific quantities over long periods of time, as production is undertaken by companies rather than governments, and will

9. See ASNO's 1999-2000 Annual Report, page 68.

depend on commercial decisions determined by balances of supply and demand and extraction costs. As GNEP develops, governments, nuclear processing companies, nuclear power utilities, and mining companies will need to consider carefully the potential implications for the international nuclear fuel market, and how industry and governments can work together to mutual advantage.

PROPOSED ASIA-PACIFIC SAFEGUARDS ASSOCIATION

Australia places a high priority on the effective implementation of nuclear safeguards and nuclear security in the region. Effective national and IAEA safeguards underpin nuclear non-proliferation and counter nuclear terrorism efforts, nuclear security and transparency of nuclear programs. Accordingly, Mr Carlson has been exploring support for a proposal for an Asia-Pacific safeguards association, which would promote greater cooperation amongst safeguards authorities in this region.

This idea has been under discussion between Mr Carlson and his Japanese, Korean and Indonesian counterparts for some time. These organisations have bilateral ties with each other, and with other organisations, such as the US Department of Energy and Nuclear Regulatory Commission, that are major providers of assistance in safeguards and security matters. ASNO has been exploring how to 'multilateralise' these bilateral relations and to broaden participation.

To put this in context - the size and complexity of nuclear industries vary greatly within the Asia-Pacific region. Japan and the Republic of Korea have large and complex nuclear fuel cycles; Australia has a modest nuclear research program but vast reserves of uranium; New Zealand has no nuclear facilities but a close interest in international peace and security issues; and Indonesia, Vietnam, Thailand and Malaysia have nuclear research programs and have expressed an interest, to varying degrees, in nuclear power.

Safeguards authorities in the Asia-Pacific region also vary greatly in size, scope, legal authority and areas of responsibilities. While there is a broad range of interests in the region there are useful synergies that could be realised if the various organisations with safeguards responsibilities came together on a regular basis. There is a strong capacity within the region to provide mutual assistance with safeguards related issues, exchange ideas, coordinate training and provide expert advice. Regular meetings and networking would raise awareness of each other's strengths and capacities and allow safeguards authorities to benefit from each other's experiences. Greater cooperation between safeguards authorities in the region could promote capacity-building for national safeguards authorities, and identify both needs and opportunities for assistance in achieving the most effective working relationship with the IAEA in safeguards implementation.

The concept of an Asia-Pacific safeguards association has received strong backing from the Minister for Foreign Affairs, Mr Downer, and ASNO has been given funding to take the proposal further.

Australia considered that an important step would be to seek support in the APEC context. In 2006 the APEC Energy Working Group and APEC Ministers endorsed Australia's proposal to hold two workshops to explore the possibility of establishing a safeguards association.

The first of these workshops was a meeting of senior officials, to discuss the possible structure, functions and programs of such an association. Mr Carlson received the welcome support of his Indonesian counterpart, Mr Sukarman Aminjoyo, Chairman of the Indonesian nuclear regulator, BAPETEN, to co-host and co-chair this meeting.

This first meeting was held in Sydney on 26-27 June 2007. The meeting drew together 38 participants – 36 from agencies and departments involved with safeguards in 13 countries and Taiwan, China, and two from the IAEA's Safeguards Department.

Senior officials meeting to discuss an Asia-Pacific safeguards association, Sydney, June 2007
(Photo courtesy of Richard Gregorio Photography)

A range of views on the utility and value of such an association were exchanged among the participants. Overall, participants were supportive of the concept of an association, and of exploring the concept further through consultations and a follow-up meeting. The meeting identified a number of important issues to be considered, including:

- whether the association would also cover physical protection
- possible objectives of the association
- possible activities of the association
- criteria for membership
- structure of the association
- funding and cost issues.

ASNO and BAPETEN will now coordinate further inter-session discussions on these issues and begin planning for a second meeting.

NEW STANDARDS FOR SECURITY OF NUCLEAR MATERIAL AND FACILITIES

In July 2005, a Diplomatic Conference on the Convention on the Physical Protection of Nuclear Material (CPPNM) adopted a detailed amendment to the Convention, which until then had chiefly encompassed security measures afforded to nuclear facilities and nuclear material involved in international transfers.[10] The amendment strengthens the Convention by extending internationally accepted standards of security to nuclear facilities and nuclear material in domestic use, storage and transport. Australia, through ASNO, played a vital part in developing the amendment and having it agreed.

The amendment to the CPPNM will become binding for those States Parties which ratify it once two-thirds of States Parties have ratified. While it may be some years before this process is complete, Australia has ensured the new security provisions apply domestically, through passage of the *Non-Proliferation Legislation Amendment Act 2007* (NPLA Act).

10. See ASNO Annual Report 2005-06, page 3.

Amendments to the CPPNM add a new Article 2A that requires States Parties to establish and maintain a physical protection regime to protect nuclear material against theft, to rapidly recover any missing or stolen nuclear material, to protect nuclear material and nuclear facilities against sabotage, and to mitigate or minimise the radiological consequences of any such sabotage. Article 2A establishes a series of fundamental principles to be applied as part of such a regime.

Australia has had a strong physical protection regime for some time. This is given legal force through the system of permits for nuclear material and facilities under the *Nuclear Non-Proliferation (Safeguards) Act 1987* (Safeguards Act). The permits place conditions and restrictions that require permit holders to establish physical protection arrangements. The requirements are specified in terms of relevant international standards, and are supervised by ASNO. The fundamental principles established by Article 2A have already been applied. The most significant example is their use in developing and evaluating the security system implemented by the Australian Nuclear Science and Technology Organisation (ANSTO) at the new OPAL reactor.

Article 7 of the CPPNM has been extended by the 2005 amendment in relation to activities that States Parties must make punishable offences under national law. In particular, new offences are added for: the international trafficking of nuclear material; the sabotage of nuclear facilities with intent to cause death, injury or damage by exposure to radiation or radioactive substances; acts organising or directing others to commit an offence specified by Article 7 (conspiracy); and acts contributing to the commission of other offences specified by Article 7. The NPLA Act extended existing offences in the Safeguards Act to make them consistent with these new requirements.

The amended CPPNM also requires States Parties to adjust their national extradition arrangements to allow prosecution of offences against the new Article 7. Australia will soon make these adjustments through regulations under the *Extradition Act 1988*, and will then move to ratify the amended CPPNM.

IRAN'S NUCLEAR PROGRAM – DEVELOPMENTS

In September 2005, the IAEA's Board of Governors, of which Australia is a member, found that Iran was in non-compliance with its safeguards commitments. This followed a long history of safeguards violations, secrecy and obstruction of the IAEA – mainly related to the development of a capability to enrich uranium, but including plutonium production and separation experiments, and acquisition of information and materials that could be related to nuclear weapons development (e.g. polonium production and information on manufacturing hemispherical uranium shapes).

In February 2006, the IAEA Board referred Iran to the United Nations Security Council (UNSC), whose President, on 29 March 2006, issued a statement calling on Iran to suspend enrichment-related and reprocessing activities, reconsider construction of a heavy water moderated research reactor, ratify the Additional Protocol, and increase cooperation with the IAEA to resolve outstanding issues. When Iran failed to comply with this, the UNSC adopted resolution 1696 making mandatory the suspension of Iran's enrichment and reprocessing activities, and calling upon all states to restrain from transferring items, materials, goods or technology to Iran that could assist these activities or Iran's ballistic missile program.

Iran has not complied with resolution 1696, or follow-up UNSC resolutions 1737 and 1747 which have imposed targeted sanctions against Iran's nuclear and ballistic missile programs as well as, inter alia, an embargo on the transfer of arms from Iran, limits on arms transfers to Iran and an expansion of the individuals and entities subject to financial measures.

On 10 April 2007, President Ahmadinejad announced that Iran had begun 'industrial-scale' uranium enrichment at Natanz. In a 17 May interview, IAEA Director General Dr Mohamed ElBaradei said that IAEA inspections had confirmed that Iran 'now has 1300 centrifuges that work continuously.' While this does not represent 'industrial-scale' enrichment – it is much smaller than a commercial enrichment plant – it is large enough to have potential military application. Dr ElBaradei had previously confirmed in a February report to the UNSC and IAEA Board that Iran was expanding its uranium enrichment activities by pursuing an industrial-scale enrichment capability at its underground facility at Natanz.

In his report of 23 May 2007 to the UNSC and IAEA Board of Governors, Dr ElBaradei confirmed that Iran was continuing uranium enrichment activities at its underground facility at Natanz. The report noted that at that time Iran had fed some 260 kg of uranium hexafluoride gas (UF6 - the feedstock for enriched uranium) into over 1000 centrifuges, and declared that it had reached enrichment levels of up to 4.8% U-235, which the IAEA was in the process of verifying. The report concluded that unless Iran addressed long outstanding verification issues, implemented the Additional Protocol and necessary transparency measures, the Agency would not be able to provide assurances about the absence of undeclared nuclear material and activities, or about the exclusively peaceful nature of Iran's nuclear program.

Following talks in Iran on 11-12 July between Iranian officials and IAEA Deputy Director General for Safeguards, Mr Heinonen, Iran agreed to resolve several safeguards issues including the designation of new IAEA inspectors able to enter Iran, a visit by inspectors to Iran's heavy water reactor at Arak[11] and the finalisation of a safeguards verification system for Iran's fuel enrichment plant at Natanz. Iran also agreed to develop within two months a plan detailing a phased approach to resolving all issues considered outstanding by the IAEA and demanded by three UNSC resolutions. These outstanding issues include plutonium experiments, explanation for traces of uranium found at various sites, the scope of Iran's 'P2' centrifuge program (a more advanced centrifuge than the 'P1' centrifuge in place at Natanz) and issues related to weaponisation, including documents related to missile re-entry vehicles and high explosives testing. At the time of writing this report, Iran had not presented a plan to resolve these outstanding issues.[12]

DPRK – NUCLEAR DEVELOPMENTS

The period covered by this report has seen mixed signals from the Democratic People's Republic of Korea (DPRK) regarding its nuclear program. On the one hand, the DPRK took a number of actions earlier in the reporting period that raised security tensions in the region. Subsequently, however, the Six-Party Talks appear to have made useful progress toward a freeze of certain nuclear activities.

The DPRK conducted tests of ballistic missiles in July 2006. The seven missiles test fired included a long-range Taepodong-2, however this failed soon after launch. The missile firings were widely condemned and in July 2006 the UN Security Council adopted resolution 1695 demanding that North Korea suspend all activities related to its ballistic missile programs and re-establish its pre-existing moratorium on missile launching. The DPRK rejected the resolution, saying it would continue with its missile tests.

In October 2006, the DPRK announced that it had conducted a nuclear weapon test. The event was detected by the developing verification system for the CTBT (see following item on 'CTBT and DPRK Nuclear Test' for more) as well as by other agencies. The size of the blast has been estimated as equivalent to several hundred tonnes of TNT. This is very

11. This visit was undertaken on 31 July 2007.
12 . Iran circulated 'understandings' reached with the IAEA on 27 August 2007.

small, especially for the type of nuclear device that the DPRK might have developed, and it is possible that the test was only partially successful. US media reported that US intelligence agencies have concluded that the test involved a plutonium-based explosive device.

On 13 February 2007, the Six-Party Talks resulted in a statement ('Initial Actions for the Implementation of the [September 2005] Joint Statement') in which the DPRK agreed to shut down and seal the Yongbyon nuclear facility, for the purpose of eventual abandonment. This activity is to be monitored and verified by the IAEA. The DPRK also agreed to discuss with the other parties a list of all its nuclear programs that would be abandoned pursuant to the Joint Statement. The DPRK and the US agreed to start bilateral talks aimed at resolving pending bilateral issues and moving toward full diplomatic relations. The US would begin the process of removing the designation of the DPRK as a state-sponsor of terrorism and advance the process of terminating the application of the Trading with the Enemy Act with respect to the DPRK. The DPRK and Japan agreed to start bilateral talks aimed at taking steps to normalize their relations and settlement of issues such as the abduction issue. The Parties also agreed to cooperate in economic, energy and humanitarian assistance to the DPRK, including an initial shipment of emergency energy assistance equivalent to 50,000 tons of heavy fuel oil.

IAEA experts arrived in the DPRK just outside the period covered by this report, on 14 July 2007, and on 18 July the IAEA announced that the five facilities (the one operational reactor, two reactors under construction, a fuel fabrication plant and a reprocessing plant) had been shut down and seals applied (although installation of monitoring equipment would take longer). The IAEA reported that the DRPK had provided access to all of these facilities and was cooperating in implementing the IAEA's verification and monitoring activities.

CTBT AND THE DPRK NUCLEAR TEST

Almost 10 years to the day after the adoption of the Comprehensive Nuclear-Test-Ban Treaty (CTBT) by the United Nations General Assembly, the DPRK government announced that it had conducted a nuclear test explosion on 9 October 2006. Although the DPRK has not committed itself to the CTBT, the explosion was detected and characterised by the Treaty's verification regime.

Over the last 10 years, signatories have been working to establish verification infrastructure for the CTBT. Central to this is an International Monitoring System (IMS) which, when completed, will comprise 337 monitoring facilities around the globe. Data from these facilities are forwarded directly to an International Data Centre (IDC) in Vienna for analysis, and events of interest are notified to member states.

Within two hours of the DPRK explosion the IDC processed and analysed signals detected at more than 10 IMS primary seismic stations around the world and identified an explosive event located in north-eastern DPRK. The uncertainty estimate for the location (referred as the "error ellipse") covered an area of about 2,500 square kilometres. Further analysis of both the primary and additional auxiliary seismic station data reduced the area of the error ellipse to less than 1000 square kilometres.

Figure 2: Location and error ellipses of the DPRK 9 October 2006 event – the larger error ellipse (a) was calculated within two hours of the event and the smaller one (b) after further analysis. (Courtesy of GA Nuclear Monitoring data analysis archive)

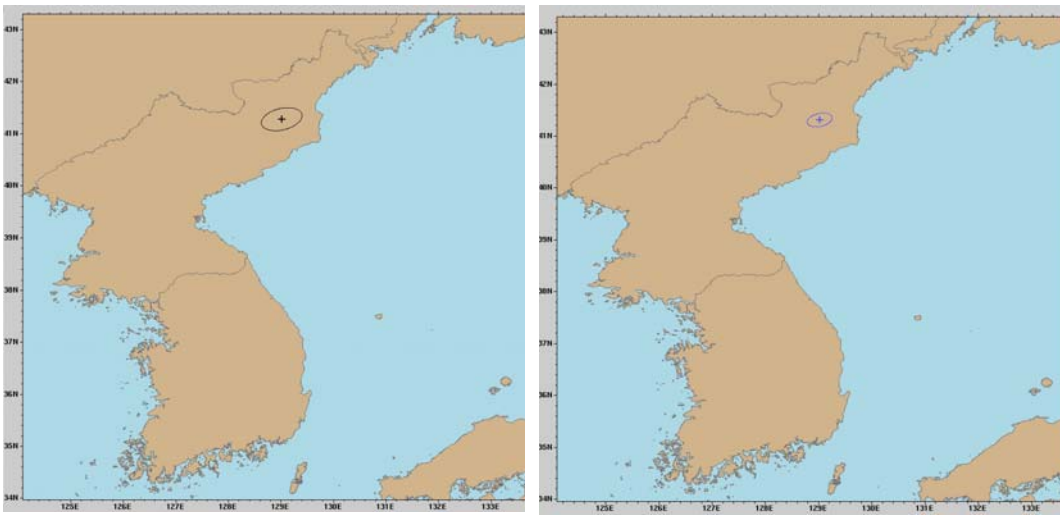
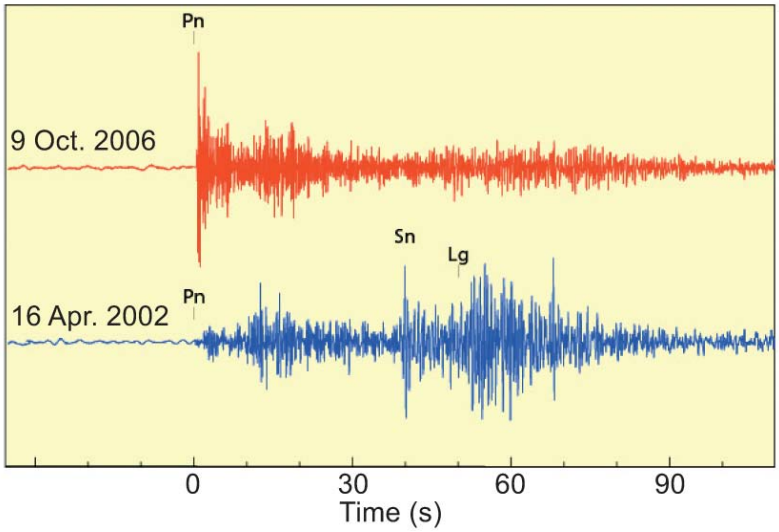
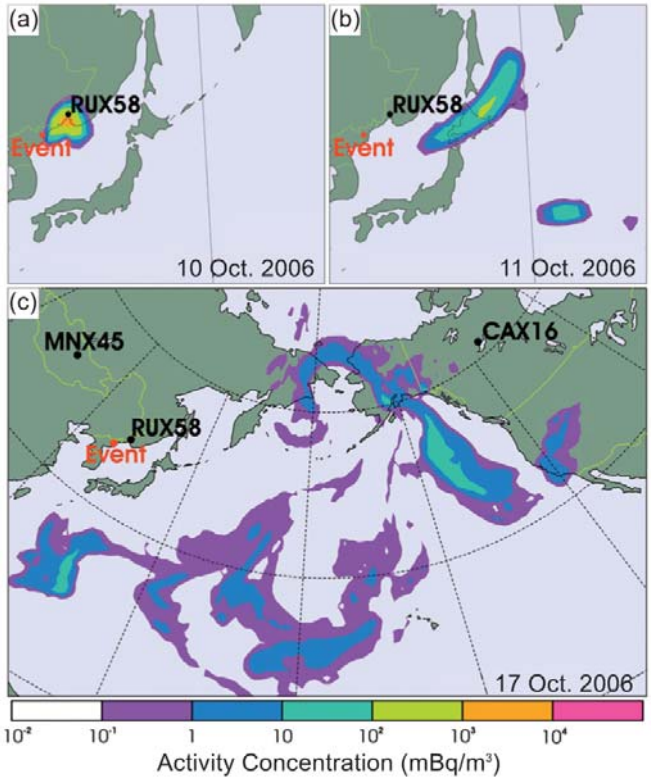


Figure 3: Seismograms from the primary seismic station PS31 at Wonju, Republic of Korea. The upper trace shows the waveform for the announced DPRK nuclear explosion. The lower trace is for a nearby shallow earthquake. The explosion generates large compressional waves (Pn) and produces little shear energy (Sn and Lg) relative to the earthquake. (Courtesy of the CTBTO Provisional Technical Secretariat, Vienna)



In 12 days, traces of the noble gas xenon-133 were detected by an IMS radionuclide station at Yellowknife in Canada. This detection was found to be consistent with release of the noble gas from a nuclear explosion in the DPRK on 9 October. A small and well-contained explosion may not release radioactive particulates into the atmosphere, and none were detected. However noble gases signifying a nuclear explosion can leak out.

Figure 4: Calculated xenon-133 concentrations over time assuming immediate venting of radioxenon (shown at the word "Event"). The plume is shown at (a) one, (b) two and (c) eight days after the event. CAX16 is the radionuclide station at Yellowknife. (Courtesy of the CTBTO Provisional Technical Secretariat, Vienna)



The size of the explosion has been estimated as equivalent to several hundred tonnes of TNT. This is quite a small nuclear explosion, and may represent a partially failed test.

Verifiability of the CTBT

A concern sometimes raised in political discussions on the CTBT is whether it can be effectively verified. In particular, the ability of the verification system to detect smaller explosions is questioned. The ready detection of the DPRK test by the IMS has been a public demonstration that such explosions are within its view. The future potential of CTBT verification is strengthened also by the fact that only about 60% of IMS stations were complete at the time of the DPRK event, and that only 10 of a planned 40 noble gas stations have so far been installed.

A further option under the CTBT, when it enters into force, will be for states to decide to conduct an on-site inspection in the area that an event was detected. Under the Treaty each State Party agrees to allow such an inspection. Up to 40 technical experts may have access to an area of up to 1,000 square kilometres for this purpose.

With the completion of the IMS network, the CTBT verification regime is expected to more than adequately meet the challenge of timely detection of a nuclear test anywhere, with a high certainty of its location within the maximum area allowed for an on-site inspection under the Treaty.

SECOND REVIEW CONFERENCE OF THE CHEMICAL WEAPONS CONVENTION

The Chemical Weapons Convention (CWC) is unique in that it is the only international treaty requiring the complete and verifiable elimination of an entire category of weapon of mass destruction. The Convention also promotes the peaceful use of chemistry and entitles States Parties to assistance and protection against the use, or threat of use, of chemical weapons.

In April 2008, the Organisation for the Prohibition of Chemical Weapons (OPCW) will host the Second CWC Review Conference of States Parties. The purpose of this special session is to review the Convention's implementation, taking into account relevant scientific and technological developments, with a view to proposing future improvements.

The First Review Conference, in May 2003, saw States Parties reiterate their commitment to the CWC, as well as agreement on actions to strengthen the Convention, including efforts to promote universality, a greater focus on national implementation, and comprehensive compliance with routine verification requirements.[13]

Current status of the Convention

29 April 2007 marked the 10-year anniversary of the CWC. The Convention has 182 States Parties representing approximately 98% of the world's population and landmass, as well as about 98% of the worldwide chemical industry. In Australia's region, Burma is the only country to remain outside the CWC.

Since 1997, the OPCW has conducted more than 2,951 on-site verification inspections worldwide. 1,723 inspections occurred at chemical weapon (CW) production, destruction or storage facilities. An additional 1,228 occurred at 859 industrial and defence research facilities in 79 States Parties to verify information declared. As of June 2007, 21 such inspections have been conducted at Australian facilities producing or using dual-use chemicals and at the Defence Schedule 1 facility for protective purposes.

One of the main goals of the Convention is the verifiable destruction of all existing chemical weapons, stockpiles, munitions and production facilities. At the end of June, about 33% of the 71 000 metric tonnes of declared chemical agent stockpiles and 32% of the 8.6 million declared chemical munitions had been verifiably destroyed in six declared CW possessor States. Technical, legal and environmental setbacks have hampered the pace of CW destruction in the six CW possessor States, justifying approvals granted for extension requests beyond the Convention's original 10-year deadline that expired in April this year. Albania is the first possessor State to have completely destroyed its entire CW stockpile, a noteworthy event which occurred soon after the end of the reporting period. In December 2006 at the 11th Conference of States Parties, Russia and the United States of America were granted extensions to their destruction deadlines to 2012 – the last date permitted under the provisions of the Convention.

Much has been achieved in the last 10 years and a number of events are being held worldwide to commemorate the anniversary. The main event was the unveiling of a permanent memorial to all victims of chemical weapons by Her Majesty Queen Beatrix of the Netherlands in The Hague on 9 May 2007. A number of other events will be held in The Hague, including an academic forum in September and an industry and protection forum in November.

13. See RC-1/5: Report of the First Special Session of the Conference of the States Parties to Review the Operation of the Chemical Weapons Convention (First Review Conference) 28 April - 9 May 2003, (www.opcw.org).

Second Review Conference

The Second Review Conference is to be held in The Hague from 7-18 April 2008. As with the First Review Conference, the review will examine the operation of the Convention and provide an opportunity to address a number of strategic issues affecting the CWC.

A topic likely to be debated in the lead-up to the conference is how under the CWC to appropriately capture emerging toxic chemicals and incapacitating agents[14]. Although the Convention does have the General Purpose Criterion[15] which covers toxic chemicals not listed in the Schedules, the verification mechanism is closely tied to the list of Scheduled chemicals.

It is unlikely the Conference will address the highly political topic of amending the Schedules of chemicals, because of the difficulty with achieving consensus. Instead States Parties should be encouraged to ensure that offence provisions in national legislation implement the comprehensive prohibition on chemical weapons in Article I, and are not focused only on chemicals listed in the Schedules.[16]

In summary, issues which are likely to be discussed before or during the Second Review Conference include:

- the timely destruction of all chemical weapons
- universality and national implementation
- reaffirmation and implementation of the General Purpose Criterion
- strengthening the efficiency of the verification regime in part by ensuring comprehensive compliance by States Parties with all the provisions of the CWC
- ensuring the high standard of expertise of the Technical Secretariat's inspectorate especially in relation to demilitarisation until all chemical weapons have been eliminated and their production facilities destroyed or converted for peaceful purposes.

The actual destruction of chemical weapon stocks is lagging behind the timetable set by the Convention. It is therefore critical that all possessor States renew efforts to meet their respective destruction deadlines. The topic of chemical weapon destruction should be discussed at the Conference. However an undue focus on the possibility that the largest possessor States may miss their 2012 final destruction deadlines, could distract from discussion of other more pertinent agenda items.

One criticism of the First Review Conference was that there was insufficient engagement of industrial, scientific and academic stakeholders and that the Conference was driven by Hague-based rather than capital-based delegations.[17] There will need to be a concerted effort by all States Parties to make sure that there is wide participation at the Second Review Conference, and that all stakeholders are suitably represented.

---

14. See Donald A. Neill, The Chemical Weapons Convention at the Second Review Conference and Beyond, Defence R&D Canada, Centre for Operational Research and Analysis, Technical Memorandum TM 2007-04, February 2007.
15. The general purpose criterion (GPC) is a combination of the general obligations of paragraph 1 of Article I and the definition of 'chemical weapons' established in paragraph 1 of Article II which include toxic chemicals and their precursors. The end result means that the GPC is a stop gap mechanism designed to ensure that the prohibitions of the Convention apply to all chemicals that are acquired or used for hostile purposes and is not limited to the chemicals listed in the CWC Schedules.
16. Delegation papers in preparation for the Review Conference: General Obligations, Declarations, Verification, Chemical Weapons and Chemical Weapons Production Facilities, United States of America (20 February 2007), and The Comprehensive Nature of the Chemical Weapons Convention and Scientific and Technological Change 'The General Purpose Criterion', United Kingdom (20 February 2007).
17. 24th Workshop of the Pugwash Study Group on the Implementation of the Chemical and Biological Weapons Conventions: Achieving a successful outcome of the Second CWC Review, 13-14 May 2006.

Australia will continue to be a strong advocate of the CWC, including by being at the cutting edge of its implementation and a source of assistance where necessary for other States Parties in the region.

What is the difference between the Conference of States Parties and the Review Conference?

The Conference of States Parties:

- is the principal organ of the OPCW
- is held in regular sessions – annually unless decided otherwise
- considers any question, matter, or issue within the scope of the CWC.

The Review Conference:

- is a special Conference whose purpose is to review the operation of the Convention
- takes into account any relevant scientific and technological developments
- is not involved in the day-to-day running of the Convention
- is held at five year intervals and as required – after the Second Review Conference, there is no requirement in the Convention for further review conferences if deemed unnecessary by States Parties.

20 YEARS OF THE SAFEGUARDS ACT

The year 2007 marks the 20th anniversary of the commencement of the *Nuclear Non-Proliferation (Safeguards) Act 1987.* The Australian Safeguards Office (ASO) – ASNO's predecessor – was established in July 1974. However it was not until the commencement of the Safeguards Act on 31 March 1987 that ASO was given a broad legislative foundation to regulate nuclear material, nuclear-related items, and nuclear-related activities across all sectors, private and public. The Act established the statutory position of Director of Safeguards, now known as the Director General of ASNO.

From 1975 to 1987, ASO operated under an administrative order from the minister with responsibility for the *Atomic Energy Act 1953*. That Act set the legislative basis for the nuclear activities at the Australian Atomic Energy Commission's (later to become the Australian Nuclear Science and Technology Organisation (ANSTO)) facility at Lucas Heights, and hence the basis for regulating AAEC's compliance with safeguards obligations under Australia's safeguards agreement with the IAEA. Regulation of Australia's other major nuclear-related activity, uranium mining and export, was ensured through the Customs (Prohibited Exports) Regulations, under which export permits were required for all uranium exports.

A comprehensive review of the Atomic Energy Act led to the replacement of the AAEC by ANSTO in 1987. As part of these changes the Safeguards Act was introduced to establish the legislative basis for the implementation of safeguards and physical protection (security) of all nuclear material, associated items and activities in Australia across all jurisdictions; and in doing so gave a firm legal basis for ASO's functions, backed up by clearly defined offences. With the introduction of the legislation, ASO became part of the Primary Industries and Energy (DPIE) portfolio.

In 1994 ASO was moved to the Foreign Affairs and Trade portfolio, under the Minister for Foreign Affairs. This move was prompted by the increasing foreign policy attention being

given to efforts to strengthen the IAEA safeguards system. There were natural synergies with DFAT's interests in international nuclear and security policy that ASO, with considerable expertise in nuclear safeguards and nuclear physical protection, could more effectively contribute. This move was followed by the designation of additional functions to the office of the Director of Safeguards: the position of Director of the Chemical Weapons Convention Office (CWCO) in 1995; and, the position of the Director of the Australian Comprehensive Test-Ban Office (ACTBO) in 1998 – further boosting the contribution that the Office could make to DFAT's interests in international security. In August 1998 the Australian Safeguards and Non-Proliferation Office (ASNO) was established, combining the functions of ASO, CWCO, and ACTBO. The position of Director of Safeguards, Director of CWCO, and Director of ACTBO were combined into the position of Director General, ASNO – an arrangement that has continued since 1998.

Under the Safeguards Act this Office (ASO and ASNO) has successfully managed Australia's obligations under: the Treaty on the Non-Proliferation of Nuclear Weapons (NPT); Australia's safeguards agreement and Additional Protocol (AP) with the IAEA; bilateral safeguards agreements; and the Convention on the Physical Protection of Nuclear Material (CPPNM). The Safeguards Act provides for a permit system which is used to ensure compliance with all these treaty obligations. The permit system under the Safeguards Act has proven very effective for regulating and administering compliance with Australia's treaty obligations in a broad range of industries, including: uranium mines; nuclear research reactors; enrichment research; and possession of small quantities of nuclear material at universities, hospitals, and industrial radiography companies. Over the last 20 years the Office has issued over 400 permits for the possession and transport of nuclear material and associated items, has facilitated over 350 days of IAEA inspections, and conducted around 500 national inspections.

The Safeguards Act has proven also to be very versatile in accommodating changes in the international nuclear non-proliferation regimes. This is illustrated by the IAEA's landmark Additional Protocol on strengthened safeguards, adopted by the Board of Governors on 3 April 1997. Whereas most countries took a few years or more to bring in laws to give effect to the AP's additional obligations and IAEA access rights, Australia made the transition seamlessly through the flexibility of permit conditions, rather than requiring any additional laws. The flexibility of the Safeguards Act contributed to Australia being the first country in the world to bring an AP into force, on 12 December 1997.

In fact the Safeguards Act has only required relatively minor amendments over the last 20 years. In 2003 the Act was amended to strengthen arrangements and offences for the protection and safeguards of nuclear material, facilities and associated information, and to introduce a permit requirement for the establishment of any new nuclear facility in Australia.[18] In 2007 the Act was amended to give legal effect to Australia's obligations under the amended CPPNM, to introduce a permit requirement for the decommissioning of nuclear facilities[19], and to extend the geographical jurisdiction for some offences.

If Australia should decide to expand its involvement in the nuclear fuel cycle to introduce nuclear power and/or enrichment, little change, if any, would be required to the Safeguards Act. The broad powers in the Safeguards Act to include conditions in permits to ensure compliance with prescribed international agreements provide the necessary degree of control over all aspects of safeguards and physical protection in any nuclear facility.

18. This was subsequently used for the later construction phases of the OPAL reactor.
19. ASNO will shortly be issuing the first permit to decommission a facility, namely ANSTO's shut-down HIFAR reactor.

UMPNER REVIEW

In June 2006 the Prime Minister commissioned the 'Review of Uranium Mining, Processing and Nuclear Energy in Australia', referred to as UMPNER. The UMPNER Taskforce was undertook an objective, scientific and comprehensive review into uranium mining, processing and the contribution of nuclear energy in Australia in the longer term. The Taskforce released its final report on 29 December 2006.[20]

The report notes that Australia has the capacity to expand production and exports of uranium, and that global demand for uranium provides a timely opportunity. Skills shortages and restrictive policies (regulation, land access and transport) are identified as constraints on expansion of the uranium mining industry in Australia.

The Taskforce found that conversion, enrichment and fuel fabrication could add substantial value to Australia's uranium exports, but noted that there are significant challenges associated with the required investment levels, highly concentrated nature of the current industry structure, access to enrichment technology and practical constraints on fuel fabrication. One of its key findings was:

> 'Downstream steps of uranium conversion, enrichment and fuel fabrication could add a further $1.8 billion of value annually if all Australian uranium was processed domestically. However, high commercial and technology barriers could make market entry difficult. Current legal and regulatory impediments would need to be removed, but there may be little real opportunity for Australian companies to extend profitably into these areas.'

The Taskforce judged that nuclear power could become competitive with fossil fuel based electricity generation in Australia if based on international best practice and with the introduction of low to moderate pricing of CO_2.

The review identified the main impediments to the growth of a civil nuclear industry in Australia and made recommendations to help facilitate such an industry (e.g. changes to federal law to allow the licensing of nuclear facilities, and a re-examination of the division of responsibility between state and federal governments for the regulation of any nuclear industry).

Following the release of the report, the Prime Minister stated in an interview on 29 December 2006 that the Australian Government would not itself be establishing nuclear power plants. He said any nuclear power plants would be established by companies, and only when such investments became economically feasible. On the issue of nuclear power reactors in Australia, the UMPNER review noted the following:

> 'Nuclear power is likely to be between 20 and 50% more costly to produce than power from a new coal-fired plant at current fossil fuel prices in Australia. This gap may close in the decades ahead, but nuclear power, and renewable energy sources, are only likely to become competitive in Australia in a system where the costs of greenhouse gas emissions are explicitly recognised. Even then, private investment in the first-built nuclear reactors may require some form of government support or directive.'
>
> 'The earliest that nuclear electricity could be delivered to the grid would be 10 years, with 15 years more probable. At the outset, the establishment of a single national nuclear regulator supported by an organisation with skilled

20. See UMPNER report, http://www.pmc.gov.au/umpner/reports.cfm.

> staff would be required. In one scenario, deployment of nuclear power starting in 2020 could see 25 reactors producing about a third of the nation's electricity by 2050 (a position already surpassed by France, South Korea, Sweden, Belgium, Bulgaria and Hungary, among others). '

On 28 April 2007 the Prime Minister announced a new strategy for the future development of uranium mining and nuclear power in Australia. The strategy will involve a number of actions that can be taken immediately, including removing unnecessary constraints impeding the expansion of uranium mining in Australia and making a firm commitment to Australia's participation in the Generation IV advanced nuclear reactor research program. The Government will also develop a number of major work plans mapping out a way forward for an appropriate nuclear energy regulatory regime, skills and technical training to support a possible expanded nuclear energy industry, enhanced research and development and communication strategies.

To carry forward the new strategy, the Department of Industry Tourism and Resources chaired an Inter-Departmental Committee meeting in May 2007, which established four working groups to develop the work plans mentioned above. At the end of the reporting period the working groups were preparing plans for Ministerial consideration.

ASNO'S OUTREACH PROGRAM IN THE ASIA-PACIFIC REGION

Outreach to promote understanding of non-proliferation and safeguards in Australia's region has increasingly become one of ASNO's core functions. About 20% of ASNO's operational expenditure is currently related to such outreach. This is a substantial change from earlier times, when outreach was seen as an important, but infrequent, element of ASNO's efforts. In the 1980s and 1990s there was an average of one training activity each year. Since 2001 the frequency has grown to more than six activities each year.

The move from occasional to near continuous outreach activity has been a gradual process. In large part it has been dependent upon:

- identification of an ongoing regional need
- recognition of the value of outreach in achieving ASNO's overall goals
- availability of funding
- availability of interested partners both within the region and internationally.

The beginnings of the outreach program were modest and domestically based. In the early 1980s ASNO's predecessor organisation the Australian Safeguards Office (ASO) entered into a cooperative arrangement with the Australian School of Nuclear Technology (ASNT) to develop and deliver a domestic safeguards training course for Australian Government officials. In the mid-1980s ASO, Japan and the IAEA entered into an arrangement to alternate in the delivery of safeguards training to counterpart organisations across the Asia-Pacific region. Japan's first such course was held in 1985, and Australia held its first course in 1986. Five further such courses have followed, all held in conjunction with the IAEA and with the active support of counterpart safeguards organisations in many other countries.

Mr Russell Leslie conducting outreach at CIT, Singapore

An active training program has helped ASNO develop a strong network of links with counterpart organisations across the region. In every country in our region with significant nuclear activities, or an interest in ensuring the effective operation of the safeguards system, there are people who have received at least some of their safeguards training in Australia. The provision of training to others is also a key part of ASNO's efforts to foster the professional development of its own staff. Solid training in fundamentals underpins the effectiveness of ASNO as an organisation.

While ASNO has been involved in safeguards training since the early 1980s, there has been a marked increase in the tempo of this effort in the period since 2001. At that time ASNO's Director General launched a program to provide countries in our region with assistance in ratifying and complying with the IAEA's Additional Protocol (AP).

The first major activity under this expanded program involved visits early in 2002 to Indonesia, Malaysia, Thailand and the Philippines. At that time, Indonesia had already signed and ratified an AP and was in the process of preparing for the introduction of integrated safeguards. The Philippines had signed an AP (in 1997) and received assistance with the detailed reporting requirements that would be part of the initial protocol declaration process. Thailand and Malaysia were in the process of considering whether they should sign APs and needed a more detailed understanding both of AP requirements and their importance. This regional outreach program of visits is ongoing and ASNO expects to be able to deliver further targeted training in Thailand, Vietnam and the Philippines before the end of 2007.

Members of the Multilateral Verification of Nuclear Non-Proliferation Agreements outreach program held July 2006

ASNO also sought out knowledgeable international partners to work with on the delivery of training, support and assistance. ASNO works closely with the IAEA, the US National Laboratories (including Sandia, Los Alamos, Pacific Northwest and Oak Ridge), the US National Nuclear Security Administration and Japanese Ministries of Foreign Affairs (MFA), Economy, Trade and Industry (METI) and Education, Culture, Sports, Science and Technology (MEXT) to deliver training both in Australia and in countries in our region.

Since 2002 ASNO and METI have worked with the International Non-proliferation Export Control Program (INECP) of the NNSA to deliver Commodity Identification Training (CIT) and Analysis of Strategic Commodity Transfers (ASCOT) to countries in the Asia-Pacific region. While CIT and ASCOT are primarily aimed at frontline export control efforts, both are extremely important tools for capacity development for safeguards and non-proliferation officials.

In 2004 ASNO entered into a partnership arrangement with the IAEA Nuclear Security Fund (NSF) and Sandia National Laboratories to deliver the first ever regional training course on nuclear security and the physical protection of nuclear materials. In 2006 a second Australian course was held in this series, and ASNO is currently planning to hold a third

Australian course in late 2008 or early 2009. Building on this initial Australian example the NSF now has a program for delivering this training in regional centres around the world.

In the late 1990s the IAEA received a significant, ongoing source of extra-budgetary funding from the Japanese Government to promote AP compliance. This funding was used effectively by the IAEA enabling regional governments to host seminars and workshops and take part in training activities. ASNO has become closely involved in this program and has hosted three seminars in Australia on the implementation of the AP and obligations arising from safeguards agreements, and has taken part in similar seminars around the world.

ASNO has facilitated ratification of the Small Quantities Protocol (SQP) among Pacific Island States through outreach to governments and through seminars, including advocacy for the 2005 revision of the model SQP.

AUSTRALIA'S URANIUM EXPORTS

Nuclear power currently provides around one sixth (or 16%) of the world's electricity, making a substantial contribution to reducing greenhouse gas emissions and providing an alternative to fossil fuels for large-scale electricity generation. At 30 June 2007, there were 438 nuclear power reactors in operation in 30 countries (plus Taiwan, China), with a total electrical generating capacity of about 371 GWe (see Appendix A). During 2006-07, power reactors produced an electrical output of around 2,700 terawatt-hours (TWh).[21]

Australia holds 36% of the world's reasonably assured uranium resources recoverable at less than US$40/kg, or 27% of such resources recoverable at less than US$80/kg.[22] In 2006, Australia's Ranger and Olympic Dam mines were respectively the world's second largest (10.2% of world uranium production) and fourth largest (7.3% of world uranium production) uranium producers.[23] Worldwide, uranium mining currently provides only about 60% of global industry requirements, with the balance coming from down-blending of excess weapons material, stockpiles and reprocessing. As material from down-blending and stockpiles is starting to run out, uranium prices have begun to increase significantly. It is clear that new mines will be necessary to meet current, let alone increased, demand.

During 2006-07 Australia exported 9,518 tonnes of uranium ore concentrates (UOC) – U_3O_8 or U_3O_8 equivalent – corresponding to 8,071 tonnes contained uranium. These exports were valued at A$658 million (up from A$545 million in 2005-06 and A$475 million in 2004-05). This quantity of uranium is sufficient for the annual fuel requirements of approximately 45 reactors (each of 1,000 MWe), producing around 320 TWh[24] of electricity in total – approximately 20% more than Australia's total electricity production.[25]

Overall Australia continues to be the world's second largest uranium producer after Canada, meeting about 12% of the world's annual uranium requirements. Effectively, Australian uranium supplied about 2% of total world electricity production. Countries using the

21. Data taken from publications of Nucleonics Week.
22. From Uranium 2005: Resources, Production and Demand, a joint report by the OECD NEA and the IAEA.
23. Australia's Identified Mineral Resources 2007 (draft). Geoscience Australia. Draft to be released in September 2007.
24. Based on a comparison of TWh of electricity generated from nuclear power, and uranium required, for each country eligible to use AONM. Source: Nucleonics Week publications of electricity generation figures; and, World Nuclear Association's table of World Nuclear Power Reactors 2006-07 and Uranium Requirements (http://www.world-nuclear.org/info/reactors.htm).
25. Australia's gross electricity generation in 2006-07 is estimated to be 262 TWh (not accounting for transmission losses which amount to about 20%). Source: Australian Energy, National and State Projections to 2029-30, ABARE Research Report 06.26, December 2006.

Australian uranium exported in 2006-07 will avoid carbon dioxide emissions roughly three quarters that of Australia's entire annual carbon dioxide emissions from all sources.[26]

While Australia appreciates the importance of its substantial uranium holding as a source of energy for other countries, Australia's nuclear export policy has always been based on strong support for the nuclear non-proliferation regime. This is a long-established position whereby Australia exports uranium only under stringent safeguards conditions.

A fundamental tenet of the Australian Government's uranium policy is that Australia exports uranium only to countries within its network of bilateral safeguards agreements. These agreements place obligations on the bilateral partner relating to nuclear material which is subject to the provisions of the particular bilateral agreement, known as Australian Obligated Nuclear Material (AONM). Moreover, these obligations apply to uranium as it moves through the different stages of the nuclear fuel cycle as well as to material generated through the use of that uranium.

Australia carefully selects the countries with which it will conclude a bilateral safeguards agreement. All Australia's bilateral agreements provide 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 activities in that country[27], and it must have an Additional Protocol with the IAEA in force (for a summary of the status of Additional Protocols, see Appendix C).

Australia currently has 22 nuclear safeguards agreements in force, covering 39 countries plus Taiwan, China (see Appendix B).[28] These bilateral safeguards agreements serve as a mechanism for applying IAEA safeguards and various supplementary conditions. These requirements ensure that AONM is appropriately accounted for as it moves through the nuclear fuel cycle, is used only for peaceful purposes in accordance with the applicable agreements, and in no way enhances or contributes to any military process. In the context of Australia's bilateral safeguards agreements, military purpose means: nuclear weapons; any nuclear explosive device; military nuclear reactors; military propulsion; depleted uranium munitions and, tritium production for nuclear weapons. The principal conditions for the use of AONM set out in Australia's bilateral safeguards agreements are:

- AONM will be used only for peaceful purposes and will not be diverted to military or explosive purposes, and that 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[29]
- fallback safeguards or contingency arrangements will apply where 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

---

26. Comparison made under a scenario whereby the equivalent electricity generated using Australian uranium is instead generated by sub-critical black coal. Comparative CO2 emissions per TWh under a full-energy chain analysis of coal and nuclear power generation taken from the Review of Uranium Mining Processing and Nuclear Energy in Australia (UMPNER Report)..
27 Subsequent to the period covered by this report, on 16 August 2007, the Prime Minister announced that the Government had decided to allow the export of uranium to India, subject to a number of strict conditions first being met.
28. Twenty-seven of the countries making up this total are European Union member states.
29. Consent has been given to reprocessing on a programmatic basis to Euratom, France and Sweden (covered by the Euratom consent), Japan and Switzerland.

- 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.

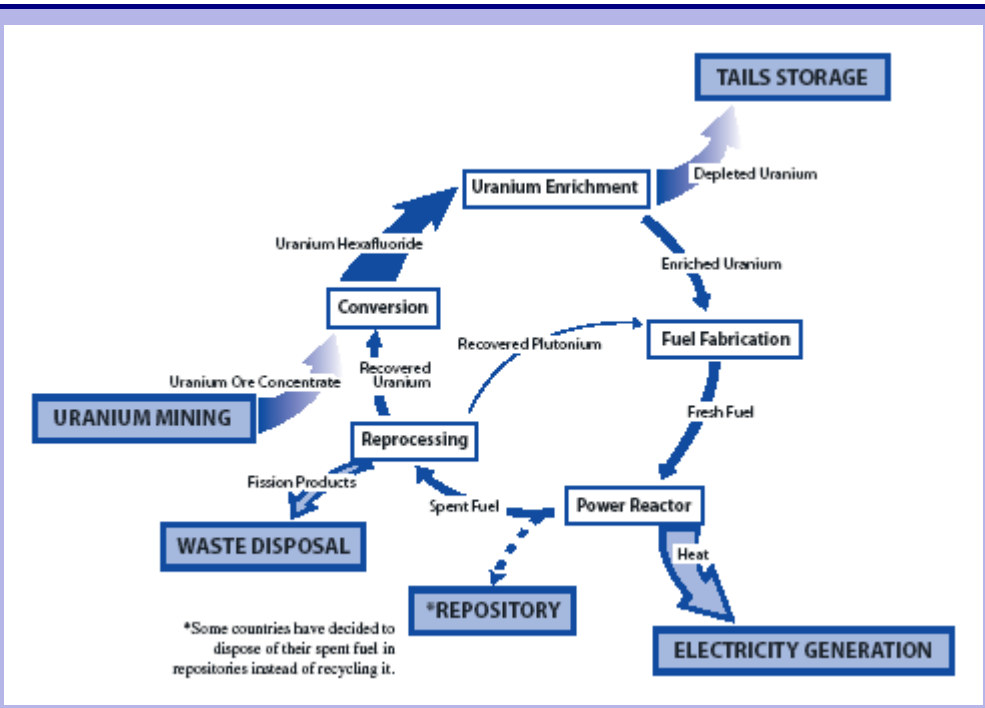
Australia's bilateral partners holding AONM are required to maintain detailed records of transactions involving AONM. In addition, counterpart organisations in Australia's bilateral partner countries are required to submit regular reports, consent requests, transfer and receipt documentation to ASNO.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

The two agreements with China were ratified and entered into force on 3 February 2007. These were the Nuclear Transfer Agreement, which allows for supply of Australian uranium to China's civil nuclear power program, and the Nuclear Cooperation Agreement for collaboration in a broad range of peaceful applications of nuclear equipment and technology. In early 2007, Australia began negotiations with the Russian Federation on a new nuclear cooperation agreement. This agreement will expand upon the existing (1990) Australia-Russia nuclear cooperation agreement by allowing for use of Australian uranium in Russia's civil nuclear power plants and cooperation in a broad range of peaceful nuclear activities.

Negotiations with Russia on a new bilateral safeguards agreement

Figure 5: 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.

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 weapons of mass destruction (WMD) – nuclear, chemical and biological 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. In particular, ASNO works to strengthen the operation of relevant treaty regimes, and technical methods for their verification. ASNO also 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 for physical protection to nuclear materials and facilities.

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 (EIF) in 1970, the NPT has become almost universal, with 190 Parties. Only three states – Israel, India and Pakistan – remain outside the NPT. A fourth – the DPRK – announced its withdrawal from the NPT in 2003, but the validity of this withdrawal has not been determined.

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

The Nuclear Non-Proliferation (Safeguards) Act 1987

The *Nuclear Non-Proliferation (Safeguards) Act 1987* (Safeguards Act), which took effect on 31 March 1987, forms the legislative basis for ASNO's nuclear safeguards activities. The Safeguards Act gives effect to Australia's obligations under:

- the NPT
- Australia's safeguards agreement and Additional Protocol with the IAEA
- agreements between Australia and various countries (and Euratom) concerning transfers of nuclear items and cooperation in peaceful uses of nuclear energy
- the Convention on the Physical Protection of Nuclear Material (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.

Nuclear Regulation in Australia

The Australian Government has two nuclear regulatory agencies: ASNO and the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA).

ASNO is responsible for nuclear safeguards and physical protection. ASNO ensures that **nuclear materials** - uranium, thorium and plutonium - and **nuclear items** - facilities, equipment, technology and nuclear-related materials - are used only for authorised purposes, are properly accounted for, and are protected against unauthorised use. An important part of this responsibility is ensuring that Australia's treaty commitments are met, particularly that nuclear activities are conducted for exclusively peaceful purposes. ASNO's responsibilities do not cover general radioactive materials as such.

ASNO's legislation applies to all persons or organisations in Australian jurisdiction having relevant materials, items or technology. This principally affects the Australian Nuclear Science and Technology Organisation, as Australia's only nuclear facility operator, but it also covers a diverse range of other entities including the uranium mines and associated transport and storage operations, private sector laboratories, educational institutions, and patent attorneys. ASNO's activities are based on a number of constitutional heads of power, especially external affairs (meeting treaty requirements).

ARPANSA is charged with responsibility for protecting the **health and safety** of people, and the environment, from the harmful effects of **radiation** (ionizing and non-ionizing). ARPANSA's responsibilities include:

- promoting uniformity of radiation protection and nuclear safety policy and practices across jurisdictions of the Commonwealth, the States and the Territories
- providing advice to Government and the community on radiation protection
- providing advice to Government and the community on nuclear safety - reactors and visits by nuclear powered warships
- undertaking research and providing services in relation to radiation protection, nuclear safety and medical exposures to radiation
- regulating radiation protection and nuclear safety aspects of all Commonwealth entities involved in radiation or nuclear activities or dealings
- approval of imports of radioactive material.

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.

Chemical Weapons Convention Functions

The Chemical Weapons Convention (CWC) prohibits the development, production, acquisition, stockpiling, retention or transfer 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 Weapons (Prohibition) Act 1994

The *Chemical Weapons (Prohibition) Act 1994* (the Act) was enacted on 25 February 1994. Division 1 of Part 7 of the Act (establishing the CWCO 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 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 Act, dealing with routine compliance inspections of Other Chemical Production Facilities, came into effect on 17 August 2000.

The Act gives effect to Australia's obligations, responsibilities and rights as a State Party to the CWC. In particular, the 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 Convention, 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 Act
- provides for procedures should another State Party seek clarification concerning compliance with the Convention at any facility or other place or by any person in Australia.

Regulations under the Act prescribe procedures and details of other arrangements provided for in the Act. In particular, the Regulations define conditions that are to be met by holders of permits issued under the 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 Act. The manner in which any powers are exercised under the Act must be consistent with, and have regard to, Australia's obligations under the Convention.

The Act was amended on 6 April 1998. The amendments refine administration of the Act by simplifying compliance obligations for facilities requiring permits, clarifying the legislative basis for Australia to implement some of its obligations under the Convention, 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 Act.

Minor amendments were made to the 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 Act are disallowable instruments. Approved forms or procedures under the Act specify matters that are essentially administrative in character, and do not fit the definition in section 5 of the Legislative Instruments Act 2003.

Comprehensive Nuclear-Test-Ban Treaty Functions

Article IV of the 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 comprising 337 monitoring 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 International Monitoring System (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 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 the provision. The Act also prohibits Australian nationals from causing a nuclear explosion in any other place.

The 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 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 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 for is by consent of the occupier of any premises, or by warrant issued by a magistrate.

The 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 7, Part 2, Division 1 of Part 4, Division 1 of Part 5, sections 68 to 72, sections 74, 75 and 78, and Schedule 1 to the Act came into effect following proclamation by the Governor-General. The proclaimed provisions were to:

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

Other Functions

South Pacific Nuclear Free Zone Treaty

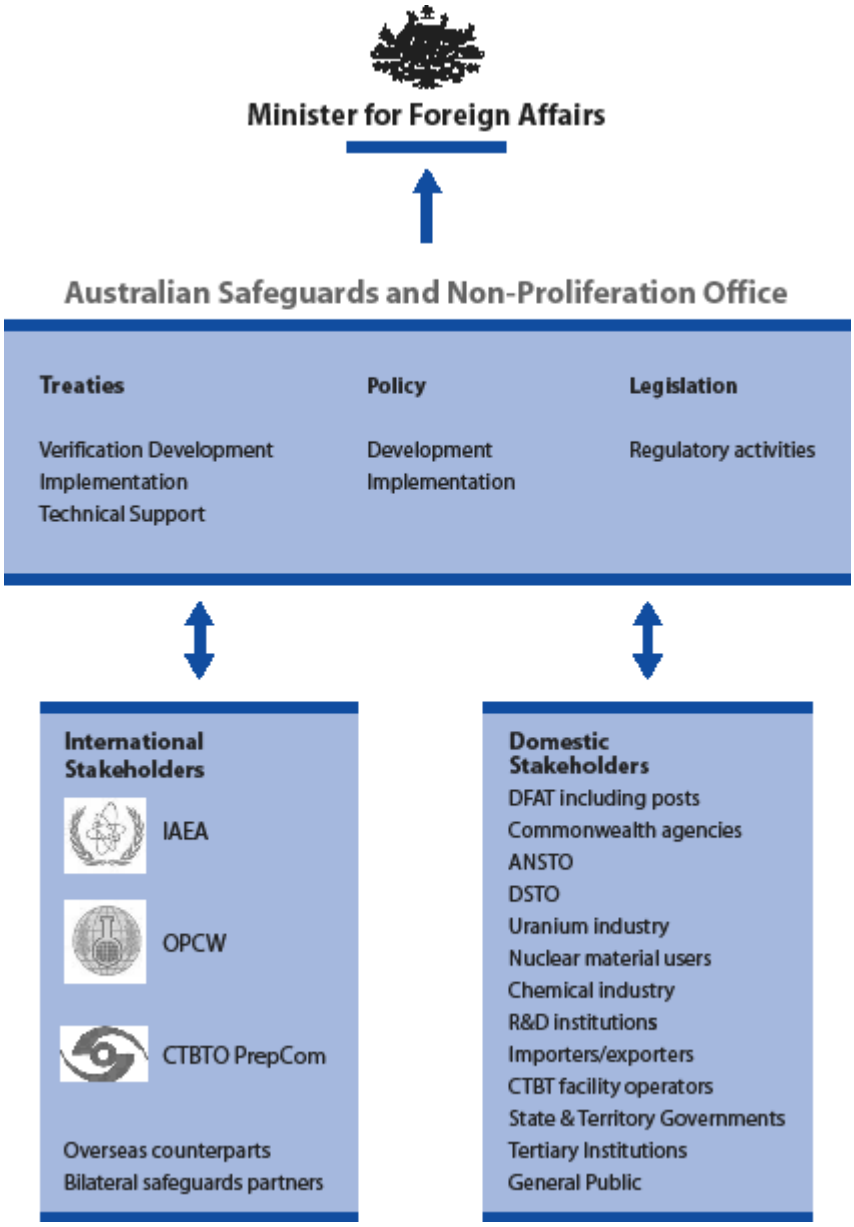
The South Pacific Nuclear Free Zone (SPNFZ) Treaty prohibits the manufacture, possession, stationing and testing of nuclear explosive devices, as well as research and development relating to manufacture or production of nuclear explosive devices, in any area for which the Signatory Parties are responsible. The SPNFZ Treaty also bans the dumping of radioactive waste at sea. Australia ratified the Treaty on 11 December 1986.

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.

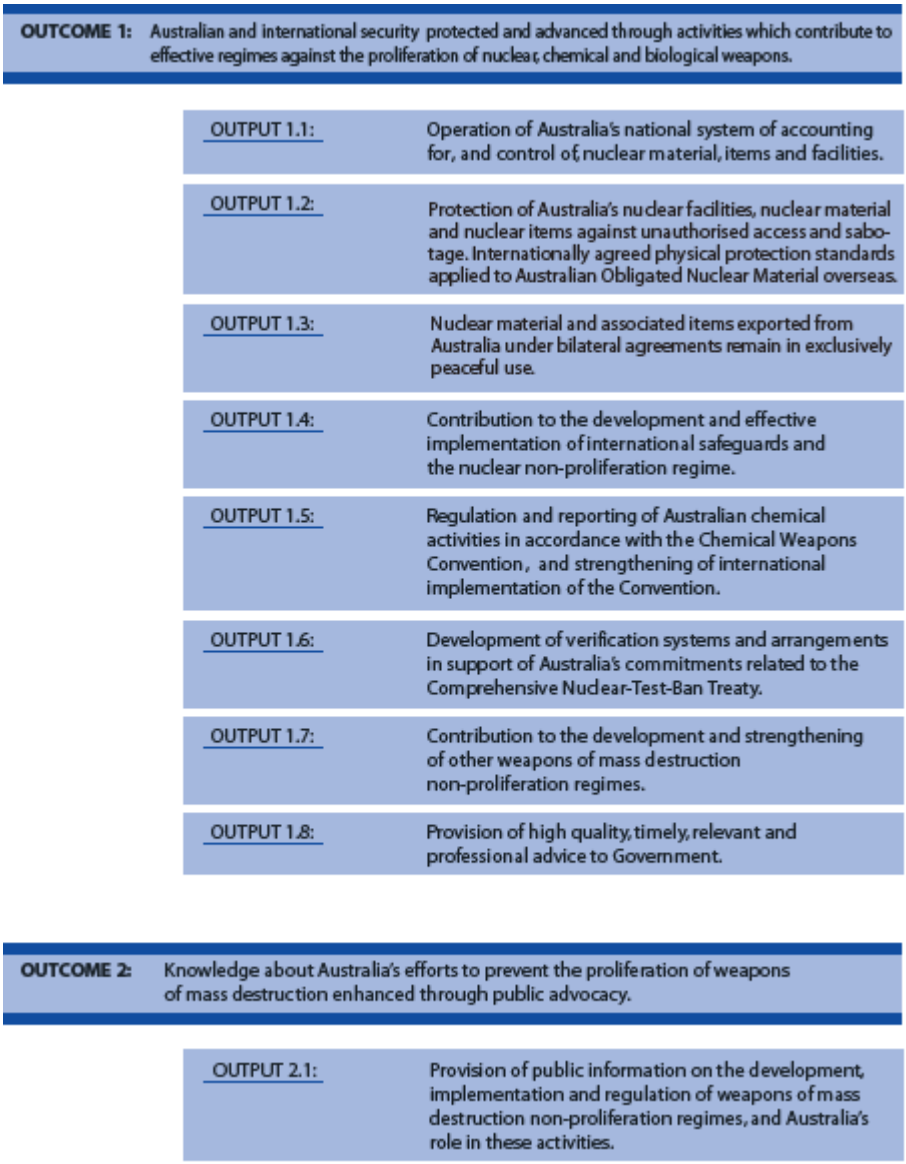
Operating Environment

Figure 6: ASNO's Operating Environment



Outcomes and Outputs Structure

Figure 7: ASNO's Outcomes and Outputs Structure



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 International Atomic Energy Agency (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 as they relate to the submission of declarations and notifications on nuclear materials and facilities in Australia under Australia's safeguards agreement with the IAEA.

ASNO reported Australia's nuclear material inventory to the IAEA on a monthly basis. 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. Due to the strengthening of the IAEA safeguards system, and ASNO's policy to be as transparent as possible, the information provided to the IAEA has increased significantly since 2002, especially at 'other locations' which mainly comprises universities and industrial radiographers.

Table 1: ASNO Reports to the IAEA, 2001-2007, by facility

Facility	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
ANSTO research laboratories	466	485	539	498	451	454
HIFAR (defuelled)	38	70	103	103	36	66
ANSTO vault storage	17	1	23	22	18	18
MOATA Reactor (defuelled)	0	13	0	11	83	9
OPAL reactor	0	0	0	0	28	67
SSL laboratories	0	92	59	34	35	39
Other locations	4	2 028	2 483	2 198	2258	3252
TOTAL	**525**	**2 689**	**3 207**	**2 866**	**2909**	**3905**

Table 2: ASNO Reports to the IAEA, 2001-2007, by data type

Type of Data	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
Inventory Change Report	191	754	813	496	407	839
Physical Inventory Listing	253	785	951	1 135	1200	1232
Material Balance Report	81	127	118	139	160	152
Concise Note	0	1 023	1 325	1 096	1142	1682
TOTAL	**525**	**2 689**	**3 207**	**2 866**	**2909**	**3905**

Table 3 shows a summary of totals of nuclear material by category in Australia. Notable changes from the previous year totals include a decrease in enriched uranium after the export of spent fuel from ANSTO in December 2006, and an increase in depleted uranium from imported radiography cameras and material for manufacture of transfer flasks.

Table 3: Nuclear Material in Australia at 30 June 2007

Category	Quantity	Intended End-use
Source Material		
Uranium Ore Concentrates (UOC)	719 tonnes	Exports for energy use pursuant to bilateral agreements
	3 tonnes	Storage
Natural Uranium (other than UOC)	10 845 kg	Research and shielding
Depleted Uranium	20 332 kg	Research and shielding
Thorium Ore Residues	59 tonnes	Storage/disposal
Thorium (other than Thorium Ore Residues)	1 968 kg	Research, industry
Special Fissionable Material		
^{235}U	75 874 grams	Research, radioisotope production
^{233}U	4 grams	Research
Plutonium (other than ^{238}Pu)	2 017 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 R&D in Australia and ensured that any developing technology remained in exclusively peaceful use and did not contribute to any proliferation activity.

During 2006-07 Silex Systems Limited (SSL) exported to the USA all the associated equipment used for its research into separating uranium isotopes using laser techniques (see also Output 1.3). The export was reported to the IAEA under Article 2.a.(ix) of the additional protocol.

Legislation and Regulation

In April 2007 the *Nuclear Non-Proliferation (Safeguards) Act 1987* was amended to provide for a permit to be required to *decommission* a nuclear facility. Here a general definition of decommissioning applies, including any work to be carried out to decommission the whole or a part of a facility. The permit provides a framework under which activity to decommission a facility may be regulated under the Australian safeguards system and with respect to physical security of nuclear material and associated items. This ensures that Australia is able to meet its international safeguards obligations with respect to any facility that is undergoing decommissioning. After the shut-down of the HIFAR reactor in January 2007, ANSTO will be required to seek a permit for the decommissioning of HIFAR. This comes

well ahead of any formal decommissioning regulated under the *Australian Radiation Protection and Nuclear Safety Act 1998* or *Environment Protection and Biodiversity Conservation Act 1999*.

Table 4: Associated Items in Australia at 30 June 2007

Category	Quantity	Intended End-use
Associated Material		
Deuterium and heavy water	27.4 tonnes	Research, reactors
Nuclear grade graphite	113.85 tonnes	HIFAR, Moata and storage
Associated Equipment		
HIFAR	1	Reactor[30]
HIFAR coarse control arms	15	Reactor components
HIFAR safety rods	4	Reactor components
Fuel charging and discharging machines	2	Reactor components
OPAL reactor[31]	1	Reactor
OPAL control rod drives	7	Reactor components
Moata	1	Reactor[32]
SSL equipment	-	Enrichment R&D

ASNO arranged amendment of the Nuclear Non-Proliferation (Safeguards) Regulations 1987 to adjust the rate at which the Uranium Producers Charge is levied (see Uranium Producers Charge under Financial Management), and to schedule the Australia-China Nuclear Material Transfer Agreement and Nuclear Cooperation Agreement as Prescribed International Agreements under the Safeguards Act.

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

Table 5: Status of Safeguards Permits and Authorities at 30 June 2007

Permit or Authority	Current Total	Granted	Varied	Revoked	Expired
Possess nuclear material	88	9	23	5	1
Possess associated items	15	0	12	0	4
Transport nuclear material	16	4	21	0	6
Transport associated items	0	0	0	0	0
Establish a facility	0	0	0	0	0
Decommission a facility	0	0	0	0	0
Communicate information contained in associated technology	11	0	10	0	3
TOTAL	**130**	**13**	**66**	**5**	**14**

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

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

32. The ANSTO Board decided to cease operation of Moata In February 1995. The reactor was de-fuelled in May 1995. It is now awaiting decommissioning.

Notice of all permit changes were published in the Commonwealth Gazette as required by the Safeguards Act (section 20(1)). Several industrial radiographers were granted permits to possess nuclear material (depleted uranium shielding) while several permits were revoked as the permitees no longer possessed nuclear material.

ASNO Inspections and safeguards

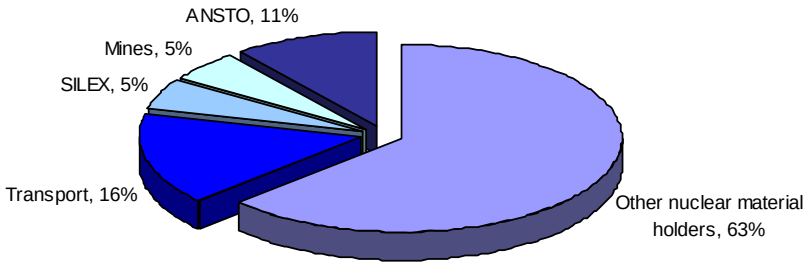
During the reporting period, ASNO carried out 38 domestic inspections to ensure that requirements of permits and authorities were being met. ASNO nearly tripled the number of inspections of other nuclear material holders while the bulk of inspection effort remained with ANSTO, with an emphasis on security arrangements.

In April 2007, BHP Billiton reported the discovery of several kilograms of uranium samples outside its approved location to hold nuclear material (Olympic Dam). While BHP Billiton undertook an immediate voluntary investigation, Director General ASNO issued a direction under subsection 73(1)(b) of the *Nuclear Non-Proliferation (Safeguards) Act 1987* for BHP Billiton to conduct an audit of all its uranium sample holdings and review its sample handling procedures. This was done in a timely manner to the satisfaction of ASNO. The South Australian Environment Protection Authority (EPA) determined that there is insufficient evidence to substantiate any breaches of the *Radiation Protection and Control Act 1982* and that no further action will be taken. On consideration of BHP Billiton's report to ASNO and South Australia EPA's findings, ASNO concluded that no further action should be taken under the Safeguards Act.

Following the incident at Olympic Dam, ASNO also confirmed the adequacy of applied procedures for the control of samples at other uranium mines in Australia. It must be noted that this material is considered before the 'starting point' of IAEA safeguards and hence not subject to nuclear material accountancy with the IAEA. Nevertheless ASNO reported the incident to the IAEA which appreciated being appraised of the matter.

Other than the incident described above ASNO found no indication of unauthorised access to, or use of, nuclear materials or nuclear items in Australia.

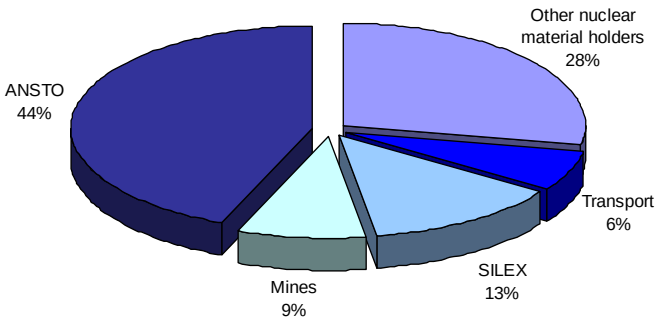
Figure 8: Nuclear Inspections by ASNO, 2006-07, by type of permit holder



Designation of Safeguards Inspectors

Sub-section 57(1) of the Act provides that the Minister may, in writing, appoint a person as an inspector for the purposes of the Act. Director General ASNO under the Minister's delegation appointed four ASNO staff as safeguards inspectors in May 2007.

Figure 9: Nuclear Inspections by ASNO, 2006-07, by effort for each type of permit holder



IAEA Inspections

ASNO met all of Australia's obligations with respect to IAEA inspections. During the reporting period, the IAEA conducted four design information verification inspections, four routine nuclear material inventory verification inspections and a short notice inspection. The IAEA also undertook three complementary accesses in accordance with the Additional Protocol.

Table 6: IAEA Safeguards Inspections and Complementary Accesses, 2006-07

Date	Facility	Type
24–25 Oct 2006	HIFAR	Short Notice Inventory Verification Inspection
	SSL Laboratories	Complementary Access
27 Oct 2006	AS-E (Flinders)	Complementary Access
7 Nov 2006	AS-E (Olympic Dam)	Complementary Access
9-15 Nov 2006	HIFAR	Special spent fuel verification
12-16 Mar 2007	HIFAR ANSTO's R&D Laboratories SSL Laboratories OPAL reactor	Routine Inventory Verification Inspection Design Information Verification Inspection

The IAEA reported the outcomes of its safeguards inspections and complementary accesses in Australia, including comments on any MUF, 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, small inventory differences were reported to the IAEA (see Table 7). These are the difference between the book and physical inventories at the end of a reporting period in a Material Balance Area (MBA). The IAEA definition for this term is 'MUF'. During 2006-07, one inventory difference of note was recorded at ANSTO research laboratories, where the physical inventory of enriched uranium was greater than the book inventory by 18.64 grams. The inventory difference derives from a major cleanup of all the low enriched material used for the production of molybdenum-99 after the shut-down of HIFAR and is consistent with the measurement uncertainties and processing losses associated with over 500 kg of throughput over the last 20 years. The other inventory difference of note was the discovery of a small (50 gram) teaching sample of natural uranium, misplaced in 2003. It is reported here as a negative inventory difference (i.e. a gain of material), reversing part of the inventory difference reported in the 2003-04 Annual Report.

Table 7: Inventory Differences Recorded During 2006-07

Material Balance Area	Difference between Book and Physical Inventory	Comment
HIFAR (defuelled) MOATA Reactor (defuelled) ANSTO vault storage OPAL reactor SSL laboratories	none	Book inventory equalled Physical Inventory
ANSTO research laboratories	-18.64 g Enriched Uranium	Derived from cleanup of material used for production of Molybdenum-99
	0.01 Kg Thorium	Difference due to rounding after rebatching 46 items
Other locations	0.01 Kg Depleted Uranium	Difference due to rounding
	-0.05 Kg Natural Uranium	Discovery of item misplaced in 2003
	0.01 Kg Thorium	One batch was double counted in the previous reporting period

In November 2006 the IAEA, Los Alamos National Laboratories (LANL), ANSTO, and ASNO (Mr Craig Everton) conducted a joint verification exercise on HIFAR spent fuel using LANL's newly developed Advanced Experimental Fuel Counter (AEFC).[33] The AEFC was designed by Dr Howard Menlove and Dr Martin Swinhoe of LANL to make the difficult in situ measurement of spent fuel characteristics, such as enrichment levels, and uranium burn-up profiles. The verification exercise served the purposes of: field-testing the AEFC for the first time; providing a means for the IAEA to confirm Australia's declaration that high enriched (rather than low enriched) HIFAR spent fuel would be exported in the upcoming spent fuel shipment; and setting a precedent for the use of this AEFC which may assist in deploying this device for similar verification exercises in other countries. The experiment was successful in meeting the IAEA's goals and in providing LANL with valuable field experience and data that will be used to further develop the device for future deployment by the IAEA. The success of the exercise benefited considerably from the preparation, assistance, and access provided by ANSTO in the middle of a busy spent fuel loading program.

The IAEA reported the outcomes of its safeguards inspections and complementary accesses in Australia, including comments on any MUF, 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.

Mr Craig Everton (ASNO), Dr Howard Menlove, Mr Alain Lebrun, and Mr Roger Lafolie monitoring spent fuel verification equipment.

33. Field application of a portable detector for the Verification of Research Reactor Spent Fuel, H.O. Menlove and M.T. Swinhoe, LANL, USA, A.Lebrun and R. Lafolie, IAEA, R. Godfrey and D. Roach, ASNTO, C. Everton, ASNO, presented at 29th ESARDA Annual Meeting, France, 22-24 May 2007.

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 properly protected.
- Internationally agreed standards for the physical protection of nuclear material are applied to all Australian Obligated Nuclear Material (AONM).
- Proactive and professional contribution made to the development and effective international implementation of the CPPNM.

Performance Assessment

International and bilateral Obligations

ASNO's inspections confirmed that current physical protection arrangements were being implemented satisfactorily in 2006-07 in accordance with Australia's obligations under the CPPNM, IAEA guidelines, relevant bilateral safeguards agreements and the *Nuclear Non-Proliferation (Safeguards) Act 1987*. ASNO also met Australia's international shipment notification obligations under the CPPNM.

The export of Silex equipment and technology to the USA (see Output 1.3) was done according to security arrangements stipulated under Administrative Security Arrangements pursuant to the Australia/US cooperation agreement on Silex technology. The equipment was transferred successfully by secure means to the authorised recipient in the USA (General Electric Company).

Exports of Australian Obligated Nuclear Material

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

Protecting Australia's Uranium

ASNO continued to require exporters to adopt and report on specific procedures to ensure appropriate levels of physical protection for UOC shipments from Australia to the port of unloading overseas. These procedures included checking on the physical condition of the containers and verifying the container and seal numbers at each port of unloading or transhipment to detect any breaches of physical protection. At the time of export ASNO contacts its counterparts in countries through which the material will transit, alerting them to the need to protect appropriately AONM within their jurisdiction.

ASNO continues to work with uranium mines on updating security requirements and implemented arrangements following an external review of the security of uranium production, storage and transport. In particular, ASNO worked with Energy Resources Australia to improve its site security after noting security structure in need of maintenance.

An ANSTO/ARPANSA/ASIO-T4 team tested the OPAL security system in late March 2007 following recommendations arising from the licensing of the reactor in July 2006. The test

confirmed that the security system had matured since it was last tested and that it is robust against the Design Basis Threat. However, the inspection team noted room for further improvement in command, control and communications within the security system. In response to the findings, ANSTO implemented immediate compensatory measures in lieu of permanent upgrades.

Strengthening the CPPNM

As reported last year, the Diplomatic Conference on the Convention on the Physical Protection of Nuclear Material (CPPNM) successfully adopted an amendment to the Convention. In April 2007 amendments to the Nuclear Non-Proliferation (Safeguards) Act 1987 to implement the new requirements arising from the CPPNM amendments agreed in July 2005, achieved royal assent. While the Safeguards Act already provided for many of the amendments to the Convention, additions to the Act were required to include, inter alia:

- the Fundamental Principles of Physical Protection (see Appendix E of this Report)
- provision for increased cooperation with States Parties in case of actual or threatened theft of nuclear material or sabotage of nuclear material or a nuclear facility
- new offence provisions, including for the trafficking of nuclear material; the sabotage of nuclear facilities with intent to cause death, injury or damage by exposure to radiation or radioactive substances
- provision for extradition and mutual legal assistance in relation to the offences set forth in Article 7 of the CPPNM.

Australia will be ready to ratify the CPPNM once further administrative processes have been finalised. The CPPNM will come into force when two-thirds of State Parties have ratified.

Following the amendment of the CPPNM, it is recognised that the IAEA guideline document INFCIRC/225/Rev.4 should subsequently be revised. It is expected that states will work with the IAEA to conclude a new revision over the next 1-2 years. The revision is likely to take account of the structure provided by the Fundamental Principles and Objectives of Physical Protection (as described in the amended CPPNM), the current threat environment and the Nuclear Security Series of documents being developed by the IAEA.

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.
- Implementation 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 concludes that all AONM is satisfactorily accounted for. The IAEA validated through its transit matching system that, at 5 June 2007, there were no outstanding unconfirmed nuclear material shipments to or from Australia. Based on the IAEA's Safeguards Statement for 2007, 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 2006-07. A copy of the IAEA's Safeguards Statement for 2006 is located in Appendix F.

Table 8: Summary of AONM by category, quantity and location at 31 December 2006[34]

Category	Location	Tonnes[35]
Depleted Uranium	European Union, Japan, Republic of Korea, United States	80,580
Natural Uranium	Canada, European Union, Japan, Republic of Korea, United States	18,702
Uranium in Enrichment Plants	European Union, Japan, United States	20,365
Low Enriched Uranium[36]	Canada, European Union, Japan, Mexico, Republic of Korea, Switzerland, United States	11,005
Irradiated Plutonium[37]	Canada, European Union, Japan, Mexico, Republic of Korea, Switzerland, United States	103
Separated Plutonium[38]	European Union, Japan	0.7
TOTAL		**130,756**

During the reporting period, Australia exported 9,518 tonnes[39] of uranium ore concentrates (UOC) – U3O8 or U3O8 equivalent – in 46 shipments from the Ranger mine, Northern

34. Figures are based on yearly reports to ASNO in accordance with Australia's bilateral agreements and other information held by ASNO. There may be minor discrepancies in the figures due to rounding.
35. All quantities are given as tonnes weight of the element uranium, plutonium or thorium. The isotope weight of 235U is 0.711% of the element weight for natural uranium and from 1 to 5% for low enriched uranium.
36. An estimated 80-90% of Australian obligated low enriched uranium is in the form of spent reactor fuel.
37. Almost all Australian-obligated plutonium is irradiated, i.e. contained in irradiated power reactor fuel or plutonium reloaded in a power reactor following reprocessing.
38. Separated plutonium is plutonium recovered from reprocessing. The figure for separated plutonium is not accumulative, but fluctuates as plutonium is fabricated with uranium as mixed oxide (MOX) fuel and returned to reactors for further power generation. On return to reactors the plutonium returns to the 'irradiated plutonium' category. During 2006, 0.27 tonne of plutonium was fabricated into MOX fuel and transferred to reactors.
39. It should be noted that this figure is for the financial year 2006-07, so is different to the quantity received by end-users (see Table 9) which is for the calendar year 2006.

Territory, and the Olympic Dam and Beverley mines in South Australia. This corresponds to 8,071 tonnes of contained uranium.

Table 9: Supply of Australian uranium delivered to end-user accounts at converters during 2006

Country	Tonnes UOC (U_3O_8)	% of Total
USA	4,360.35	41.15
Japan	2,917.98	27.54
France	907.70	8.57
ROK	699.16	6.60
UK	728.93	6.88
Sweden	250.59	2.36
Belgium	238.82	2.25
Germany	158.75	1.50
Finland	112.04	1.06
Canada	136.08	1.28
Taiwan	86.18	0.81
TOTAL	**10,596.59**	**100.0**

Table 10: Summary of AONM Transfers, 2006[40]

	Destination	U (tonnes)
Conversion	Canada	2402
	European Union	2597
	United States	4330
Enrichment	European Union	3381
	United States	387
Fuel Fabrication	Japan	148
	Republic of Korea	276
	United States	299
Reactor Irradiation	Japan	5
	United States	9

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 notified each export to the safeguards authorities in the relevant countries. In every case, those safeguards authorities confirmed to ASNO receipt of each shipment. ASNO notified also the IAEA of each export to non-nuclear-weapon states pursuant to Article 35(a) of Australia's international safeguards agreement as well as to NWS under the IAEA's Voluntary Reporting Scheme. Receiving countries similarly reported receipts to the IAEA.

40. Figures are for transfers completed between jurisdictions from 1 January to 31 December 2006. 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.

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

Australia/China Transfers Agreement

On 3 February 2007 the Agreement between the Government of Australia and the Government of the People's Republic of China on the Transfer of Nuclear Material entered into force. An Administrative Arrangement which details, inter alia, how notifications and reports of nuclear material subject to the agreement will take place, was concluded on 24 November 2006. The list of facilities allowed to use AONM in China has been decided, however as of 30 June 2006, no transfers of uranium pursuant to the Australia/China Transfers Agreement had taken place.

Australia/Russia Nuclear Cooperation Agreement

As announced by the Minister for Foreign Affairs, Mr Downer, on 27 April 2007, Australia and Russia commenced negotiations in early 2007 on updating the existing (1990) Australia-Russia nuclear agreement to bring the scope of the agreement into line with Australia's other bilateral safeguards agreements. The Australian side in the negotiations was led by Mr Carlson, supported by DFAT's International Legal Division, the Attorney-General's Department, and the Australian Embassy in Moscow. There were informal consultations in Moscow in December 2006 and March 2007, two rounds of formal negotiations, in Canberra in April 2007 and Moscow in May 2007, and a series of follow-up actions leading to signature.[41]

Transfer of Silex Technology

In early 2007 Silex Systems Limited (SSL) exported its uranium technology for further development in the USA, in a series of transfers pursuant to the Australia/US Silex agreement. The technology continues to be subject to the agreement and ASNO will continue to monitor its development. While SSL has ceased its uranium enrichment research in Australia, it will continue its stable-isotopes program which uses technology not applicable to separation of uranium isotopes.

41. The Agreement was signed outside the reporting period, on 7 September 2007.

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

- Contribution to the strengthening of international safeguards in ways that advance Australia's interests.
- Contribution to policy development and diplomatic activity by the Department of Foreign Affairs and Trade.
- Contribution to the IAEA's Standing Advisory Group on Safeguards Implementation (SAGSI).
- Management of the Australian Safeguards Support Program (ASSP).
- Cooperation with counterparts in other countries on the development of international safeguards.
- Management of an international outreach program.
- Assessments of 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. Notable contributions included:

- Mr Carlson's final term as chair of SAGSI and the appointment by IAEA Director General, Dr ElBaradei of Dr Berriman as a new member of SAGSI
- ongoing management of ASSP
- provision of international and regional training on nuclear safeguards, nuclear security, the Additional Protocol and related export controls
- participation in the IAEA's Technical Working Groups on developing a nuclear security culture, nuclear security fundamental and guidelines for developing a design basis threat (DBT)
- participation in the Australian delegation to the IAEA Board of Governors meetings in September 2006 and March 2007
- participation in the 2006 IAEA General Conference
- participation in experts meetings and discussions with counterparts in other countries
- attendance at conferences
- production of publications.

During the reporting period, ASNO was proactive in maintaining and strengthening contacts with the IAEA. Extensive discussions were held with senior IAEA officials, including the Deputy Director General for Safeguards Mr Olli Heinonen, the Deputy Director for Nuclear Applications, Mr Werner Burkart, the Director for Safeguards Information Management, Mr Jacques Baute, the Director for Safeguards Concepts and Planning Ms Jill Cooley, the Director for Safeguards Operations A, Mr Kaluba Chitumbo, the Director for Safeguards Operations B, Mr Herman Nackaerts, and the Director for Safeguards Operations C, Mr Kenji Murakami. As a result of its highly effective links with the IAEA, ASNO remained well abreast of developments and emerging problems in safeguards and was able to

effectively promote Australian thinking on a range of safeguards and associated issues, contribute to the resolution of matters of safeguards concern, and ensure 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. However, ASNO noted that there are substantial technical and administrative challenges to the success of the system. As noted in previous annual reports, major technical challenges remain in the timely processing of environmental samples that are collected during the IAEA inspectors' in-field activities such as inspection, complementary access and design information verification. An ongoing major administrative problem is the retention of expertise with the retirements of experienced senior safeguards inspectors and managers – while technical measures can be used to address a portion of this problem, the loss of corporate memory is something that can only be partially compensated for, not prevented.

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 Embassy and Permanent 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 likeminded governments in Vienna and other key capitals.

Issues dealt with by ASNO included:

- Iran's safeguards breaches, including analysis of nuclear developments in Iran and advice on handling in the IAEA Board of Governors
- assessment of nuclear developments in the DPRK
- the technical components of the IAEA's requested budget increases for the 2008-09 biennium.

An important task for ASNO is analysis of the IAEA's annual Safeguards Implementation Report (SIR), which is the principal means by which the IAEA reports to Member States on the operation of the safeguards system. The SIR is the main means by which the Agency informs Member States of the safeguards conclusions it has drawn, with respect to both the correctness and completeness of states' declarations as to their holdings of nuclear materials, and their nuclear activities. As such, the SIR is a key component of the safeguards system. The SIR is a confidence building measure in its own right. The SIR is always examined in detail by ASNO for the insights into the operation of the safeguards system that it contains.

IAEA Standing Advisory Group on Safeguards Implementation

One of the key advantages that ASNO has experienced in its 30 years of existence has been in the near continuous involvement of ASNO safeguards professionals in the IAEA's Standing Advisory Group for Safeguards Implementation (SAGSI). In the 10 years from the late 1970s to the end of the 1980s ASO's first Director of Safeguards served with and eventually chaired SAGSI. This service gave Australia in general, and ASO in particular, a real and very effective voice in the growth and development of the safeguards system. Service with SAGSI also provided ASNO with high level personal contacts with the pre-eminent safeguards experts in IAEA member states.

During the year, Mr Carlson ended his term as chair of SAGSI and ended his eight year period of involvement in this important group. Dr Berriman was invited to become a member of SAGSI in 2007 and took part in one SAGSI working group meeting and one plenary session during the period covered by this report

Australian Safeguards Support Program

Re-Examination of Basic Safeguards Implementation Parameters

During the 1990s the IAEA acknowledged the need, in parallel with the development of strengthened and integrated safeguards concepts, to re-examine basic safeguards implementation parameters, such as timeliness goals, significant quantities, and the categorisation of nuclear material for safeguards purposes.

ASNO is currently undertaking consultancy work for the IAEA's Division of Safeguards Concepts and Planning (SGCP) on the safeguarding of research reactors. This work is expected to take up to two years to complete.

Support for Information Review and Evaluation

Since 1997, ASNO has undertaken a number of consultancy subtasks for the IAEA supporting the implementation of strengthened safeguards. These involve:

- consultancy by Dr Berriman to SGIT for periods of four to six weeks twice each year
- provision of open source information on developments in Australia's region.

Design information review and evaluation for the Pebble Bed Modular Reactor (PBMR)

In September 2005 ASNO accepted a task to evaluate the methods that could be used by the IAEA to verify the design information of the South African designed PBMR. No progress was made on this project during the reporting period as it has not been possible to put in place arrangements to obtain the relevant design information from South Africa.

ASNO has agreed with the IAEA's Support Programs Administration Unit that this task will be wound up in September 2007 if no design information has been supplied to ASNO by that time.

Analytical Services for Environmental Sampling

Environmental sampling is an important safeguards strengthening measure that enhances the IAEA's capability to detect undeclared nuclear activities. ANSTO has shown that mass spectrometry using a tandem accelerator can be used to analyse environmental samples with very high sensitivity.

ANSTO has demonstrated that Accelerator Mass Spectroscopy (AMS) is the only technique capable of measuring U-236 at the low levels expected in environmental materials. The AMS at ANSTO is now a certified facility of the IAEA's Network of Analytical Laboratories for measurements of U-236 and I-129.

ANSTO is undertaking long term development work to investigate the applicability of AMS methodology for measurements of isotopes of plutonium. Significant progress on these investigations has been made.

Cooperation with other States Parties

ASNO actively strengthened contacts with other safeguards agencies and international safeguards practitioners. ASNO undertook extensive consultation with senior officials of several foreign governments and foreign industry representatives, including from Argentina, Canada, China, India, Indonesia, Iran, Iraq, Japan, Korea, Thailand, Vietnam and the United States.

ASNO staff presented papers at the July 2006 Institute of Nuclear Materials Management Annual Meeting in Nashville in the United States.

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. All of this work was well received and led to requests for further assistance. Key contributions included:

- hosting a regional IAEA Seminar entitled 'Multilateral Verification of Nuclear Non-Proliferation Undertakings: Safeguards Agreements, Small Quantities Protocols and Additional Protocols'
- hosting a meeting of senior officials involved in safeguards from across the Asia-Pacific region in order to discuss the establishment of an Asia-Pacific safeguards association
- supporting the US NNSA and Japanese METI in delivery of 'Commodity Identification Training' in Singapore and Thailand
- provision of training on additional protocol implementation issues in Vietnam
- lectures by Mr Russell Leslie at a regional safeguards training course held by the Japanese Atomic Energy Agency.

WMD Commodity Identification Training, Thailand 21-23 May 2007

OUTPUT 1.5: CWC IMPLEMENTATION

Regulation and reporting of Australian chemical activities in accordance with the Chemical Weapons Convention, and strengthening of 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.
- Contribution to the work of the Organisation for the Prohibition of Chemical Weapons (OPCW) and its working groups.
- Cooperation with the OPCW and other CWC States Parties.
- Contribution to Australia's CWC international outreach efforts.

Performance Assessments

International 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:

- Article VI declaration of imports and exports of CWC Scheduled Chemicals[42] and of the 46 facilities with CWC-relevant chemical production, processing or consumption activities during 2006 (March 2007)[43]
- Article VI declaration of eight chemical research/industrial facilities anticipated activities during 2007 with CWC Scheduled Chemicals (September and October 2006)
- Article X, paragraph 4, declaration of Australia's national chemical defence program (April 2007)
- responses to OPCW Third Person Notes including routine clarification of the operational status of chemical plants and chemical trade
- two voluntary submissions of information to the OPCW of discoveries of old chemical weapons
- routine response to OPCW notifications and amendments/corrections to inspector details and deletions or additions to the OPCW inspectorate.

The OPCW conducted three successful routine facility inspections in Australia during the reporting period to verify declarations. The first two, in July, were sequential and inspectors visited the existing Schedule 1 Protective Purpose Facility in Victoria as well as a discrete organic chemical production facility in New South Wales. In December, the OPCW carried out a routine inspection of a declared Schedule 3 facility in Queensland. All inspections proceeded smoothly and the OPCW team verified the accuracy of relevant declarations as well as the absence of Schedule 1 chemical production, in accordance with its inspection mandates. ASNO facilitated the inspections, and appreciated the support and cooperation by industry.

42. Declared information was obtained from reports by licensed importers and exporters, industry surveys, data exchanges with trading partners and from the Australian Customs Service data.
43. Declared information was obtained mainly from industrial facilities subject to reporting obligations of the permit and notification system defined under Chemical Weapons (Prohibition) Act 1994.

Legislation and Regulation

The system of permits and notifications continued to operate well and was subject to some refinements. During the reporting period:

- a new permit was issued authorising the production of Schedule 1 chemicals for research purposes
- a new permit was issued authorising the processing of Schedule 2 chemicals
- 52 permits authorising the import of Schedule 2 and/or 3 chemicals were issued by ASNO in accordance with the Customs (Prohibited Imports) Regulations 1956.

Table 11: Permits for CWC Scheduled Chemical Facilities at 30 June 2007

Chemicals	Schedule 1			Schedule 2		Schedule 3
	s19(4)	s19(5)	s19(6)	s18(1)	s18(1)	s18(1)
Facility Type	Protective	Research	Consumption	Processing	Consumption	Production
Total	1	10	1	12	1	3

OPCW inspectors and facility representatives during a routine chemical industry inspection in Queensland.

ASNO undertook consultation and outreach across Australia. ASNO representatives visited six facilities during the reporting period, primarily to promote awareness of regulatory obligations and prepare industrial sites for possible OPCW inspections.

ASNO continued to assist the Department of Defence to finalise military standard operating procedures for management of old chemical weapons found in Australia. These procedures will help ASNO make timely declarations to the OPCW, facilitate a possible OPCW inspection and ensure appropriate destruction of old chemical weapons.

A number of suspected old chemical weapons (OCW) were found in New South Wales, Northern Territory and Queensland during the reporting period. All of the munitions and containers were found by Defence to have no chemical agent remaining and were classified as “old chemical weapons” based on their age and poor condition. While not requiring a formal declaration due to these weapons being considered already destroyed by corrosion, Australia voluntarily notified the OPCW of these discoveries for transparency purposes. In some cases the munitions were cut up further before being removed for disposal as scrap metal.

Heavily corroded WWII light case chemical bombs (500lb and 250lb) of UK origin discovered while clearing exDefence property in Queensland. Photograph courtesy of the Department of Defence

During the reporting period, ASNO made two amendments to regulations under the *Chemical Weapons (Prohibition) Act 1994* (the Act) relating to lowering the concentration threshold required for Part A Schedule 2 chemical facility permits, as well as including in the

Regulations two technical amendments to the Verification Annex of the Chemical Weapons Convention which have previously been accepted by Australia. The amended Regulations were tabled in Parliament on 4-5 December 2006.

Amendments to regulations relating to Part A Schedule 2 chemicals mean that a permit is required to produce, process or consume any mixture containing more than 0.5% of a Part A Schedule 2 chemical, provided that the annual threshold quantities specified under the Act are exceeded.

This amendment was considered necessary because Part A Schedule 2 chemicals are highly toxic and are more readily able to be used in a manner which is prohibited under the Convention. On the other hand, Part B Schedule 2 chemicals are precursor chemicals for chemical warfare agents and are less toxic than the chemicals listed in Part A. Australia has been involved in negotiations over the past seven years with other parties to the Convention on a draft decision regarding threshold limits for these groups of chemicals. International consensus on this issue has not yet been reached. The amendment enabled Australia to demonstrate in a practical way its commitment to regulating the production and use of highly toxic chemicals were such chemicals to be produced or used commercially in Australia.

Minor and inconsequential amendments to ASNO forms, such as reporting under the permit and notification system, were approved and tabled in Parliament according to section 8 of the Act. That instrument was, at the time, a disallowable instrument for the purposes of section 46A of the Acts Interpretation Act 1901.

ASNO continued to provide input into a review of the regulation, reporting and security surrounding the storage, sale and handling of hazardous chemicals in Australia. The review was commissioned in 2002 by the Council of Australian Governments with the aim of minimising the risk of these materials being used for terrorist purposes.

Support for the OPCW and its Working Groups

Certain aspects of Convention's declaration and verification provisions that were not fully defined at entry-into-force are subject to ongoing development through discussions in The Hague. ASNO provides input to these discussions, primarily through Australia's representative to the OPCW. Australia's general approach is to make verification as practical and effective as possible, and based on risk-benefit considerations. Australia's input is substantial and credible because it often draws on practices that ASNO has put into place domestically, for instance chemical trade tracking systems. Australia continues to inform other CWC State Parties, through the industry cluster meetings, about the processes and systems for tracking chemical trade required for submission of declarations.

Cooperation with the OPCW and other States Parties

ASNO continued its engagement with the OPCW on CWC implementation issues and in regards to meeting the assistance requests of other States Parties under the Action Plan on Article VII implementation.

ASNO has had extensive and useful dealings with other States Parties, especially in the region, including in conjunction with the OPCW.

ASNO continued to be proactive and effective in its work with the OPCW, with representation at the fourth regional meeting of National Authorities of CWC States Parties in Asia, held in Indonesia in September 2006, the eighth Annual Meeting of CWC National Authorities in The Hague in December 2006, and the 11th Conference of the CWC States Parties in The Hague in December 2006. Ambassador Brady, Australia's Permanent Representative to the OPCW, attended a CWC 10th anniversary symposium in Berlin in April 2007.

Domestic Outreach

ASNO officers conducted outreach visits to a number of facilities including: facilities that process or consume Schedule 2 chemicals; facilities which produce Schedule 1 chemicals for research purposes; and also other chemical production facilities.

As part of outreach efforts, ASNO has revised and updated the publication 'The Chemical Weapons Convention – A guide for Australian Industry Producing, Using or Trading Chemicals', which was released just outside the period covered by this report, in July 2007.

In conjunction with the Department of Defence and the Department of Prime Minister and Cabinet, ASNO engaged with the Australian Vice-Chancellor's Committee to enhance communication channels between government and academia, and to inform them of university obligations regarding importing, exporting, and/or researching WMD-related materials and equipment.

International Outreach

Australia places great importance on international CWC compliance and best practice. ASNO and the International Security Division (ISD) within DFAT, in conjunction with Indonesia and Japan, held an 'Industry Workshop on Implementing the Chemical Weapons Convention' for the Indonesian chemical industry in February 2007. Participation by the Australian Customs Service and the Australian Plastics and Chemicals Industries Association helped enhance the depth of discussion at the workshop.

Government and industry representatives from Australia, Japan and Indonesia together with participants from the 'Industry Workshop on Implementing the CWC' held in Jakarta 26-27 February 2007

The visit to Jakarta was followed by a meeting in Kuala Lumpur in March where ASNO and ISD met with representatives from Malaysian government ministries responsible for implementation of the CWC to share lessons from Australia's experience in receiving routine OPCW inspections.

ASNO continued to exchange trade data regarding CWC Scheduled chemicals with key trading countries so as to improve the quality and accuracy of their respective declarations to the OPCW. ASNO also met with Hong Kong Customs officials visiting Canberra to share its experiences in meeting the import/export provisions under the CWC.

Australia provided practical assistance to Cambodia in preparation for the drafting of CWC implementing legislation by translating the text of the CWC into Khmer through the AusAID funded Cambodian Technical Assistance Facility in Phnom Penh.

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.
- Effective legal and administrative mechanisms which support Australia's commitments related to the CTBT.
- Effective contribution to the work of the CTBT Preparatory Commission (PrepCom) and its Working Groups.
- Contribution to Australia's CTBT international outreach efforts.

Performance Assessment

International Obligations

Of the 21 facilities that Australia will host for the CTBT International Monitoring System, 17 are now in place and certified as capable of operating to CTBT technical specifications. Work to plan and build the remaining four at remote locations (including in Antarctica) continued during the year. A list of Australia's IMS facilities and their status is at Appendix G.

Specific advances during 2006-07 in relation to Australian hosted IMS stations included:

- finalisation of plans for an infrasound monitoring station on the Cocos Islands
- survey of site requirements for radionuclide and infrasound stations in Antarctica
- certification of Australia's CTBT radionuclide laboratory in Melbourne as meeting Treaty standards.

Legislation and Regulation

ASNO continues to fund Geoscience Australia (GA) to carry out nuclear test monitoring through GA's network of seismic stations. This arrangement, set out in a letter of understanding between GA and DFAT, has been administered by ASNO on behalf of DFAT since 1 July 2000. GA satisfied its requirements under the letter of understanding for the reporting period. ASNO and GA reviewed the arrangement during the year, including in light of the DPRK test on 9 October 2006, and considered steps to ensure that it meets Australia's requirements.

The *Comprehensive Nuclear Test-Ban Treaty Act 1998* was amended to apply section 15.2 of the Criminal Code (extended geographical jurisdiction – category B) to the offence of causing a nuclear explosion. For an act carried out outside Australia, the offence now applies to an Australian citizen or resident. This was one of several measures in the Non-Proliferation Legislation Amendment Act 2007 to extend and harmonise geographical jurisdiction for non-proliferation offences in Australian law.

Support for the PrepCom and its Working Groups

ASNO participates in the technical working group sessions of the PrepCom, in conjunction with Australia's Mission in Vienna and with technical specialists from GA and ARPANSA. During the year ASNO has facilitated Australia's contributions to the work of the PrepCom on development of the CTBT verification regime.

The CTBT includes the possibility for an on-site inspection (OSI) to determine whether a nuclear explosion has taken place in a particular area. Mr Coxhead, as the Task Leader for the elaboration of an Operational Manual on the conduct of OSI, continued to chair discussions at the PrepCom's technical working group. A significant milestone was reached during the year with the settlement of a provisional operational manual (Test Manual). The manual will guide the conduct of mock inspectors during a major inspection exercise planned for 2008. It will also be used for inspector training in the lead-up to the exercise. In addition, Mr Coxhead participated in two meetings of an expert group advising on planning of the inspection exercise.

As well as its use for Treaty verification, data from the CTBT's monitoring system has the potential to contribute to civil and scientific purposes. Interaction between the CTBTO and the broader scientific community will also help hone the Treaty's verification mechanisms. ASNO contributed to two activities in September 2006 to help ensure these possibilities are realised: a meeting of experts in Vienna during events marking the tenth anniversary of the CTBT's opening for signature; and a subsequent workshop in Budapest, Hungary.

Consistent with principles set out in the CTBT, activities associated with the development of CTBT verification are funded primarily from the contributions of Signatories. This includes training of people involved with the work of the Treaty. ASNO coordinates the involvement of Australians in this training. During the year one Australian participated in such activities.

International Outreach

In the period 2005-07 Australia held a specific role as the CTBT Article XIV coordinator, acting on behalf of all signatory states, which entails promoting EIF among the hold-outs. ASNO has assisted DFAT with efforts to encourage states to ratify the CTBT.

OUTPUT 1.7: OTHER NON-PROLIFERATION REGIMES

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

Performance Measures

- Proactive and professional contribution to the development of an effective and verifiable Fissile Material Cut-off Treaty (FMCT).
- Strengthened export controls supported through participation in the Australia Group (AG).
- Contribution to the Global Initiative to Combat Nuclear Terrorism (GI).

Performance Assessment

Controlling intangible technology transfers

Working with the Department of Defence and the Department of Prime Minister and Cabinet, ASNO is conducting outreach to universities concerning intangible technology transfer. ASNO worked closely with the Australian Vice-Chancellors' Committee and hopes to hold more detailed discussions in the coming year.

Fissile Material Cut-off Treaty

Throughout the year, ASNO has been active in helping the Geneva mission prepare for further substantive discussions on the FMCT. Regrettably, in this reporting period, technical discussions in Geneva were stalled.

Australia Group (AG)

ASNO continues to make a substantial contribution to the AG, intersessionally and through the annual meetings. Mr Leask was invited to again chair work on development and implementation of AG measures. This achieved a number of key outcomes in 2007. In June 2007 the AG plenary agreed to amend the factors for consideration for the addition of chemicals to the control list in order to make the factors more sharply focussed and take into account some additional elements. Further, it agreed to update the entry for Mycoplasma mycoides on the Animal Pathogens List. Lastly, it established an open-ended virtual discussion group to further consider developments in synthetic biology, including oligonucleotides. ASNO participated fully in other information exchange and enforcement meetings of the AG.

Global Initiative

The GI is a voluntary framework for international cooperation to counter nuclear and radiological terrorism, with more than 50 participating states. Mr Leask participated in GI meetings in Ankara (February 2007) and Astana (June 2007) to discuss Australian activities which build nuclear security and safeguards capacity in its region (ASNO) and assist in locating and managing orphan radioactive sources (ANSTO). In May 2007, ASNO participated in a regional outreach seminar in Sydney to consider and develop regional cooperation and capacity building to counter nuclear terrorism, including through the GI.

OUTPUT 1.8: ADVICE TO GOVERNMENT

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

Performance Measures

- Satisfaction by Ministers and other key stakeholders with policy advice, analysis and briefings.
- Contribution to the development of Australia's policies by DFAT in the area of WMD arms control and non-proliferation.
- Cooperation on technical issues of common interest with agencies such as ANSTO, ARPANSA, the Defence Intelligence Organisation and the Office of National Assessments.

Performance Assessment

ASNO staff 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 the Government and other bodies. ASNO provides the Government with advice on nuclear safeguards, from both international and domestic perspectives, together with expert advice across the full range of WMD technologies.

During the year ASNO provided advice and analysis on a range of developments in the nuclear fuel cycle. ASNO also analysed and reported on nuclear programs of concern, particularly in Iran and the DPRK. Another area of work was provision of advice on international and bilateral safeguards aspects of nuclear supply to India. ASNO provided briefings for Ministers, Departments and Parliament, including the House of Representatives Standing Committee on Industry and Resources' inquiry into the development of the non-fossil fuel energy industry in Australia. ASNO prepared 45 ministerial submissions, and received favourable comment from the Minister for these. Similarly, other stakeholders acknowledged that briefings were relevant and timely.

Further, ASNO provided professional advice to assist Government efforts to address the threat of chemical terrorism, including activities and publications to raise awareness and provide guidance to chemical companies in regard to obligations under the CWC and chemical counter-terrorism measures.

ASNO collaborated with Defence in the updating and distribution of its information CD-ROM for Australian chemical traders. ASNO provided special briefing materials and additional assistance to the Australian Mission to the IAEA in Vienna, and Australian missions in Washington, Geneva, London, The Hague, Moscow and Beijing.

ASNO has worked closely with other departments on issues covering the Global Nuclear Energy Partnership, Uranium Industry Framework and the Commonwealth Radioactive Waste Facility.

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 has worked to ensure that the nuclear debate in Australia is soundly based. During the year, Mr Carlson gave media interviews and briefings on nuclear issues. Both Mr Carlson and Mr Leask provided several background briefings to press, industry, academic and non-governmental organisations. ASNO made further submissions to the House of Representatives Standing Committee on Industry and Resources with respect to its Inquiry into the Strategic Importance of Australia's Uranium Resources. ASNO provided extensive briefing to the Prime Minister's task force on Uranium Mining, Processing and Nuclear Energy. ASNO also promoted non-proliferation obligations and objectives in the science and academic community. In particular, ASNO helped raise awareness in tertiary institutions about advanced research which could be of use to weapons of mass destruction (WMD) programs, including through engagement with the Australian Vice-Chancellors' Committee.

At the request of industry, and in addition to its involvement in the Uranium Industry Framework, ASNO took part in discussions on industry stewardship issues. These consultations covered investment, education, fuel cycle developments and knowledge management. To coincide with the 10th anniversary of entry into force of the CWC a number of articles were written for professionals in industry and academia, which are available on ASNO's web site.

Director General John Carlson addressing the Annual Meeting of the Institute of Nuclear Materials Management, July 2006

Management and Accountability

CORPORATE GOVERNANCE

Portfolio Minister

Responsibility for administration of the legislation under which ASNO operates - the *Nuclear Non-Proliferation (Safeguards) Act 1987, Non-Proliferation Legislation Amendment Act 2003, Non-Proliferation Legislation Amendment Act 2007, Chemical Weapons (Prohibition) Act 1994* and *Comprehensive Nuclear-Test-Ban Treaty Act 1998* – rests with the Minister for Foreign Affairs, the Hon Alexander Downer MP.

Director General ASNO

The Director General ASNO reports directly to the Minister for Foreign Affairs. The position combines the statutory offices of the:

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

Remuneration for the statutory position of Director General ASNO is determined by the Remuneration Tribunal.

Mr John Carlson has held the position of Director General ASNO since the establishment of ASNO on 31 August 1998, having previously held the position of Director of Safeguards since 1989. Mr Carlson's current term of appointment will expire at the end of 2009.

Assistant Secretary ASNO

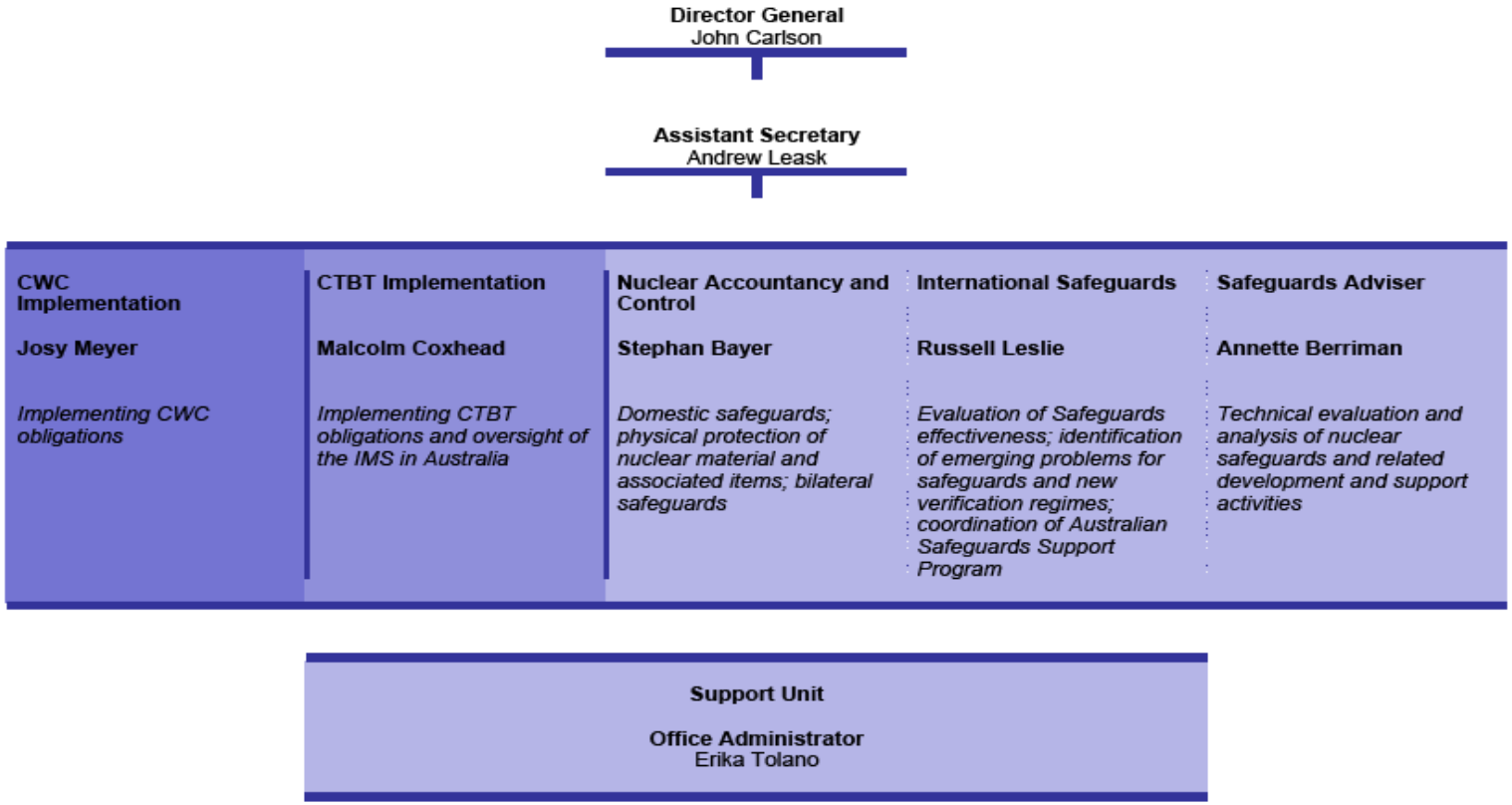
The Assistant Secretary, ASNO, deputises for the Director General and is responsible for the day-to-day operations of the Office. The Assistant Secretary, Mr Andrew Leask, left this position outside the reporting period (in August 2007). Dr Geoff Shaw has been promoted to the position.

ASNO Staff

ASNO has a small core of staff whose day-to-day operations 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 Certified Agreement. Further details are in Table 12.

At the start of the reporting period ASNO staff numbers increased by two. Due to the demands of the recruitment and security clearance processes, new staff (for both new positions and vacancies) did not start in ASNO until the last quarter of the period. In 2006-07 ASNO achieved an average staff level of 13.5 (against an approved level of 16).

Figure 10: ASNO's Organisational Structure



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. In the reporting period two staff attended nuclear materials accountancy training courses in the US. Further details are in Table 13.

Table 12: ASNO Staff at 30 June 2007

	Male	Female	Total (Approved)	
SES B2	1	0	1	(1)
SES B1	1	0	1	(1)
Executive Level 2	3	2	5	(5)
Executive Level 1	2	1	3	(3)
APS Level 6	1	2	3	(3)
APS Level 5	0	0	0	(0)
APS Level 4	1	1	2	(3)
TOTAL	**9**	**6**	**15**	**(16)**

Table 13: Training and Development Activities

Training and Development Activity	Person Days
Leadership/Management	7.4
Professional Development	44.8
Consular	0.5
Finance and Administration	4.5
Security	2.5
Information Technology	7.4
Other	42.0
TOTAL	**109.1**

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 14: ASNO Administrative Costs[44]

		2005-06	2006-07
Salaries[45]		$1 564 526	$1 578 279
Running Costs	General	$411 992	$463 342
	Seismic monitoring[46]	$564 071	$570 388
	Nuclear & radiological security enhancement for Asia and the Pacific		$252 483
	Sub-Total	$969 969	$1 286 213
TOTAL		**2 540 589**	**2 864 492**

Uranium Producers Charge

The Uranium Producers Charge is payable on each kilogram of uranium ore concentrate production (set in 2006 to 5.6012 cents per kilogram). In 2006-07, the charge yielded $472,597 for Consolidated Revenue.

Australian Safeguards Support Program

The cost of the Australian Safeguards Support Program (ASSP) totalled about $438,261 in 2006-07. This amount included $128,261 for direct expenditure by ASNO relating to consultancy services provided to the IAEA and participating in SAGSI (including travel costs and salaries). Expenditure on ASSP projects by ANSTO amounted to $310,000. The 2006-07 ASSP budget did not include monies spent on ASSP projects by Commonwealth agencies other than ASNO and ANSTO. Further, it did not include AusAID contributions under the international outreach program.

Environmental Management System (EMS)

In accordance with the Government's decision of May 2001, ASNO, under coverage of DFAT, implemented an Environmental Management System (EMS). The EMS is aimed at reducing negative impacts on the environment, in particular through reduction in the use of energy and goods, a minimisation of waste, and improvement in recycling and re-use of materials. ASNO is a key member of the DFAT EMS committee, providing input into the development of programs and processes that allow DFAT to effectively implement its EMS. ASNO also provides specialist advice on the licensing, storage and disposal requirements for radioactive sources. In April 2006 DFAT was audited by an accredited certifying body, NCS International, against the International Standard for Environmental Management Systems, ISO 14001:2004. Following this, DFAT received certification to the International Standard in June 2006.

44 Excludes GST.

45 Includes Long Service Leave accruals.

46 Undertaken by Geoscience Australia.

Performance Indicators

ASNO has tracked its performance against specific indicators relating to core aims and organisational tasks. This information is presented below from two different perspectives. Figure 11 summarises the number of person-days of effort expended in each type of activity. Figure 12 relates to the number of events of each type in which ASNO was involved.

Figure 11: ASNO's Activities and Projects, by percentage of staff time

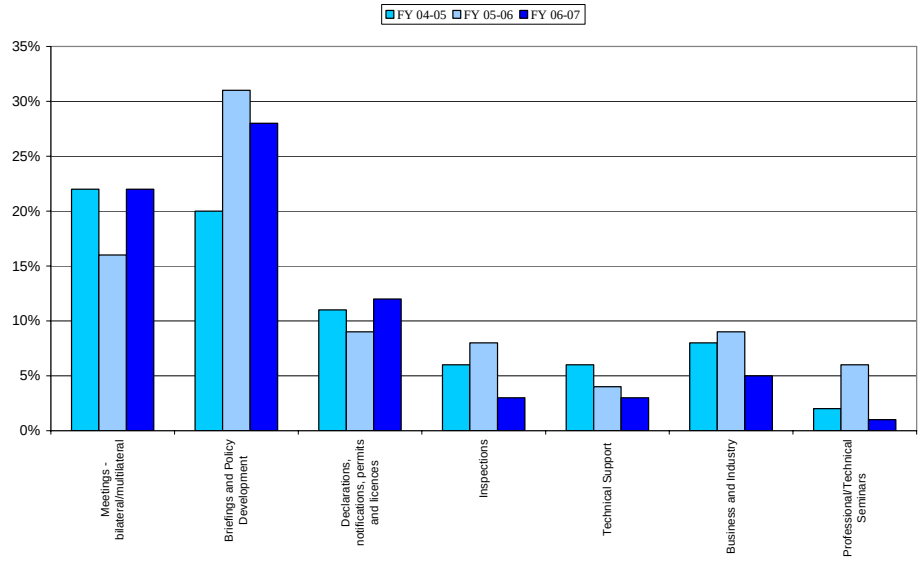
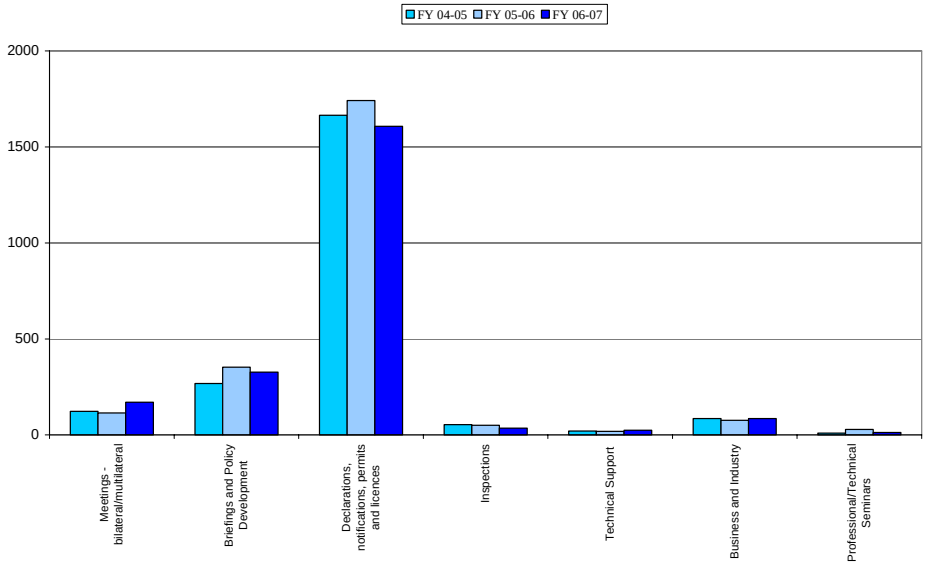


Figure 12: ASNO's Activities and Projects, by type



Appendixes

APPENDIX A WORLD NUCLEAR ENERGY, JUNE 2007

Table 15: World Nuclear Energy, June 2007[47]

Country	Operating Reactors		% of Total Electricity in 2006	Reactors under Construction	
	Total	Capacity (GWe)		Total	Capacity (GWe)
*United States	104	100.3	19.4		
*France	59	63.3	78.1		
*Japan	55	47.6	30	1	0.9
Russian Federation	31	21.7	15.9	7	4.6
*Germany	17	20.3	31.8		
*Republic of Korea	20	17.5	36.6	2	1.9
Ukraine	15	13.1	47.5	2	1.9
*Canada	18	12.6	15.8		
*United Kingdom	19	10.2	18.4		
*Sweden	10	9	48		
*China	11	8.6	1.9	4	3.2
*Spain	8	7.5	19.8		
*Belgium	7	5.8	54.4		
*Taiwan[48], China	6	4.9	20	2	2.6
India	17	3.8	2.6	6	2.9
*Czech Republic	6	3.5	31.5		
*Switzerland	5	3.2	37.4		
*Bulgaria	2	1.9	43.6	2	1.9
*Finland	4	2.7	28	1	1.6
*Slovak Republic	5	2	52.7		
Brazil	2	1.8	3.3		
*Hungary	4	1.8	37.7		
South Africa	2	1.8	4.4		
*Mexico	2	1.4	4.9		
*Lithuania	1	1.2	72.3		
*Argentina	2	0.9	6.9	1	0.7
*Romania	1	0.7	9	1	0.7
*Slovenia	1	0.7	40.3		
*Netherlands	1	0.5	3.5		
Armenia	1	0.4	42		
Pakistan	2	0.4	2.7	1	0.3
Iran				1	0.9
TOTAL	**438**	**371.1**	**(est.) 16.0**	**31**	**24.1**

Sources: IAEA Power Reactor Information System (PRIS) (www.iaea.org/programmes/a2/)

47. Countries eligible under bilateral agreements with Australia to use AONM are marked with an asterix. These countries operate 368 power reactors, which produce around 14% of total world electricity and about 88% of world nuclear energy. In addition Australia has an agreement with Russia which covers processing on behalf of third countries.
48. Supply of AONM to Taiwan, China is covered by an agreement between Australia and the United States.

APPENDIX B AUSTRALIA'S BILATERAL SAFEGUARDS AGREEMENTS

Table 16: Australia's Bilateral Safeguards Agreements at 30 June 2007

Country	Entry into Force
Republic of Korea	2 May 1979
United Kingdom	24 July 1979
Finland	9 February 1980
United States	16 January 1981
Canada	9 March 1981
Sweden	22 May 1981
France	12 September 1981
Euratom[49]	15 January 1982
Philippines	11 May 1982
Japan	17 August 1982
Switzerland	27 July 1988
Egypt	2 June 1989
Russia	24 December 1990
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, China)	17 May 2002
Hungary	15 June 2002
Argentina	12 January 2005
People's Republic of China[50]	3 February 2007

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

49. The Euratom agreement covers all 27 member states of the European Union.
50. Two agreements covering nuclear material transfers and nuclear cooperation.

APPENDIX C STATUS OF ADDITIONAL PROTOCOLS

At 30 June 2007, there were 74 states (plus Taiwan, China) with significant nuclear activities[51]. Of these states, 5 were nuclear-weapon states (NWS), 66 were non-nuclear-weapon states (NNWS) party to the NPT, and 3 were non-NPT Parties.

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

Of the 66 NNWS NPT Parties with significant nuclear activities, 48 had an Additional Protocol in force (Table 17). A further 11 such states had signed an AP or had an AP approved by the Board of Governors (Table 18).

Status of Additional Protocols at 30 June 2007

Table 17: States with Additional Protocols in force at 30 June 2007

State			
Afghanistan	**Estonia**	**Latvia**	**Portugal**
Armenia	Fiji	**Libya**	**Republic of Korea**
Australia	**Finland**	**Lithuania**	**Romania**
Austria	**France**	**Luxembourg**	Seychelles
Azerbaijan	FYROM	Madagascar	**Slovakia**
Bangladesh	**Georgia**	Mali	**Slovenia**
Belgium	**Germany**	Malta	**South Africa**
Botswana	**Ghana**	Marshall Islands	**Spain**
Bulgaria	**Greece**	Monaco	**Sweden**
Burkina Faso	Haiti	Mongolia	**Switzerland**
Canada	Holy See	**Netherlands**	Tajikistan
Chile	**Hungary**	New Zealand	Tanzania
China	Iceland	Nicaragua	**Turkey**
Croatia	**Indonesia**	**Niger**	Turkmenistan
Cuba	**Ireland**	**Nigeria**	Uganda
Cyprus	**Italy**	**Norway**	**Ukraine**
Czech Republic	**Jamaica**	Palau	**United Kingdom**
DR Congo	**Japan**	Panama	**Uruguay**
Denmark	Jordan	Paraguay	**Uzbekistan**
Ecuador	**Kazakhstan**	**Peru**	
El Salvador	Kuwait	**Poland**	
TOTAL: 82 states (including 48 NNWS with significant nuclear activities), plus Taiwan, China			

51. '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.

A further 39 states had signed an Additional Protocol or had an Additional Protocol that had been approved by the IAEA Board of Governors.

Table 18: States with Additional Protocols signed or approved but not in force at 30 June 2007

State	State	State	State
Albania	Comoros	Malawi	**Russia**
Algeria	Costa Rica	**Malaysia**	Senegal
Andorra	Dominican Republic	Mauritania	**Serbia**
Belarus	Gabon	Mauritius	Singapore
Benin	Guatemala	**Mexico**	**Thailand**
Burundi	Honduras	Moldova	Togo
Cameroon	**Iran**	Montenegro	Tunisia
Cape Verde	Kiribati	**Morocco**	**USA**
Central African Rep	Kyrgyzstan	Namibia	**Vietnam**
Colombia	Liechtenstein	**Philippines**	
TOTAL: 39 states (including 11 NNWS NPT Parties with significant nuclear activities)			

The remaining 7 NNWS NPT Parties with significant nuclear activities had not signed an Additional Protocol.

Table 19: States with Significant Nuclear Activities that had not signed or had an Additional Protocol approved at 30 June 2007

State	State	State	State
Argentina[52]	**Egypt**	**Iraq**	**Venezuela**
Brazil	**India** (non-NPT)	**Pakistan** (non-NPT)	
DPRK	**Israel** (non-NPT)	**Syria**	
TOTAL: 10 states (including 7 NPT Parties with significant nuclear activities)			

52. Argentina and Brazil intend to bring the Additional Protocol into effect in conjunction with their regional safeguards authority, ABACC.

APPENDIX D IAEA STATEMENTS OF CONCLUSIONS FOR AUSTRALIA 2006-07

Inventory verification inspections carried out by the IAEA at Australian nuclear facilities and locations are shown in Table 6. 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.

Table 20: IAEA Conclusions of Inspections in Australia

Verification Activity	Applicable Facilities	End Date of Material Balance Period	Conclusion
Examination of records	HIFAR OPAL R&D Laboratories SSL	12/03/2007 15/03/2007 13/03/2007 16/03/2007	'The records satisfied the Agency requirements.'
Examination of Reports to the Agency	HIFAR OPAL R&D Laboratories SSL	12/03/2007 15/03/2007 13/03/2007 16/03/2007	'The reports satisfied the Agency requirements.'
Application of Containment and Surveillance Measures	HIFAR	12/03/2007	'The application of containment and surveillance measures adequately complemented the nuclear material accountancy measures.'
Verification of Domestic and International Transfers	HIFAR OPAL	12/03/2007 15/03/2007	'The domestic and international transfers declared by the operator were verified and the results satisfied the Agency requirements.'
Verification of Physical Inventory	HIFAR OPAL R&D Laboratories SSL	12/03/2007 15/03/2007 13/03/2007 16/03/2007	'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	HIFAR OPAL	12/03/2007 15/03/2007	'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	HIFAR R&D Laboratories	12/03/2007 13/03/2007	'The verification activities for timely detection during the material balance period satisfied the Agency requirements.'

The IAEA provides statements of conclusions of inspections under Article 91(b) of Australia's NPT Safeguards Agreement. Table 20 summarises the latest available Article 91(b) statements arising from physical inventory inspections. The IAEA has not closed the material balance period for locations outside Lucas Heights since 2004 and hence no Article 91(b) conclusions were made for 2006-07.

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 2006 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:*
> *• Lucas Heights Science & Technology Centre, (Building 3);*
> *• Lucas Heights Science & Technology Centre, (Building 19);*
> *• Flinders University;*
>
> *Access pursuant to Article 4.a.(i) did not indicate the presence of undeclared nuclear material or activities at the following sites, however, final conclusion is pending the results and evaluation of environmental samples:*
> *• Olympic Dam Mine, Olympic Mine, South Australia;*
> *• Lucas Heights Science & Technology Centre, Silex Systems Ltd. Research Laboratories (Building 64).*

APPENDIX E FUNDAMENTAL PRINCIPLES AND OBJECTIVES OF PHYSICAL PROTECTION

These principles were agreed by the IAEA Board and published in GOV/2001/41 dated 15 August 2001.

FUNDAMENTAL PRINCIPLE A: Responsibility of the State
The responsibility for the establishment, implementation and maintenance of a physical protection regime within a State rests entirely with that State.

FUNDAMENTAL PRINCIPLE B: Responsibilities during International Transport
The responsibility of a State for ensuring that nuclear material is adequately protected extends to the international transport thereof, until that responsibility is properly transferred to another State, as appropriate.

FUNDAMENTAL PRINCIPLE C: Legislative and Regulatory Framework
The State is responsible for establishing and maintaining a legislative and regulatory framework to govern physical protection. This framework should provide for the establishment of applicable physical protection requirements and include a system of evaluation and licensing or other procedures to grant authorization. This framework should include a system of inspection of nuclear facilities and transport to verify compliance with applicable requirements and conditions of the license or other authorizing document, and to establish a means to enforce applicable requirements and conditions, including effective sanctions.

FUNDAMENTAL PRINCIPLE D: Competent Authority
The State should establish or designate a competent authority which is responsible for the implementation of the legislative and regulatory framework, and is provided with adequate authority, competence and financial and human resources to fulfil its assigned responsibilities. The State should take steps to ensure an effective independence between the functions of the State's competent authority and those of any other body in charge of the promotion or utilization of nuclear energy.

FUNDAMENTAL PRINCIPLE E: Responsibility of the License Holders
The responsibilities for implementing the various elements of physical protection within a State should be clearly identified. The State should ensure that the prime responsibility for the implementation of physical protection of nuclear material or of nuclear facilities rests with the holders of the relevant licenses or of other authorizing documents (e.g. operators or shippers).

FUNDAMENTAL PRINCIPLE F: Security Culture
All organisations involved in implementing physical protection should give due priority to the security culture, to its development and maintenance necessary to ensure its effective implementation in the entire organisation.

FUNDAMENTAL PRINCIPLE G: Threat
The State's physical protection should be based on the State's current evaluation of the threat.

FUNDAMENTAL PRINCIPLE H: Graded Approach
Physical protection requirements should be based on a graded approach, taking into account the current evaluation of the threat, the relative attractiveness, the nature of the material and potential consequences associated with the unauthorized removal of nuclear material and with the sabotage against nuclear facilities or nuclear material.

FUNDAMENTAL PRINCIPLE I: Defence in Depth
The State's requirements for physical protection should reflect a concept of several layers and methods of protection (structural or other technical, personnel and organisational) that have to be overcome or circumvented by an adversary in order to achieve his objectives.

FUNDAMENTAL PRINCIPLE J: Quality Assurance
A quality assurance policy and quality assurance programmes should be established and implemented with a view to providing confidence that specified requirements for all activities important to physical protection are satisfied.

FUNDAMENTAL PRINCIPLE K: Contingency Plans
Contingency (emergency) plans to respond to unauthorized removal of nuclear material or sabotage of nuclear facilities or nuclear material, or attempts thereof, should be prepared and appropriately exercised by all license holders and authorities concerned.

FUNDAMENTAL PRINCIPLE L: Confidentiality
The State should establish requirements for protecting the confidentiality of information, the unauthorized disclosure of which could compromise the physical protection of nuclear material and nuclear facilities.

APPENDIX F IAEA SAFEGUARDS STATEMENT FOR 2006

The following is extracted from the IAEA's Annual Report for 2006.

'In 2006, safeguards were applied for 162 States with safeguards agreements in force with the Agency. The Secretariat's findings and conclusions for 2006 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. Seventy-five States had both comprehensive safeguards agreements and additional protocols in force:

   (a) For 32 of these States[53], 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 43 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 78 States with comprehensive safeguards agreements in force, but without additional protocols in force[54]. 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. The Secretariat concluded that, for 2006, declared nuclear material in Iran remained in peaceful activities. However, the Secretariat was unable to make progress in resolving the outstanding issues related to the completeness of Iran's declarations. Verification of the correctness and completeness of Iran's declarations remained ongoing. In February 2006, the Board of Governors requested the Director General to report to the United Nations Security Council all Agency reports and resolutions, as adopted, relevant to the implementation of Iran's safeguards agreement.

3. As of the end of 2006, 31 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 in force safeguards agreements concluded pursuant to 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

53 And Taiwan, China.

54 The 78 States do not include the Democratic People's Republic of Korea (DPRK), as the Secretariat was not able to perform verification activities in that State and, therefore, could not draw any conclusion.

misuse of the facilities or other items to which safeguards were applied. On this basis, the Secretariat concluded that, for these States, nuclear material, facilities or other items to which safeguards were applied remained in peaceful activities.

5. Five nuclear-weapon States had voluntary offer safeguards agreements in force. Safeguards were implemented with regard to declared nuclear material in selected facilities in four of the five States. For these four States, the Secretariat found no indication of the diversion of nuclear material to which safeguards were applied. On this basis, the Secretariat concluded that, for these States, nuclear material to which safeguards were applied in selected facilities was not withdrawn, except as provided for in the agreements, and remained in peaceful activities.'

APPENDIX G STATUS OF CTBT IMS FACILITIES IN AUSTRALIA

Table 21: Status of Australian CTBT IMS Stations at 30 June 2007

Facility	Status	Operator
Primary Seismic Stations		
Warramunga, NT	Certified against CTBT standards	ANU
Alice Springs, NT	Certified against CTBT standards	GA / US
Stephens Creek, NSW	Certified against CTBT standards	GA
Mawson, Antarctica	Certified against CTBT standards	GA
Auxiliary Seismic Stations		
Charters Towers, QLD	Certified against CTBT standards	GA
Fitzroy Crossing, WA	Certified against CTBT standards	GA
Narrogin, WA	Certified against CTBT standards	GA
Infrasound Stations		
Warramunga, NT	Certified against CTBT standards	ANU
Hobart, TAS	Certified against CTBT standards	GA
Shannon, WA	Certified against CTBT standards	GA
Cocos Islands	Establishment work underway	GA
Davis Base, Antarctica	Site survey underway	GA
Radionuclide Stations		
Melbourne, VIC	Certified against CTBT standards	ARPANSA
Perth, WA	Certified against CTBT standards	ARPANSA
Townsville, QLD	Certified against CTBT standards	ARPANSA
Darwin, NT	Certified against CTBT standards	ARPANSA
Cocos Islands	Certified against CTBT standards	ARPANSA
Macquarie Island, TAS	Site survey completed	ARPANSA
Mawson, Antarctica	Site survey underway	ARPANSA
Radionuclide Laboratory		
Melbourne, VIC	Certified against CTBT standards	ARPANSA
Hydroacoustic Stations		
Cape Leeuwin, WA	Certified against CTBT standards	GA

APPENDIX H FREEDOM OF INFORMATION STATEMENT

This statement is provided in accordance with section 8 of the *Freedom of Information Act 1982* (FOI Act) and is correct to 30 June 2007.

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. ASNO received no FOI requests in 2006-07.

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 General
Australian Safeguards and Non-Proliferation Office
R G Casey Building
John McEwen Crescent
BARTON ACT 0221
Australia
Telephone: +61 (2) 6261 1920
Facsimile: +61 (2) 6261 1908
E-mail: asno@dfat.gov.au

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, memorandums 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 policy and strategies;
- Materials relating to staff development, training, personnel management and general administration; and
- 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:

Nuclear

- John Carlson, Russell Leslie, Annette Berriman, *Nuclear weaponisation activities: what is the role of IAEA safeguards?* INMM 47th Annual Meeting, Nashville Tennessee. 16-20 July 2006.
- John Carlson, Russell Leslie, Annette Berriman, *Detection of undeclared nuclear activities: does the IAEA have the necessary capabilities?* INMM 47th Annual Meeting, Nashville Tennessee. 16-20 July 2006.
- Annette Berriman, Russell Leslie, John Carlson, *The role of "safeguards criteria" in an evolving safeguards environment*, INMM 47th Annual Meeting, Nashville Tennessee. 16-20 July 2006.
- Andrew Leask, *The strengthened safeguards system – the Australian perspective*, Seminar on Multilateral Verification of Nuclear Non-Proliferation Undertakings: IAEA workshop on Safeguards Agreement, Small Quantities Protocols and Additional Protocols, Sydney 4-6 July 2006.
- ASNO submission to Uranium Mining, Processing and Nuclear Energy Review, 16 August 2006.
- Stephan Bayer, *COAG Review of Hazardous Materials – recommendations concerning nuclear material*, presentation to Coalition of Australian Governments, Brisbane, 25 August 2006.
- Submission 30 (29 September 2006) to the Joint Standing Committee on Treaties (JSCOT) inquiry into the Australia-China nuclear agreements, Australia-China nuclear agreements – JSCOT hearing 4 September 2006, Response to questions from ACF raised on notice by Mr Kim Wilkie MP.
- *Sensitive technologies: the tertiary sector's responsibilities*, Prepared jointly by DFAT, ASNO, Defence & PM&C, September 2006.
- Andrew Leask, *Australia's national experiences and efforts in the field of non-proliferation*, Global Disarmament and Non-Proliferation Seminar, Bali, Indonesia, October 2006.
- John Carlson, *Defining the safeguards mission,* IAEA Safeguards Symposium, Vienna, Austria, 16-20 October 2006.
- Andrew Leask, *Australia's national experiences and efforts in the field of non-proliferation*, Global Disarmament and Non-Proliferation Seminar, Bali Indonesia, October 2006.
- Supplementary submission 30.1 (10 November 2006) to the Joint Standing Committee on Treaties (JSCOT) inquiry into the Australia-China nuclear agreements, Australia-

China Nuclear Agreements: JSCOT Hearing 25 October 2006 Response to Questions from Friends of the Earth Raised in a Submission to the Inquiry.

- Andrew Leask, *The global non-proliferation architecture: existing mechanisms and export controls,* 5th United Nations-Republic of Korea Joint Conference on Disarmament and Non-Proliferation, December 2006.
- Andrew Leask, *Overview of international non-proliferation activities and challenges, and international export control regimes*, dialogue between Australia and India on Export Controls, 24-25 January 2007.
- Andrew Leask*, Implementing the amended convention on the physical protection of nuclear material*, Global Initiative to Combat Nuclear Terrorism, Regional Seminar, Sydney, 17-18 May 2007.
- Craig Everton as co-author with non-ASNO authors*, Field application of a portable detector for the Verification of Research Reactor Spent Fuel*, H.O. Menlove and M.T. Swinhoe, LANL, USA, A.Lebrun and R. Lafolie, IAEA, R. Godfrey and D. Roach, ASNTO, C. Everton, ASNO, presented at 29th ESARDA (European Safeguards Research and Development Association) Annual Meeting, France, 22-24 May 2007.
- Russell Leslie, John Carlson, Andrew Leask and Annette Berriman, *Developing and maintaining safeguards expertise: Australia's experience*, discussion paper 23 May 2007 for meeting on establishing an Asia-Pacific safeguards association.
- John Carlson, *Challenges to the nuclear non-proliferation regime: Can the regime survive? An Australian perspective*, presented to the Carnegie Moscow Centre, 29 May 2007.
- John Carlson, *Developments in the international safeguards system and the implications for national nuclear programs*, Seminar on the role of the international legal framework on nuclear peaceful uses in supporting the Indonesian nuclear power plant program, Bali, Indonesia, 6 June 2007.
- John Carlson as co-author with non-ASNO authors, James Larrimore, Myron Kratzer and Bruce Moran, *Transparency and openness: roles and limitations in the nuclear non-proliferation verification system*, Journal of Nuclear Materials Management, Volume XXXV, number 1, Fall 2006.

Chemical

- Josy Meyer and Vanessa Masters, OPCW verifies compliance with the Chemical Weapons Convention, DFATNEWS, Vol.13(7), July 2006.
- Josy Meyer, *Australian Non-Paper on Nil Declarations*, distributed to delegations in The Hague and on OPCW website, 10 August 2006.
- Josy Meyer and Vanessa Masters, *Chemical Trade and the Chemical Weapons Convention*, Defence Export Controls Bulletin Issue 3, Autumn 2007.
- Josy Meyer, *Promoting universal adherence to the Convention – assistance to States Parties*, 4th Annual Meeting of National Authorities of States Parties in Asia, Jakarta, 5-7 September 2006.
- Josy Meyer, *Role of Customs authorities in carrying out the import/export provisions of the CWC*, 4th Annual Meeting of National Authorities of States Parties in Asia, Jakarta, 5-7 September 2006.
- Josy Meyer, *National obligations under the Chemical Weapons Convention*, Industry Workshop on Implementing the Chemical Weapons Convention, Jakarta, Indonesia, 26-27 February 2007.

- Josy Meyer, *Identification and reporting requirements of declarable chemical facilities under Article VI,* Industry Workshop on Implementing the Chemical Weapons Convention, Jakarta, Indonesia, 26-27 February 2007.
- Josy Meyer, *OPCW inspection process and the role of the National Authority,* Industry Workshop on Implementing the Chemical Weapons Convention, Jakarta, Indonesia, 26-27 February 2007.
- Josy Meyer, *Preparing the national authority and industry for receiving OPCW inspections under Article VI*, bilateral meeting with CWC National Authority of Malaysia, Kuala Lumpur, 2 March 2007.
- Josy Meyer and Vanessa Masters, *Celebrating 10 years of implementing a global ban on Chemical Weapons,* Plastics and Chemicals Industries Association Member News Update, April 2007.
- Josy Meyer and Vanessa Masters, *The Chemical Weapons Convention: 10 years on,* Chemistry in Australia, Volume 74, No. 3, April 2007 (magazine of the Royal Australian Chemical Institute Inc.).

Papers prepared during the reporting period and presented after June 2007

- John Carlson*, Five decades of safeguards, and directions for the future: an Australian perspective*, Journal of Nuclear Materials Management, Volume XXXV, number 4, Summer 2007.
- John Carlson, *Addressing proliferation challenges from the spread of uranium enrichment capability*, INMM 48th Annual Meeting, Tucson, Arizona, 2007.
- John Carlson, *SAGSI: its role and contribution to safeguards development*, INMM 48th Annual Meeting, Tucson, Arizona, 2007.
- Russell Leslie, John Carlson and Annette Berriman, *Potential for production of proliferation sensitive materials in research reactors*, INMM 48th Annual Meeting, Tucson, Arizona, 2007.
- Russell Leslie, John Carlson and Annette Berriman, *Ensuring effective safeguards coverage of states with small quantities protocols*, INMM 48th Annual Meeting, Tucson, Arizona, 2007.

Compliance Index

This index is prepared from the checklist of annual report requirements set out in Attachment E 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* in June 2005.

Description	Requirement	Location
Letter of transmittal	Mandatory	Page iii
Table of contents	Mandatory	Page iv
Index	Mandatory	Page 92
Glossary	Mandatory	Page 86
Contact officer(s)	Mandatory	Page ii
Internet home page address and Internet address for report	Mandatory	Page ii
Review by Secretary		
Review by statutory office holder	Mandatory	Page 1
Summary of significant issues and developments	Suggested	Page 1
Overview of department's performance and financial results	Suggested	N/A
Outlook for following year	Suggested	Page 7
Significant issues and developments—portfolio	Portfolio departments—suggested	Page 9
Departmental Overview		
Overview description of Office	Mandatory	Page 30
Role and functions	Mandatory	Page 30
Organisational structure	Mandatory	Page 63
Outcome and output structure	Mandatory	Page 37
Where outcome and output structures differ from PBS format, details of variation and reasons for change	Mandatory	N/A
Portfolio structure	Portfolio departments—mandatory	DFAT AR
Report on Performance		
Review of performance during the year in relation to outputs and contribution to outcomes	Mandatory	Page 38
Actual performance in relation to performance targets set out in PBS/ PAES	Mandatory	DFAT AR
Performance of purchaser/ provider arrangements	If applicable, mandatory	N/A
Where performance targets differ from the PBS/ PAES, + details of both former and new targets, and reasons for the change	Mandatory	N/A
Narrative discussion and analysis of performance	Mandatory	Page 38
Trend information	Suggested	Page 66
Factors, events or trends influencing departmental performance	Suggested	N/A
Significant changes in nature of principal functions/ services	Suggested	N/A

Performance against service charter customer service standards, complaints data, and the department's response to complaints	If applicable, mandatory	N/A
Social justice and equity impacts	Suggested	N/A
Discussion and analysis of the Office's financial performance	Mandatory	Page 64
Discussion of any significant changes from the prior year or from budget.	Suggested	N/A
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
Corporate Governance and Management Accountability		
Statement of the main corporate governance practices in place	Mandatory	DFAT AR
Names of the senior executive and their responsibilities	Suggested	Page 62
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 and arrangements in place to manage risks	Suggested	DFAT AR
Agency heads are required to certify that their agency comply with the Commonwealth Fraud Control Guidelines.	Mandatory	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 62
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
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 62
Impact and features of certified agreements and AWAs	Suggested	DFAT AR
Training and development undertaken and its impact	Suggested	Page 64
Occupational health and safety performance	Suggested	DFAT AR
Productivity gains	Suggested	DFAT AR
Statistics on staffing	Mandatory	Page 64
Certified agreements and AWAs	Mandatory	DFAT AR
Performance pay	Mandatory	DFAT AR
Contracts exempt from Purchasing and Disposal Gazette	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). (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 proforma as set out in Attachment D.)	Mandatory	DFAT AR
Competitive Tendering and Contracting		
Competitive tendering and contracting contracts let and outcomes	Mandatory	DFAT AR
Absence of contractual provisions allowing access by the Auditor-General	Mandatory	DFAT AR
Contracts exempt from the Purchasing and Disposal Gazette	Mandatory	DFAT AR
Financial Statements		
Financial Statements	Mandatory	DFAT AR
Other Information		
Occupational health and safety (section 74 of the *Occupational Health and Safety (Commonwealth Employment) Act 1991)*	Mandatory	DFAT AR
Freedom of Information (subsection 8(1) of the *Freedom of Information Act 1982)*	Mandatory	Page 79
Report on performance in implementing the Commonwealth Disability Strategy	Mandatory	DFAT AR
Advertising and Market Research (section 311A of the *Commonwealth Electoral Act 1918)*	Mandatory	DFAT AR
Ecologically sustainable development and environmental performance (Section 516A of the *Environment Protection and Biodiversity Conservation Act 1999*)	Mandatory	DFAT AR
Discretionary Grants	Mandatory	DFAT AR
Correction of material errors in previous annual report	If applicable, mandatory	N/A

Glossary

Additional Protocol	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.
Agency Inspector	Person nominated by the IAEA and declared under section 57 of the Safeguards Act to undertake IAEA inspections.
AMS	Accelerator Mass Spectroscopy.
ANSTO	Australian Nuclear Science and Technology Organisation.
AONM	Australian Obligated Nuclear Material. Australian uranium and nuclear material derived therefrom which is subject to obligations pursuant to Australia's bilateral safeguards agreements.
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency.
ASIO	Australian Security and Intelligence Organisation.
ASSP	Australian Safeguards Support Program.
Australia Group	The Australian-chaired, multilateral arrangement for coordinating national export controls on materials and equipment of potential relevance to chemical and biological weapons.
BAPETEN	Indonesian Nuclear Energy Control Board.
BATAN	Indonesian National Nuclear Energy Agency.
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	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 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 to give effect to the CTBT.
Customs	Australian Customs 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).
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	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%.
Environmental analysis	A technique for detecting residual traces of nuclear material on building surfaces, in plants and soil, in water and in the air. A very powerful safeguards tool, the value of which was first demonstrated in Iraq.
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.
Facility Attachment	A document agreed between the IAEA and the relevant Member State that specifies the nuclear materials accountancy system for a specific facility and defines the format and scope of inspection activities.
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).
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).
FMCT	Fissile Material Cut-off Treaty. A proposed international treaty to prohibit production of fissile material for nuclear weapons.
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.
G-8	Group of Eight. Comprises Canada, France, Germany, Italy, Japan, Russia, the United Kingdom and the United States.
GA	Geoscience Australia (formerly the Australian Geological Survey Organisation).
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 (hydrogen 2) 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.
HEU	High enriched uranium. Uranium enriched to 20% or more in ^{235}U. Weapons-grade HEU is enriched to over 90% ^{235}U.
HIFAR	High Flux Australian Reactor. The 10 MWt research reactor located at ANSTO, Lucas Heights.
Hydro-acoustic	Term referring to underwater propagation of pressure waves (sounds).
IAEA	International Atomic Energy Agency.
IDC	International Data Centre. Data gathered by monitoring stations in the CTBT IMS network is compiled, analysed and archived by the Vienna-based IDC. IDC products giving the results of analyses are made available to CTBT signatories.
IMS	International Monitoring System. A network of 337 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 explosive nuclear testing.
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/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.
INFCIRC/153 (Corrected)	The model agreement used by the IAEA as a basis for safeguards agreements with non-nuclear-weapon states party to the NPT.
INFCIRC/225 Rev.4 (Corrected)	IAEA document entitled 'The Physical Protection of Nuclear Material 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	The model text of the Additional Protocol.

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.
Inventory Change Report	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 the same chemical element.
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.
Light water	H_2O. Standard water.
Light water reactor	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).
Material Balance Report	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.
Missile Technology Control Regime, MTCR	An informal and voluntary association of countries which share the goals of non-proliferation of unmanned delivery systems capable of delivering weapons of mass destruction, and which seek to coordinate national export licensing efforts aimed at preventing their proliferation.
Moata	Small training reactor located at Lucas Heights. The ANSTO Board decided to cease operation of this reactor in February 1995. The reactor was defuelled in May 1995.
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.
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%.
MUF	Material Unaccounted For. A term used in nuclear materials accountancy to mean the difference between operator records and the verified physical inventory. A large MUF may indicate diversion of material or loss of control, however, a certain level of MUF is expected due to measurement processes.
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%.
NNWS	Non-nuclear-weapon state(s). 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 Suppliers Group, NSG	A group of countries (currently 45) which seeks to contribute to the non-proliferation of nuclear weapons through the implementation of harmonised Guidelines for nuclear and nuclear-related exports.
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.
NWS	Nuclear-weapon state(s). 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.
OCW	Old chemical weapons.
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 by the Prime Minister on 20 April 2007.
OPCW	Organization for the Prohibition of Chemical Weapons.
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.
Physical Inventory Listing	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 for the Comprehensive Nuclear-Test-Ban Treaty.
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 Comprehensive Nuclear-Test-Ban Treaty.
^{239}Pu	An isotope of plutonium with atomic mass 239 (94 protons and 235 neutrons). The fissile isotope of plutonium most suitable for nuclear weapons.
R&D	Research and Development.
Reprocessing	Processing of spent fuel to separate uranium and plutonium from highly radioactive fission products.
ROK	Republic of Korea.
Safeguards Act	Nuclear Non-Proliferation (Safeguards) Act 1987.
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.
SAGSI	Standing Advisory Group on Safeguards Implementation. An international group of experts appointed by and advising the IAEA Director General on safeguards implementation matters.

SQP	Small Quantities Protocol – 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.
^{232}Th	Thorium-232.
Toxin	Compound originating from micro-organisms, animals or plants, irrespective of the method of production, whether natural or modified, that can cause death, disease or ill health to humans, animals or plants.
^{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.
UOC	Uranium Ore Concentrates. A commercial product of a uranium mill usually containing a high proportion (greater than 90%) of uranium oxide.
WMD	Weapons of mass destruction. Refers to nuclear, chemical, biological and occasionally radiological weapons.

Index