

AUSTRALIAN SAFEGUARDS
AND NON-PROLIFERATION OFFICE

ANNUAL REPORT
2007-2008

Director General ASNO

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Cover: Commercial wellfield at Beverley mine site. Photo courtesy of Heathgate Resources 2003
Oleochemical manufacturing facility. Symex Holdings Limited, Victoria, Australia
IAEA Board of Governors. IAEA Boardroom, Vienna, Austria, 9 July 2007. Photo by Dean Calma, IAEA.

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Australian Government

Australian Safeguards and Non-Proliferation Office

14 October 2008

Mr Stephen Smith MP
Minister for Foreign Affairs
Parliament House
CANBERRA ACT 2600

Dear Minister

I submit my Annual Report on the operations of the Australian Safeguards and Non-Proliferation Office (ASNO) for the financial year ended 30 June 2008. 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 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, including preventing terrorist access to materials for such weapons, 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

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Guide to the Report

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

The report has five parts:

- a report by the Director General ASNO on key developments in 2007-08 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 2007-08
- 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 75).

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. Suspected undeclared nuclear activities in Syria have also become a concern in the last year. The spread of proliferation sensitive nuclear technology (SNT), namely uranium enrichment and spent fuel reprocessing, remains an ongoing non-proliferation challenge.

Iran continues to expand its uranium enrichment capacity in defiance of resolutions passed by the United Nations Security Council, requiring it to suspend all enrichment activity. Despite the International Atomic Energy Agency (IAEA) reporting progress in resolving many of the outstanding technical issues pertaining to Iran's past undeclared nuclear activities, there remain serious concerns with respect to Iran's "alleged studies" related to weaponisation. Iran has stonewalled IAEA efforts to resolve this issue by insisting that all of the information on the alleged studies available to the IAEA is baseless fabrication and forgery. However, given the breadth of information available, the IAEA does not consider Iran's assertion credible. The IAEA, therefore, remains unable to provide assurances to the international community that there are no undeclared nuclear activities or materials in Iran.

The Six-Party process for resolving the DPRK nuclear issue has slowly progressed. The DPRK shut down its Yongbyon nuclear facilities in July 2007. Disablement activities are underway, including the destruction of the cooling tower of the Yongbyon reactor in June 2008. After much delay, the DPRK submitted its declaration on its nuclear programs to China on 26 June 2008. The United States and other members of the Six-Party process are currently checking the completeness and accuracy of the declaration to ensure that the DPRK has fully accounted for its nuclear program. The Six-Party talks are now focused on verification and monitoring principles that will provide credible assurance that DPRK is fulfilling its undertakings to denuclearise.

In September 2007 Israel destroyed what was reportedly an undeclared, partially constructed nuclear reactor in a remote region within Syria. Media reports indicated that the reactor had been designed and built with North Korean assistance, and that its intended purpose had been the production of plutonium for a nuclear weapons program. Syria's response to the attack was muted. It initially described the facility as an empty building and then as a militarily related building. Shortly after the attack, Syria completely demolished the remains of the building on the site, removed soil and vegetation and constructed a building of similar dimensions in its place. Despite repeated requests, Syria refused to permit the IAEA access to the site until June 2008. At the time of writing, the results of the IAEA inspection are pending.

The G8 moratorium on the transfer of SNT, which has been in place for the past five years, has come under increased strain with some G8 members having concerns the moratorium will hinder the introduction of these technologies in states that have sound economic reasons to use them. The Nuclear Suppliers Group (NSG) – of which Australia is a member – discussed possible ways to strengthen the criteria for SNT transfers at its plenary meeting in May 2008. Debate focused on whether to limit the transfer of SNT to a "black box" basis (i.e.

transfers of equipment but no transfers of technology), a provision that is in line with current practice of the technology holders. These considerations are ongoing.

Under the previous Government, Australia joined the Global Nuclear Energy Partnership (GNEP), at its inaugural ministerial meeting in September 2007, by signing the non-legally binding GNEP Statement of Principles.¹ At the time of writing, the Government is carefully considering the issue of Australia's future participation in GNEP.

In the meantime, GNEP membership has continued to grow and as of 30 June 2008 stood at twenty-one. GNEP partners have commenced working on the development of nuclear fuel supply assurances as an alternative to countries acquiring SNT. GNEP partners are also working on spent fuel cycling, as a means of consuming plutonium and other sensitive materials, and reducing the volume of high-level radioactive waste and the period this needs to be isolated from the environment.

IAEA Safeguards Agreement with India

The IAEA negotiated a draft safeguards agreement with India which, after protracted internal political debate, India has agreed to submit to the IAEA Board of Governors for its consideration.² The safeguards agreement will cover those nuclear facilities that India has designated as part of its civil nuclear program under its nuclear cooperation agreement with the US (which is yet to be ratified by the US). These facilities will be subject to IAEA safeguards.

International Atomic Energy Agency Safeguards

During the IAEA General Conference in September 2007, the IAEA Director General announced the establishment of a Commission of Eminent Persons, chaired by the former President of Mexico, Mr Ernesto Zedillo, and including former Australian Foreign Minister, Mr Gareth Evans, to look at the Agency's program up to 2020 and beyond. The Commission reported its findings, which covered the so-called "three pillars" of the Agency's Statute (promotion of nuclear energy, safety and safeguards), in May 2008.

With regard to safeguards, the report noted that from 1984 to 2007 the amount of nuclear material under safeguards had increased tenfold. The report estimates that the IAEA's safeguards responsibilities will continue to expand rapidly, especially given the expected increase in the number of nuclear facilities worldwide. The report concluded that without sufficient resources, the IAEA will not be able to maintain the same relative level of in-field inspection and verification effort. While inspection work in the field will remain important, the interpretation and analysis of all of the sources of safeguards relevant information available to the IAEA will assume greater importance. Emphasis will need to be directed towards the use of approaches that look at safeguards measures in a state-wide context (referred to as State-Level Approaches). This involves evaluating the potential acquisition paths/diversion scenarios relevant to each state, and state-specific factors, to determine the most effective and cost-efficient safeguards plan for that state.

At 30 June 2008, the number of states implementing the Additional Protocol, which gives the IAEA rights to additional information and increased access, grew to 88 from 82 a year prior. This is the first time that the number of states with comprehensive safeguards agreements (CSA) and an Additional Protocol in force exceeded the number of CSA states without an Additional Protocol. A further 38 states had signed Additional Protocols, or had Additional Protocols approved by the IAEA Board of Governors.

Of the 66 non-nuclear-weapon states (NNWS) with significant nuclear activities party to the Nuclear Non-Proliferation Treaty (NPT), 48 had an Additional Protocol in force, and 11 had

¹ See www.gnep.energy.gov/pdfs/GNEP_SOP.pdf.

² The IAEA Board of Governors approved the safeguards agreement by consensus on 1 August 2008.

signed an Additional Protocol or had an Additional Protocol approved by the Board, i.e. some 90% of all such states. Now that the Additional Protocol is becoming more and more accepted, Australia considers that it 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 Additional Protocol as a condition for supplying uranium to such states.

In implementing the Additional Protocol, by the end of 2007 the IAEA had made whole-of-state evaluations for 47 states, an increase of 47% over 2006. The IAEA reported in its *Safeguards Statement* for 2007 (see Appendix E) that it had found no indication of diversion, or undeclared nuclear materials or activities in any of these states.

Regional Safeguards Development

In February 2008, together with the then Chairman of BAPETEN, Indonesia's Nuclear Energy Control Board, Mr Sukarman Aminjoyo, I circulated a paper to senior officials in the Asia-Pacific region on the possible establishment of an Asia-Pacific Safeguards Association (APSA). This paper was prepared on the basis of discussions that took place at an informal meeting of senior officials in June 2007. In June 2008, ASNO's Assistant Secretary, Geoffrey Shaw, visited a number of countries in Asia to further discuss this proposal. Support for APSA is strong and a follow-up meeting of officials is likely to be held in the Republic of Korea (ROK) in 2009.

Regional outreach on non-proliferation issues continues to be one of ASNO's core business functions and serves two important Australian priorities. The first, operational capacity building, is providing assurance that regional counterpart organisations are able to fulfil their obligations under the NPT and the 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. A more detailed discussion of ASNO's outreach program can be found under "Output 1.4: International Safeguards and Non-Proliferation".

During the reporting period, ASNO provided training in the areas of nuclear safeguards, nuclear security and export controls to over 180 professionals from 15 regional countries.

Bilateral Safeguards Developments

On 7 September 2007 the then Australian Foreign Minister, Mr Alexander Downer, and the head of Russia's Federal Atomic Energy Agency, Mr Sergey Kiriyyenko signed a new nuclear cooperation agreement. This agreement, upon entry into force, will bring Australia's nuclear cooperation relationship with Russia into line with Australia's other bilateral agreements. The agreement was tabled in Parliament on 14 May 2008 and the first hearing by the Joint Standing Committee on Treaties (JSCOT) was held on 16 June 2008.³

In January 2008 Australia met with USA, Canada and Euratom to discuss bilateral nuclear safeguards agreements – in particular to establish a common understanding of the policies and mechanisms for the tracking of 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.

Domestic Safeguards Developments

In March 2008, ASNO re-issued permits granted to mines, which included a major update to security requirements. The new requirements prescribe security arrangements for uranium ore concentrates (UOC) from production at mines and transport within Australia to final shipment overseas.

3 JSCOT's report was tabled on 18 September 2008 – see page 38 below.

During the reporting period, in Australia the IAEA conducted three design information verification inspections, three 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.

As part of its effort to ensure the professional development of ASNO staff, and as an training exercise for DFAT and the broader Australian Intelligence Community, ASNO recommenced its series of seminars on non-proliferation relevant technologies. The seminars were very well attended, with the typical seminar having some forty attendees and up to ten different Canberra based government agencies represented.

Chemical Weapons Convention Developments

As a State Party to, and strong advocate of, the Chemical Weapons Convention (CWC), Australia was represented at the two major forums for industry and academia to mark the occasion of the Convention's 10 year anniversary held in the latter part of 2007. Australia continued its support of the ongoing efforts of the Organisation for the Prohibition of Chemical Weapons (OPCW) to ensure the verifiable destruction of existing chemical weapons and to prevent dual-use and other toxic chemicals from being used to make new chemical weapons. In March 2008, Ms Lydia Morton replaced Mr Stephen Brady as Australia's Ambassador to the Kingdom of the Netherlands and Permanent Representative to the OPCW. Australia continued to serve on the OPCW's Executive Council.



Ms Lydia Morton, Australian Ambassador to the Netherlands, after presenting her credentials as Permanent Representative of Australia to the OPCW to HE Mr Rogelio Pflirter, OPCW Director-General, on 31 March 2008. Photo courtesy of the OPCW.

Australia actively participated in the Second Review Conference of the CWC held in The Hague from 7-18 April 2008. The Conference successfully concluded with the adoption, by the 114 States Parties in attendance, of a consensus report reaffirming their commitment to the object and purpose of the Convention. As anticipated, the Conference Report did not chart any radical new directions for the OPCW, nor address contentious issues such as the 2012 chemical weapons destruction deadline. Rather it continued along the lines of the recommendations from the First Review Conference in 2003.

Australia's delegation worked to ensure that Australia's key positions were preserved, including references to relevant UN Security Council Resolutions and the role of the OPCW in countering chemical terrorism. Lack of consensus agreement on the language of the Conference Report meant that the Conference fell short of advancing a number of key implementation issues. Moreover, the lack of transparency and inclusiveness in arriving at the language contained in the final report is an issue to be addressed prior to the conduct of future review conferences.

As highlighted by Ambassador Morton in Australia's national statement to the Conference, Australia welcomed progress (albeit slow) made during the past five years towards chemical weapons destruction, improved implementation of national obligations and universality. Overall the CWC has performed well, although efforts to improve operational effectiveness, efficiency and full implementation of all CWC obligations need to be continued.

Australia has continued to promote effective and universal implementation of the Convention in the region. To this end, Australia worked closely with Japan, the Philippines and the OPCW in organising an Industry Workshop on Implementing the CWC. This was held in Manila in July 2007. ASNO also delivered presentations at the 5th Regional Meeting of National Authorities of CWC States Parties in Asia, held in Doha, Qatar, in September 2007.

In June 2008, Australia hosted a visit to Australia by the OPCW's Technical Secretariat to clarify Australia's offer of assistance and protection against chemical weapons use, or threat of use, as required under Article X of the Convention. The visit brought together a range of government agencies that will potentially be involved in the provision of assistance, to discuss practical issues surrounding the coordination and delivery of assistance to other States Parties if requested. The Technical Secretariat was appreciative of Australia's efforts and transparency in providing tours of stored items of protective and detection equipment managed by the Department of Defence and Emergency Management Australia, as well as the visit to the Australian Federal Police's deployable mobile analytical laboratory.

During the reporting period, the OPCW conducted four routine inspections of declared industrial chemical facilities in Australia. Australia presented a national paper during the Second Review Conference to encourage the technical secretariat to make better use of sequential inspections as a cost-effective way to improve the coverage and efficiency of CWC verification.

In February 2008, Australia hosted its first industrial chemical facility inspection involving sampling and analysis (S&A) at a declared chemical facility in Melbourne. This visit was part of an initial trial conducted in various regions, which began in September 2006, of OPCW inspections at facilities producing or using chemicals listed in Schedule 2 of the Convention. Further discussion about S&A inspections is available under "Current Topics".

Comprehensive Nuclear-Test-Ban Treaty Developments

At 30 June 2008, 178 states had signed the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and 144 had ratified. Nine of the 44 states which must ratify the Treaty to trigger its entry into force have yet to do so.⁴

In statements on 5 February and 12 May 2008, the Minister for Foreign Affairs, Mr Stephen Smith MP set out the Government's strong support for efforts to bring the CTBT into force, and to see the completion of its verification system. The Government believes that the CTBT is vital to the framework of measures needed to make progress on nuclear disarmament and non-proliferation, and has noted that its entry into force is an immediate

⁴ The states whose ratifications are required are: China, DPRK, Egypt, India, Indonesia, Iran, Israel, Pakistan and the US.

disarmament and non-proliferation priority. Mr Smith has urged all countries that have yet to ratify the CTBT, especially those amongst the remaining nine whose ratification is required for entry into force, to do so at the earliest opportunity.

In May 2008, Australia hosted a visit by the Executive Secretary of the CTBT Organization's Preparatory Commission, Ambassador Tibor Tóth. The Executive Secretary discussed with the Minister for Foreign Affairs, the Parliamentary Secretary for Pacific Island Affairs and with government officials how to promote support for the CTBT, with a particular focus on Australia's region. He also sought support for efforts to promote entry into force of the CTBT in discussions with parliamentarians and non-government organisations. ASNO, together with the Arms Control and Counter-Proliferation Branch of DFAT, coordinated the visit by Ambassador Tóth.

The Preparatory Commission coordinates and funds the build up of the CTBT verification system. At the end of 2007, around 78% of International Monitoring System (IMS) stations were operational, but not all had been certified as meeting treaty requirements. Delays, and in many cases failure, by states with payment of their assessed contributions to the Commission have hampered progress with the IMS, as well as other aspects of the verification system. Australia continues to call for all member states to provide the Commission with the resources it needs.

Other Non-Proliferation Developments

On 9 June 2008 the Prime Minister of Australia, Mr Kevin Rudd, proposed the International Commission on Nuclear Non-proliferation and Disarmament (ICNND), to be co-chaired by former Australian Foreign Minister Gareth Evans. On 9 July, Prime Minister Rudd and Japanese Prime Minister Yasuo Fukuda agreed to establish the Commission and announced that former Japanese Foreign Minister Yoriko Kawaguchi would co-chair the Commission. It is envisaged that ASNO will contribute substantially to the work of the ICNND.⁵

During the reporting period, ASNO was actively engaged in interdepartmental activities to coordinate Australian non-proliferation and counter-proliferation efforts. ASNO provided sound technical advice on non-proliferation issues to policy makers, other regulatory agencies and the Australian intelligence community.

THE YEAR AHEAD

The following developments in the international environment are likely to impact on ASNO's work during 2008-09:

- developments with Iran's nuclear program, including the IAEA's efforts to resolve serious concerns about the military dimensions of that program, and diplomatic efforts to persuade Iran to suspend its enrichment activities
- developments with the DPRK's nuclear program, including further disablement of facilities, possible verification activities and assessment of the DPRK's declaration
- IAEA investigations into possible undeclared nuclear activities in Syria
- progress of the IAEA-India safeguards agreement at the IAEA Board of Governors⁶ and consideration in the NSG of a possible exemption for India⁷
- international efforts to limit the spread of enrichment and reprocessing technology, and corresponding efforts to develop assurance of supply mechanisms

5 The establishment of the ICNND was announced by the Prime Minister Mr Kevin Rudd and Japanese Prime Minister Mr Taro Aso in New York on 25 September 2008.

6 The IAEA Board of Governors approved this safeguards agreement by consensus on 1 August 2008.

7 The NSG agreed to arrangements for India on 6 September 2008.

- the work of the International Commission on Nuclear Non-proliferation and Disarmament
- the presidential election in the United States, and the possible impact on key non-proliferation objectives such as entry-into-force of CTBT and the beginning of formal negotiations on a Fissile Material Cut-Off Treaty (FMCT) at the Conference on Disarmament (CD)
- the election of a new IAEA Director General.

Regionally, ASNO will seek to continue to build operational capacity in nuclear safeguards and security, and export controls.

Bilaterally, ASNO will work to complete ratification of the new nuclear cooperation agreement with Russia and to bring it into operation, including the conclusion of a memorandum of understanding incorporating administrative arrangements for implementing the agreement.

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. ASNO, in conjunction with the IAEA and the US Department of Energy (DOE), plan to hold a regional course on the security of nuclear research facilities in the coming year.

Domestically, ASNO will continue to work with the Australian Nuclear Science and Technology Organisation (ANSTO) to implement physical protection upgrades at the OPAL reactor at Lucas Heights and rationalise security associated with ANSTO's plan to consolidate nuclear material holdings in light of the decommissioning of the HIFAR reactor. Additionally, ASNO will work with the uranium mines to confirm compliance with new security requirements.

Sustained effort is required to ensure the full and effective regional and international implementation of the Chemical Weapons Convention, as the means by which its objectives can be met, whilst also raising barriers against chemical terrorism in the current global security environment. ASNO will continue to encourage the OPCW together with States Parties to work steadfastly towards the complete destruction of remaining chemical weapons stockpiles and in monitoring legitimate chemical activities to prevent new chemical weapons from being developed. ASNO will make every effort to provide regional capacity-building assistance and technical advice by sharing lessons learned from its implementation experiences. ASNO will continue to conduct industry outreach to ensure compliance with the domestic legislation, and will work with other stakeholder agencies to review the efficacy of Australia's current CWC implementing legislation and regulations.

ASNO will work with other States Parties to encourage a more active contribution by the OPCW in addressing the threat of chemical terrorism, including by encouraging the OPCW to develop and share best practices for the safety and security of chemicals and chemical facilities.

The fact that the Comprehensive Nuclear-Test-Ban Treaty has not entered into force more than eleven years after being opened for signature remains a matter of deep concern. There is reason for hope however. The need for new efforts to revitalise nuclear non-proliferation and disarmament has increasingly become a focus of international discourse over 2007-08, including in statements by US presidential contenders. A renewed focus on the CTBT has been part of this. The International Commission on Nuclear Non-proliferation and Disarmament could add new impetus also.

Development of the verification system for the CTBT will continue, but the rate of progress will remain limited by the budgetary and financial constraints on the CTBT Organization's Preparatory Commission. Based on current funding, progress from the current 78%

completion of the International Monitoring System (IMS) to about 90% will take around 5 years. Of the 21 IMS facilities that Australia will host, 17 are fully operational. Work to construct two of the remaining four is planned for 2009, and one further by 2011.

If new political commitments to nuclear disarmament are made, they will have to be underpinned by effective verification. The development of concepts and technical methods applicable for disarmament is discussed at page 13 of this report. ASNO will contribute to this work. In 2007, the United Kingdom announced that it would become a "disarmament laboratory" to test verification measures for key aspects of disarmament, including the verifiable elimination of nuclear weapons. ASNO is developing its cooperation with UK agencies on this work, and will host a workshop of UK and Australian experts in late 2008.

John Carlson
Director General ASNO

CURRENT TOPICS

NUCLEAR GROWTH AND PROLIFERATION ISSUES⁸

Nuclear energy is gaining increased interest worldwide, especially because of its potential to mitigate greenhouse gas emissions. For example, in our region Indonesia, Malaysia, the Philippines, Thailand and Vietnam are considering nuclear power programs. The expansion of nuclear power programs and the involvement of a wider range of countries raise the issue of how to ensure this does not lead to increased risk of nuclear weapons proliferation.

It is important to appreciate that nuclear power reactors in themselves do not present a proliferation problem. Production of nuclear weapons requires highly enriched uranium or separated plutonium – the principal barrier to proliferation continues to be the difficulty of obtaining these materials. Production of these materials requires enrichment or reprocessing facilities – collectively described as “sensitive nuclear technologies” or SNT. SNT are relatively limited in non-nuclear-weapon states (NNWS).

Past and current proliferation cases have involved development of unsafeguarded enrichment or reprocessing capabilities. Historically, proliferation programs have followed two routes:

- operation of reactors of a type optimised for production of low burn up plutonium – including large natural uranium fuelled “research” reactors such as those of India, Israel and the DPRK, and now being built by Iran – together with reprocessing plants or large hot cells for separation of plutonium, or
- operation of uranium enrichment plants – particularly stolen Urenco centrifuge technology which found its way onto the black market. Examples include Pakistan, Iraq and Libya. Iran’s enrichment program has similar origins – and Iran’s pursuit of enrichment in violation of Security Council resolutions raises international concern about its underlying purpose.

Although these cases have involved illicit or unsafeguarded programs, there is a potential problem for the future – that sensitive nuclear facilities established ostensibly for “civil” purposes could be used to support a break-out from non-proliferation commitments. Hence it is important to limit such facilities. Two conclusions follow:

- proliferation risk lies not with the spread of nuclear power as such, but with the spread of SNT
- maintaining the effectiveness of the non-proliferation regime depends on maintaining effective control over these technologies.

It is neither necessary nor cost effective for every country with a nuclear power program to have uranium enrichment and reprocessing facilities. Because possession of such capabilities, particularly in regions of tension, could give rise to international concerns, and also because of 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 legitimate need to develop national SNT facilities.

⁸ This is a summary of a presentation made by John Carlson to the 2007 Conference of the Australian Nuclear Association, Sydney, 19 October 2007.

It is now apparent that the Nuclear Non-Proliferation Treaty (NPT) does not adequately deal with the issue of SNT. The NPT refers to the "inalienable" right to use nuclear energy. The Treaty certainly does not guarantee the right to develop SNT. Nor, however, does the Treaty explicitly limit the development of SNT, other than by the fundamental obligations of NNWS not to acquire (or seek to acquire) nuclear weapons, and to place all their nuclear material under IAEA safeguards.

Current approaches to control the spread of SNT have focused on measures against the transfer of equipment, components, special materials and technology, through national export controls and multilateral coordination within the NSG. However, these approaches do not fully address the problems of illicit acquisition of enrichment technology and development of indigenous enrichment technology. A way is needed to assess the international acceptability of enrichment projects regardless of whether they involve authorized transfers of controlled items.

Concerns about SNT programs are not addressed simply by having these activities placed under safeguards. Safeguards are an essential part of international confidence-building, but safeguards alone cannot provide assurance about a country's future intent. An enrichment or reprocessing facility under safeguards today could be used as the basis for break-out from non-proliferation commitments in the future. In the case of enrichment, a large centrifuge plant, using LEU feed, could produce sufficient HEU for a nuclear weapon in a matter of days, or even hours.⁹ An essential aspect of non-proliferation is minimising the risk of break-out occurring, through limiting the countries with SNT facilities to those regarded as presenting a low proliferation risk.

Since the NPT does not elaborate on the issues surrounding SNT, it is now apparent there is a need to develop an international framework dealing with these issues, to complement the objectives of the NPT. Such a framework might address the following elements:

- how to reduce the availability of SNT for misuse now or in the future
- how to ensure that countries with nuclear power programs have a secure and reliable supply of fuel, so they have no legitimate need to develop national enrichment or reprocessing capabilities
- development of proliferation-resistant fuel cycle technologies.

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 NSG should refrain from transferring enrichment and reprocessing equipment and technology to any country that does not already have "full-scale functioning" facilities. This year the G8¹⁰ welcomed the progress of the NSG in "moving towards consensus on a criteria based approach to strengthen controls on transfers of enrichment and reprocessing equipment, facilities and technology". Further, the G8 agreed that "transfers of enrichment equipment, facilities and technology to any additional state in the next year will be subject to conditions that, at a minimum, do not permit or enable replication of facilities; and where technically feasible reprocessing transfers to any additional state will be subject to those same conditions".

The NSG has been discussing what such criteria might involve. While details of the NSG's deliberations are not publicly available, possible criteria could include: a country's non-proliferation and safeguards record and whether it has ratified an IAEA Additional Protocol; whether there is a clear economic rationale for the project concerned; whether there is

9 See John Carlson, Addressing Proliferation Challenges from the Spread of Uranium Enrichment Capability, Annual Meeting of the Institute of Nuclear Materials Management, Tucson, 8-12 July 2007.

10 The Group of Eight comprises Canada, France, Germany, Italy, Japan, Russia, the UK and the US.

multination or regional involvement in the project; and the implications of the project for international and regional security.

Recent initiatives have shifted focus from supply and denial policies to addressing demand – how to create conditions under which countries that might otherwise consider national enrichment projects would have no reason to continue – indeed would have incentives not to do so. For example, a number of proposals involve supply assurances – that countries choosing not to pursue national enrichment projects would be given assurances about the supply of nuclear fuel at commercial prices. The IAEA has prepared a collation of these proposals.¹¹

One of the main proposals along these lines is the “Concept for a Multilateral Mechanism for Reliable Access to Nuclear Fuel” (RANF), launched by France, Germany, the Netherlands, Russia, the UK and the US in June 2006. This proposal focuses on assurances for reliable supply of enrichment services or enriched uranium for countries not pursuing national enrichment or reprocessing projects. In July 2007 the US and Russia launched a new initiative, developing the fuel assurance concept further.

A further elaboration in this area is the concept of an international fuel cycle centre, under which enrichment facilities would be operated by groups of countries rather than as national projects. Interested countries could participate, securing a share of product and profit, but without having access to the technology – the technology holder would retain sole control of the technology. In addition to the fuel assurance aspect, there is also an important non-proliferation benefit – the involvement of several countries, appropriate treaty arrangements, and limiting know-how to the technology holder, would help ensure sensitive facilities were not misused.

The concept of multination ownership of sensitive nuclear facilities has been around for some decades. Now, Russia is proceeding with a practical expression of this concept. The enrichment facility at Angarsk, Siberia, has been established as an international fuel cycle centre, monitored by the IAEA. Russia is inviting multination participation in this project, and already Kazakhstan has joined. Ukraine has announced that it will participate and Armenia has expressed an interest in joining. In addition to the non-proliferation advantages, the benefits of participation include assured supply of product and profit-sharing.

As already discussed, technologies at the front and back ends of the currently-established fuel cycle – enrichment and reprocessing – have dual-use potential, i.e. they could be used for military as well as civil purposes. There are many concepts for a proliferation-resistant fuel cycle, but the basic issue is, can a fuel cycle be developed which produces nuclear fuel without using enrichment, and enables plutonium recycle without plutonium separation?

The need for enrichment can be avoided through approaches such as accelerator-driven systems, but these do not offer the sustainability advantages of plutonium recycle. Fast neutron reactors do not require enrichment – but the conventional fast breeder reactor depends on reprocessing, and what is more, produces high-fissile plutonium (attractive for weapons use).

Fast neutron reactor concepts are being developed to address these issues, a notable example being the Russian BREST lead-cooled fast reactor. The basic concept is to use a fast neutron reactor in conjunction with “dry” processing of spent fuel, to enable the recycle of plutonium without separation, and to transmute minor actinides and fission products. This has both non-proliferation and waste management benefits – the period high level waste

11 IAEA document GOV/INF/2007/11.

must be isolated from the environment will be very substantially reduced, from 10,000 years plus to around 300-500 years.

The practicability of using lead as a coolant in a large reactor has yet to be demonstrated – but the proliferation-resistant features could be adapted to other fast reactor types. It is noted that four of the six reactor concepts under development in the Generation IV program are fast neutron reactors.¹²

In principle, the general use of fast neutron reactors, which are fuelled through plutonium recycle, would make uranium enrichment obsolete. However, establishing fast reactors on an industrial basis will take some decades, and may be constrained by availability of fuel for initial core loads (i.e. until self-sustainability is achieved). For most of this century, light water reactors will continue to have an important role, so there will be a continuing need for enrichment for the foreseeable future. An increase in global enrichment capacity will be needed from as early as the coming decade.

As regards reprocessing, however, the development of fast reactors together with advanced spent fuel treatments such as pyro-metallurgical processing could have a more immediate effect – making the current solvent-based reprocessing technology obsolete in the near term. If the viability of these new technologies is proven, there should be no requirement to build new plutonium separation plants – management of spent fuel from light water reactors would be based on advanced spent fuel treatment and recycle through fast neutron reactors. Proliferation-resistance would be ensured through avoiding production of separated plutonium. Plutonium would always be in a mix with actinides and fission products. This material could not be used for nuclear weapons, and the high radiation levels would make it self-protecting against diversion or theft. Safeguards would continue to apply in case of possible clandestine plutonium extraction plants.

The nuclear industry is on the verge of major developments – a substantial expansion of nuclear power, including uptake by new countries; the development of new institutional arrangements, to further strengthen non-proliferation objectives; and the establishment of proliferation-resistant technologies. With the world's largest uranium reserves, Australia can and should have a major influence in these developments.

IRAN'S NUCLEAR PROGRAM - DEVELOPMENTS

Iran's long history of safeguards violations, secrecy and obstruction led the IAEA Board of Governors (BOG) in September 2005 to determine that Iran was in non-compliance with its safeguards agreement. Subsequently, the United Nations Security Council, through the adoption of a number of resolutions, made a legally binding direction to Iran to suspend its uranium enrichment activities and to engage in negotiations to resolve concerns about its nuclear program. To date Iran has not met these demands, and has continued to expand the capacity of its uranium enrichment plant at Natanz.

During this reporting period the IAEA has produced a further four reports on Iran's nuclear program. While the IAEA is able to continue to verify the non-diversion of declared nuclear material in Iran, it remains unable to provide assurances to the international community that there are no undeclared nuclear activities or materials in Iran.

The safeguards reports also demonstrate that the IAEA has made progress in resolving many of the outstanding technical issues pertaining to Iran's past undeclared nuclear activities, issues that have been under investigation over a number of years. However, a key

¹² In addition to the lead-cooled fast reactor, Gen IV includes a sodium-cooled fast reactor, a gas-cooled fast reactor, and a supercritical water-cooled reactor that can operate in thermal or fast spectra.

area where, regrettably, the IAEA has made no headway is on Iran's "alleged studies" related to weaponisation. This is a matter of serious concern.

Iran has been found, by the IAEA, to be in the possession of a document relating to the production of uranium metal spheres, which are key components to a weapons program. The IAEA has also accumulated evidence from a number of sources that Iran had conducted a wide range of activities with administrative inter-linkages that, when taken as a package, indicate an active program of nuclear weapon research. Studies included, inter alia, development of multi-point high-explosive detonation systems with the capacity for operation at an extended distance and the modification of an existing long range missile system for delivery of a payload with dimensions similar to known nuclear weapon designs.

Iran has insisted that all of the information on the alleged studies that has come to the IAEA's attention consists of baseless fabrications and forgeries. However, given the breadth of information available to it, the IAEA considers Iran's assertion not to be credible. Moreover, the IAEA has made clear to Iran that the only way to resolve this issue is for Iran to be fully transparent and to provide the IAEA with the necessary access to information, people and sites of interest.

The serious concerns surrounding Iran's nuclear program highlights the need for the international community to take action to counter the spread of proliferation-sensitive nuclear technologies.

DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA – NUCLEAR DEVELOPMENTS

The period covered by this report has seen slow progress in the Six-Party process to resolve the DPRK nuclear issue. As agreed by the parties in February 2007, the DPRK shut down its Yongbyon nuclear facilities in July 2007 (albeit three months later than expected). The IAEA has been monitoring the shut down since that time. In October 2007, the DPRK committed to provide a complete and correct declaration of nuclear programs and to disable its reactor, reprocessing plant and fuel fabrication plant at Yongbyon by 31 December 2007. Experts from the US and the DPRK completed major disablement tasks by 31 December, but removal of the reactor's 8,000 fuel rods continues (slowed owing to safety reasons, and by the DPRK, saying delivery of assistance had not kept pace with disablement).

After a period of intense diplomatic effort, the DPRK provided 18,000 pages of technical documents relating to the DPRK's plutonium program to the US in May 2008, and finally submitted its declaration of its nuclear program to China on 26 June 2008. The declaration is currently being examined by experts from the Six-Parties.

In a much publicised event, the DPRK demolished the cooling tower of the Yongbyon reactor in June 2008. Attention has now turned to finalising an appropriate verification and monitoring mechanism that will provide assurances that the DPRK is fulfilling its commitments under the Six-Party agreement. The future role of the IAEA is also being discussed.

VERIFYING NUCLEAR DISARMAMENT

When announcing, on 9 June 2008, the formation of an International Commission on Nuclear Non-Proliferation and Disarmament, the Prime Minister noted a renewal over the last year of calls for action to revitalise the NPT, including through progress on nuclear disarmament. If new political commitments to disarmament are made, they will have to be underpinned by

effective verification. What needs to be done to develop these verification arrangements, and what are likely issues?

Comprehensive Nuclear-Test-Ban Treaty and Fissile Material Cut-off Treaty

Important first steps toward nuclear disarmament are those that will cap or limit the development of new or additional nuclear weapons. Both the Comprehensive Nuclear-Test-Ban Treaty (CTBT) and a fissile material cut-off treaty (FMCT) will serve these, as well as non-proliferation, objectives.

By banning nuclear test explosions, the CTBT will constrain the development of nuclear weapons. Although the Treaty has yet to enter into force, its verification system, in particular the International Monitoring System, is well advanced in its development, and demonstrated its potential with the detection of the nuclear test in the DPRK in 2006. With appropriate political support for the Treaty, the CTBT's verification system could be brought to a good level of readiness relatively quickly.

The basic objective of an FMCT would be to proscribe further production of fissile material for nuclear weapons or other nuclear explosive devices. The parties would not only undertake not to produce fissile material for nuclear weapons, they would also pledge not to use any existing fissile material that is subject to verification under an FMCT for nuclear weapons.

Negotiation of an FMCT has been blocked for several years by the failure of the Conference on Disarmament to agree on its broader work program. However, there is no need to start from scratch in the design of verification arrangements. The IAEA safeguards system already offers a highly developed verification regime for nuclear material and activities. Since the main focus of FMCT verification would be on states possessing nuclear weapons, methods will be needed to limit the disclosure of information about highly sensitive materials and facilities. Considerable work has been done on such methods for US/Russian verification and confidence-building mechanisms, but would need to be adapted for an FMCT.

Reductions in arsenals and weapons

Verifying the reduction of nuclear arsenals presents other verification issues. Some of these have already been tackled in the US/Russian Strategic Arms Reduction Treaty (START), and related agreements. Verification under these agreements addresses issues such as the disposition of nuclear weapons and their delivery systems, as well as destruction of the latter.

To date, however, such agreements have not included requirements to verifiably dismantle nuclear warheads. Verifying this activity poses special problems as access to the warheads, and application of measurement techniques to confirm their status, could risk disclosure of information that is sensitive for nuclear proliferation, as well as for national security interests. Obtaining the transparency needed for the international community to have confidence in verification, while protecting sensitive information, presents a considerable challenge.

A verification regime for nuclear weapon dismantlement could include the following elements:

- baseline declarations of holdings of nuclear weapons and of weapons grade fissile material
- tagging and tracking of warheads designated for dismantlement

- monitoring of the dismantlement process to confirm dismantlement of designated warheads
- verification at weapon storage and dismantlement facilities to confirm consistency with declared activities
- application of nuclear material accountancy and control to the storage and further processing of relevant components from dismantled weapons.

The US and Russia have, in the past, sought to elaborate methods for allowing inspectors to access, and to conduct limited measurements on nuclear warheads and weapons grade material. In the late 1990s, a *trilateral initiative* between the US, Russia and the IAEA began the development of special nuclear material accountancy and control measures to allow highly sensitive forms of weapons grade materials (i.e. weapon components) to be placed under IAEA safeguards. A model verification agreement was close to completion in late 2001, when the US and Russian governments brought the project to a close. Reactivating the trilateral initiative should not require significant new technical research.

More recently, the UK has undertaken research to further develop these and other ideas for disarmament verification, and has called for greater cooperation among the nuclear weapon states in this area. Current UK research is focusing on techniques for measuring unique attributes of nuclear warheads without disclosing sensitive information. Together with Norway, the UK is examining the use of managed access techniques in verifying activities at weapon storage and dismantlement facilities.

Key knowledge required for the development of a verification regime for nuclear disarmament is possessed only by states that have nuclear weapons. However non-nuclear weapon states like Australia can contribute significantly to developing many of the concepts and techniques. For example, the development of containment and surveillance techniques for storage and dismantlement of warheads should not require knowledge of proliferation sensitive information. ASNO has recently begun cooperation with UK experts in these areas.

In the lead up to and during the negotiation of both the CTBT and the CWC, groups of scientific experts devoted much time to developing verification for those treaties. Early and coordinated efforts by experts will also be needed to develop the range of tools needed to verify the dismantlement of nuclear weapons.

STRENGTHENING VERIFICATION THROUGH SAMPLING AND ANALYSIS

One of ASNO's key functions in implementing the Chemical Weapons Convention is to facilitate routine inspections at declared chemical and defence facilities in Australia by the Organisation for the Prohibition of Chemical Weapons. ASNO's dual role is to assist the OPCW in fulfilling its inspection mandate whilst also protecting any confidential business information and national interests.

In February 2008, Australia received its 25th routine OPCW inspection, at an industrial chemical plant that processes Schedule 2 chemicals¹³ in Victoria. However, this was no ordinary inspection. For the first time in the 11 years since the Convention's commencement in 1997, an inspection at an Australian industrial chemical facility used sampling and analysis (S&A). This highly specialised and powerful verification tool was used in addition to the more routine inspection activities, such as inspection of the declared plant and associated infrastructure, and the viewing of relevant facility records to confirm the absence of

13 The majority of Schedule 2 chemicals have normal industrial uses, but can be used in the production of Schedule 1 chemicals (chemical warfare agents).

undeclared CWC Scheduled chemicals, including chemical warfare agents (i.e. Schedule 1 chemicals), and in verifying Australia's declarations.

Out of more than 1400 OPCW industry inspections in 81 countries, this was only the 12th time that the OPCW has used S&A at an industrial facility. What distinguishes these inspections from non-S&A inspections is the need for OPCW inspectors to transport from OPCW Headquarters in The Hague, and set-up in-country, large amounts of laboratory equipment¹⁴ (approx. 600 kg) in order to analyse the chemical samples collected from the inspected facility. These S&A requirements therefore pose new challenges to the OPCW, CWC National Authorities and the inspected facility.

The need to provide the OPCW Inspection Team (IT) a lockable and dedicated room with bench space and a fume hood for setting up the IT's laboratory equipment, meant that on-site analysis was problematic. Under these circumstances, and to minimise disruption to the inspected facility, the Defence Science and Technology Organisation (DSTO) offered the use of its mobile laboratory.

Two samples were removed with permission from the inspected facility and transported to DSTO for analysis by the IT's analytical chemists. The results helped confirm that activities at the site were in accordance with obligations under the Convention and consistent with the information provided in Australia's declaration.



Site representative removing a chemical sample from the reaction vessel for analysis by OPCW inspectors.

So why has S&A only recently been introduced into this international verification regime when the Convention¹⁵ clearly mandates this activity for all Schedule 2 inspections? Extensive research and development was required to develop the necessary capabilities including reference data (e.g., the OPCW central analytical database), robust S&A procedures, software development, sourcing of appropriate portable equipment and validation required. Member States' approval of inspection equipment and modalities for analysis was also needed before S&A inspections of industrial facilities could be initiated.

Verification costs for inspections at Schedule 2 facilities have increased since S&A commenced in September 2006 during a time of successive zero nominal growth budgets for the OPCW. Such costs can be attributed to the larger size of the IT, the longer duration of the inspection and the transportation of IT analytical equipment to the inspected state. Additional expenditures have been partly offset by savings resulting from reducing the size of OPCW Inspection Teams for non-S&A inspections, and increasing the numbers of sequential inspections.¹⁶

14 Equipment includes Gas Chromatograph/Mass Spectrometer, a sample preparation kit, nitrogen and helium gas cylinders, etc.

15 Part VII, paragraph 27, of the Verification Annex to the CWC states that "Sampling and analysis shall be undertaken to check for the absence of undeclared scheduled chemicals".

16 Australian National Paper prepared for 2nd Review Conference, "Sequential Inspections" RC-2/NAT.6, 8 April 2008.

As with any change to established practice, some initial resistance by Member States might be expected especially when such changes appear to increase the intrusiveness of inspections. It is also important to get the balance right between equipment/resources provided by the OPCW and the inspected Member State, respectively, to minimise the cost of transportation from The Hague, without hindering the effectiveness or integrity of analysis.



*OPCW chemist preparing a sample for analysis of its component chemicals
Photo courtesy of DSTO.*

Member States' acceptance of S&A is likely to improve over time, as this verification tool is increasingly utilised, further streamlined, S&A procedures and equipment procurement enhanced, risk assessment for selection of Schedule 2 plant sites modified and expanded to include Schedule 3 and other chemical production facilities.¹⁷ Australia will work to ensure that verification benefits of S&A inspections are appropriately balanced against the additional resource costs for the OPCW and Member States.

The success of this inspection and all others preceding it in Australia, illustrates a strong record of industry compliance, transparency and cooperation with ASNO and the OPCW to ensure Australia's industry declarations are verified, as well as building confidence at the international level, that no chemicals suitable for use in chemical weapons are being produced.

AUSTRALIA'S URANIUM EXPORTS

Nuclear power currently provides around 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 2008, there were 439 nuclear power reactors in operation in 30 countries (plus Taiwan), with a total electrical generating capacity of about 372 GWe (see Appendix A).¹⁸ During 2007-08, power reactors produced an electrical output of around 2,600 terawatt-hours (TWh).¹⁹

17 Note by OPCW Director General: "Report on Schedule 2 Sampling and Analysis Start-up Period", S/688/2008, 10 April 2008.

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

19 Source: World Nuclear Association's table of World Nuclear Power Reactors 2007-08 and Uranium Requirements (<http://www.world-nuclear.org/info/reactors.htm>).

Australia holds 34% of the world's reasonably assured uranium resources recoverable at less than US\$80/kg.²⁰ In 2007, Australia's Ranger and Olympic Dam mines were respectively the world's second largest (10.7% of world uranium production) and fourth largest (8.3% of world uranium production) uranium producers.²¹ 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 2007-08 Australia exported 10,140 tonnes of UOC – U₃O₈ or U₃O₈ equivalent – corresponding to 8,598 tonnes contained uranium. These exports were valued at A\$882 million (up from A\$658 million in 2006-07 and A\$545 million in 2005-06). This quantity of uranium is sufficient for the annual fuel requirements of approximately 49 reactors (each of 1,000 MWe), producing around 347 TWh²² of electricity in total – approximately 30% more than Australia's total electricity production.²³

Overall Australia continues to be the world's second largest uranium producer after Canada, meeting about 13% of the world's annual uranium requirements. Effectively, Australian uranium supplied about 2% of total world electricity production. Countries using Australian uranium exported in 2007-08 will avoid carbon dioxide emissions roughly three quarters that of Australia's entire annual carbon dioxide emissions from all sources.²⁴

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 which are a party to the nuclear Non-Proliferation Treaty (NPT), and are within Australia's 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

20 World figures taken from Uranium 2007: Resources, Production and Demand, a joint report by the OECD NEA and the IAEA. Australia's resource figures taken from the Geoscience Australia publication, Australia's Identified Mineral Resources 2008 – Geoscience Australia.

21 Based on estimated world mine production in 2007 from Australia's Identified Mineral Resources 2008 – Geoscience Australia.

22 Based on a comparison of TWh of electricity generated from nuclear power, and uranium required, for each country eligible to use AONM. Source: World Nuclear Association's table of World Nuclear Power Reactors 2007-08 and Uranium Requirements (<http://www.world-nuclear.org/info/reactors.htm>).

23 Australia's gross electricity generation in 2007-08 is estimated to be 271 TWh. Source: Australian Energy, National and State Projections to 2029-30 – Statistical Tables, ABARE Research Report December 2007.

24 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 University of Sydney consultancy report, "Life-Cycle Energy Balance and Greenhouse Gas Emissions of Nuclear Energy in Australia", 3 November 2006.

non-nuclear-weapon states (NNWS), it is a minimum requirement that IAEA safeguards apply to all existing and future nuclear activities in that country, and it must have an Additional Protocol with the IAEA in force (for a summary of the status of Additional Protocols, see Appendix C). In the case of nuclear-weapon states (NWS), there must be a treaty-level assurance that AONM will be used only for peaceful purposes and AONM must be covered by safeguards arrangements under that country's safeguards agreement with the IAEA.

Australia currently has 22 nuclear safeguards agreements in force, covering 39 countries plus Taiwan (see Appendix B).²⁵ 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 ²³⁵U and reprocessing²⁶
- 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
- 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.

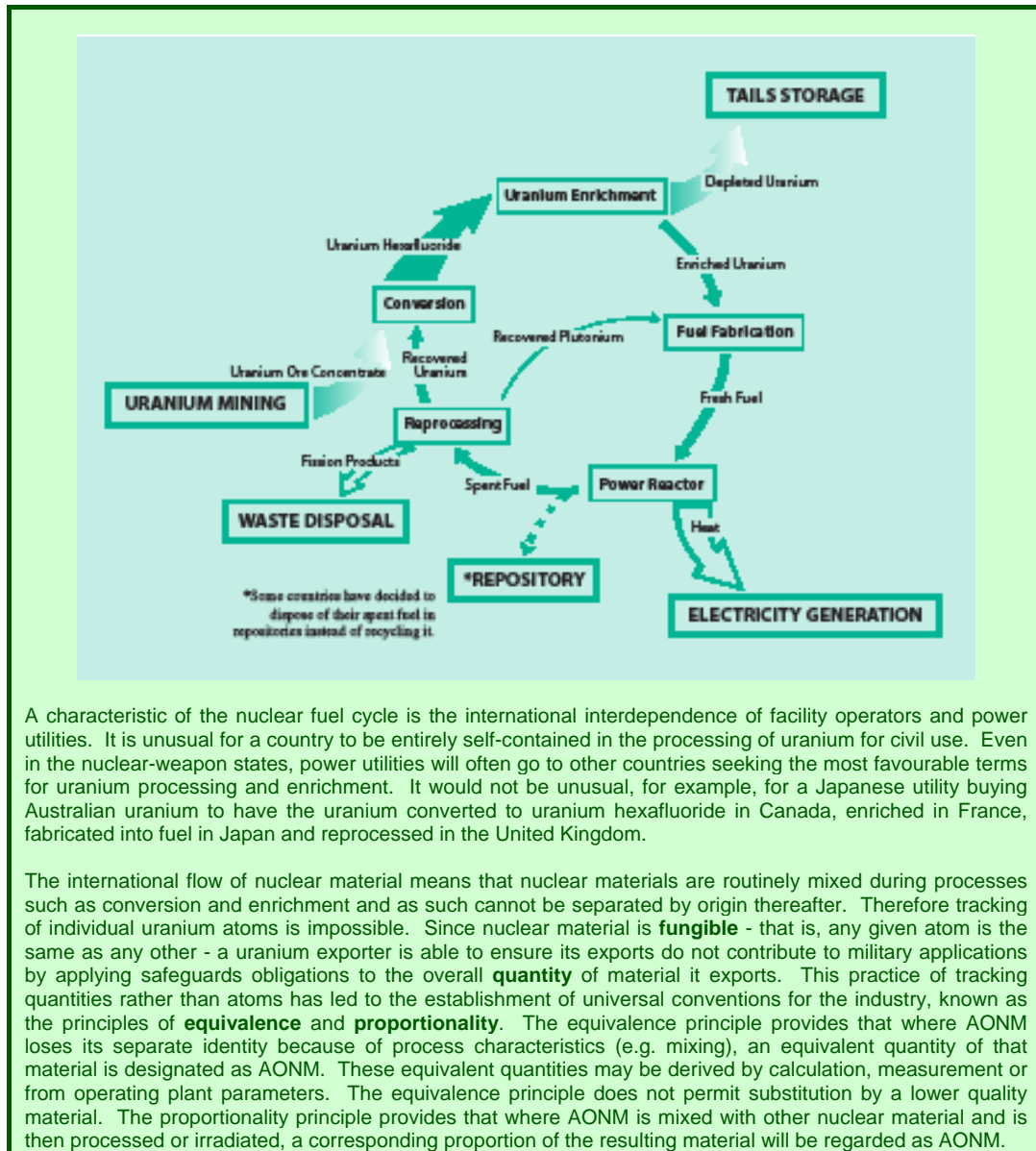
Australia's bilateral partners holding AONM are required to maintain detailed records of transactions involving AONM. In addition, counterpart organisations in Australia's bilateral partner countries are required to submit regular reports, consent requests, transfer and receipt documentation to ASNO.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

²⁵ Twenty-seven of the countries making up this total are European Union member states.

²⁶ Australia has given reprocessing consent on a programmatic basis to the UK, France and Japan. Separated Australian plutonium is intended for blending with uranium into mixed oxide fuel (MOX) for further use for nuclear power generation.

Figure 1: 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 and effectiveness of relevant treaty regimes through the application of specialist knowledge to complex policy problems in technical areas, including treaty verification and compliance. 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 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 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 SNT is also controlled through the grant of authorities.

The safeguards functions of the Director General ASNO are set out in section 43 of the Safeguards Act. These include:

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

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.



ASNO, OPCW and site representatives during a routine OPCW industry inspection in NSW.

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 this prohibition. 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 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
- 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.

Outcomes and Outputs Structure

Figure 3: ASNO's Outcomes and Outputs Structure

OUTCOME 1: Australian and international security protected and advanced through activities which contribute to effective regimes against the proliferation of nuclear, chemical and biological weapons.	
<u>OUTPUT 1.1:</u>	Operation of Australia's national system of accounting for, and control of nuclear material, items and facilities.
<u>OUTPUT 1.2:</u>	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.
<u>OUTPUT 1.3:</u>	Nuclear material and associated items exported from Australia under bilateral agreements remain in exclusively peaceful use.
<u>OUTPUT 1.4:</u>	Contribution to the development and effective implementation of international safeguards and the nuclear non-proliferation regime.
<u>OUTPUT 1.5:</u>	Regulation and reporting of Australian chemical activities in accordance with the Chemical Weapons Convention, and strengthening of international implementation of the Convention.
<u>OUTPUT 1.6:</u>	Development of verification systems and arrangements in support of Australia's commitments related to the Comprehensive Nuclear-Test-Ban Treaty.
<u>OUTPUT 1.7:</u>	Contribution to the development and strengthening of other weapons of mass destruction non-proliferation regimes.
<u>OUTPUT 1.8:</u>	Provision of high quality, timely, relevant and professional advice to Government.
OUTCOME 2: Knowledge about Australia's efforts to prevent the proliferation of weapons of mass destruction enhanced through public advocacy.	
<u>OUTPUT 2.1:</u>	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

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.
- 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. The high number of reports attributed to "other locations" relates to holdings of chemical salts mainly held by universities and depleted uranium shielding held by industrial radiographers.

Table 1: ASNO Reports to the IAEA, 2002-2008, by facility

Facility	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
ANSTO research laboratories	485	539	498	451	454	550
HIFAR (defuelled)	70	103	103	36	66	27
ANSTO vault storage	1	23	22	18	18	18
MOATA Reactor (defuelled)	13	0	11	83	9	11
OPAL reactor	0	0	0	28	67	60
Silex laboratories	92	59	34	35	39	68
Other locations	2 028	2 483	2 198	2 258	3 252	3 024
TOTAL	2 689	3 207	2 866	2 909	3 905	3 758

Table 2: ASNO Reports to the IAEA, 2002-2008, by data type

Type of Data	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
Inventory Change Report	754	813	496	407	839	488
Physical Inventory Listing	785	951	1 135	1 200	1 232	1 476
Material Balance Report	127	118	139	160	152	152
Concise Note	1 023	1 325	1 096	1 142	1 682	1 642
TOTAL	2 689	3 207	2 866	2 909	3 905	3 758

Table 3 shows a summary of totals of nuclear material by category in Australia. Notable changes from the previous year totals include an increase in enriched uranium due to the import of fresh fuel for the OPAL reactor.

Table 3: Nuclear Material in Australia at 30 June 2008

Category	Quantity	Intended End-use
Source Material		
Uranium Ore Concentrates (UOC)	676 tonnes	Exports for energy use pursuant to bilateral agreements
	6 tonnes	Storage
Natural Uranium (other than UOC)	10 870 kg	Research and shielding
Depleted Uranium	20 680 kg	Research and shielding
Thorium Ore Residues	59 tonnes	Storage/disposal
Thorium (other than Thorium Ore Residues)	1 980 kg	Research, industry
Special Fissionable Material		
²³⁵ U	95 999 grams	Research, radioisotope production
²³³ U	4 grams	Research
Plutonium (other than ²³⁸ Pu)	2 011 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.

Table 4: Associated Items in Australia at 30 June 2008

Category	Quantity	Intended End-use
Associated Material		
Deuterium and heavy water	29.9 tonnes	Research, reactors
Nuclear grade graphite	113.85 tonnes	HIFAR, Moata and storage
Associated Equipment		
HIFAR	1	Reactor ²⁷
HIFAR coarse control arms (unused)	5	Reactor components
HIFAR safety rods	3	Reactor components
Fuel charging and discharging machines	2	Reactor components

27 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.

OPAL reactor ²⁸	1	Reactor
OPAL control rod drives	6	Reactor components
Moata	1	Reactor ²⁹
Silex equipment	-	Enrichment R&D

Permits and Authorities System

ASNO continued to operate Australia's State System of Accounting for and Control of Nuclear Material in accordance with Australia's safeguards agreement with the IAEA and legislation. Administration of this system was carried out in a timely manner.

Table 5: Status of Safeguards Permits and Authorities at 30 June 2008

Permit or Authority	Current Total	Granted	Varied	Revoked	Expired
Possess nuclear material	90	4	81	1	1
Possess associated items	15	0	2	0	0
Transport nuclear material	19	3	2	0	0
Transport associated items	0	0	0	0	0
Establish a facility	0	0	0	0	0
Decommission a facility	2	2	0	0	0
Communicate information contained in associated technology	11	0	0	0	0
TOTAL	137	9	85	1	1

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 one permit was revoked as the permittees no longer possessed nuclear material. Both ANSTO (for the HIFAR reactor) and Silex Systems Limited (SSL) (for its research enrichment project) were granted permits to begin decommissioning their facilities. Most of the 81 variations to permits to possess nuclear material were attributed to creating new uniform requirements for holders of small amounts of nuclear material and extending the expiration date.

ASNO Inspections

During the reporting period, ASNO carried out 15 domestic inspections to ensure that requirements of permits and authorities were being met. ASNO found no indication of unauthorised access to, or use of, nuclear materials or nuclear items in Australia.

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

29 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.

Figure 4: Nuclear Inspections by ASNO, 2007-08, by type of permit holder

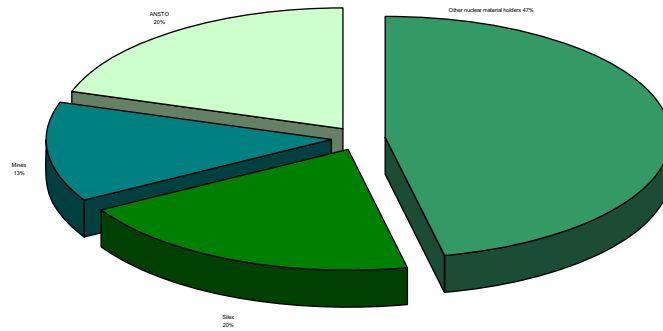
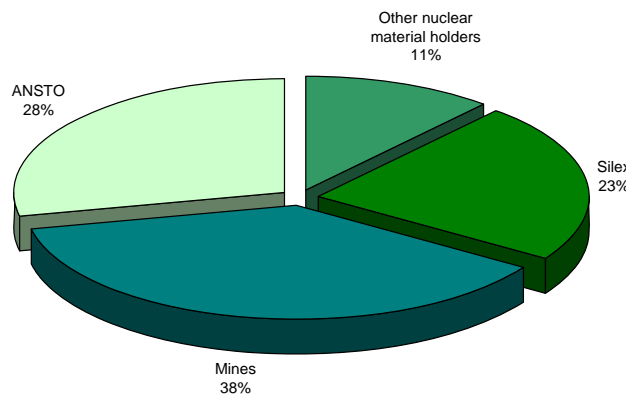


Figure 5: Nuclear Inspections by ASNO, 2007-08, by effort for each type of permit holder



IAEA Inspections

ASNO met all of Australia’s obligations with respect to IAEA inspections. During the reporting period, the IAEA conducted three design information verification inspections, three 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, 2007-08

Date	Facility	Type
22 Nov 2007	Other locations	Complementary Access
23 Nov 2007	Silex Laboratories	Complementary Access
26 Nov 2007	OPAL reactor	Short Notice Inventory Verification Inspection
10-14 Mar 2008	MOATA reactor ANSTO’s R&D Laboratories OPAL reactor	Routine Inventory Verification Inspection Design Information Verification Inspection
13 March 2008	Silex Laboratories	Complementary Access

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

During the reporting period, small inventory differences were reported to the IAEA. None was reported for facilities at Lucas Heights while various re-measurements of batches, rounding, shipper/receiver differences, and correction of double-counted batches at various locations gave rise to small inventory differences as summarised in Table 7.

Table 7: Inventory Differences Recorded During 2007-08

Material Balance Area	Difference between Book and Physical Inventory	Comment
HIFAR (defuelled) MOATA Reactor (defuelled) ANSTO research laboratories ANSTO vault storage OPAL reactor Silex laboratories	none	Book inventory equalled the Physical Inventory
Other locations	0.62 Kg Natural uranium - 0.18 Kg Depleted uranium - 0.14 g Enriched uranium	Rounding, re-measurement, shipper/receiver differences and correcting double-counted batches.

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 and associated physical protection guidelines.

Performance Assessment

International and bilateral Obligations

ASNO's inspections confirmed that current physical protection arrangements for nuclear material were being implemented satisfactorily in 2007-08 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.

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 transshipment 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 March 2008, ASNO re-issued permits granted to mines, which included a major update to security requirements. The new requirements prescribe security arrangements for UOC from production at mines, transport within Australia to final shipment overseas.

Physical protection arrangements at OPAL continue to mature and ANSTO has worked well to implement recommendations arising from previous inspections, including the conclusion of a service level agreement for the guarding of the facility by the Australian Federal Police. Upgrades of command, control and communication facilities are expected to be completed by the end of 2008.

Strengthening the Convention on the Physical Protection of Nuclear Material

The 1980 Convention on the Physical Protection of Nuclear Material (CPPNM) requires States Parties to make specific arrangements and meet defined standards for the physical protection of nuclear material in international transport, and promotes international cooperation for these purposes. The 1980 CPPNM does not specifically address the protection of nuclear facilities and deals only in a limited way with domestic use, storage or transport of nuclear material.

In July 2005, a Diplomatic Conference on the Convention on the Physical Protection of Nuclear Material adopted a detailed amendment to the Convention³⁰. The purpose was to strengthen internationally accepted standards of security on nuclear items, in particular by extending the standards to nuclear facilities and nuclear material in domestic use, storage and transport. Article 7 of the CPPNM has been extended by the Amendment in relation to activities that States Parties must make punishable offences under national law. In particular, new offences are added for: international trafficking of nuclear material; 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. Australia, through ASNO, played a significant role in developing the amendment and securing international agreement to it.

In implementing the Convention, Australia has always taken a broad view of its obligations under the NPT to protect nuclear materials and facilities. As such, many of the provisions of the Amended Convention have been applied under the Safeguards Act for some years, through a system of permits for nuclear material and facilities issued under that 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.

This said, to achieve full compliance with the CPPNM amendment the Safeguards Act was amended in early 2007 to, *inter alia*, extend existing offences 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. On 11 September 2007, regulations were promulgated under the *Extradition Act 1988*, administered by the Attorney-General's Department. With this legislative amendment, Australia had in place all necessary measures to meet the requirements of the amended Convention.

On 19 June 2008, the Governor-General in Executive Council authorised Australia's ratification of the Convention Amendment.

As at 30 June 2008, the Amendment has been ratified by 16 of the 136 parties to the Convention. The amendment to the CPPNM will come into force internationally after two-thirds of States Parties have ratified. While this may take some years, most of the new provisions already apply in Australia.

Just outside the period covered by this report, on 17 July 2008 Australia lodged its Instrument of Ratification with the Convention's depositary, the IAEA. As of that date, Australia was the 17th state to ratify the Amendment.

30 See ASNO Annual Report 2006-07 p 13.

Review of recommendations for nuclear security

As part of its responsibility to provide guidance to States in their efforts to implement international instruments (such as the CPPNM and the Nuclear Terrorism Convention), the IAEA is developing and publishing guidance documents in a *Nuclear Security Series*. In October 2007 ASNO attended the first Reference Group meeting for the development of *Nuclear Security Series* documents and revision 5 of INFCIRC/225. That meeting decided to proceed with the development of three recommendations documents; one of which will cover nuclear material and facilities in use, storage and transport - which will also serve as revision 5 of INFCIRC/225. Other technical-level security documents will be developed in parallel.

INFCIRC/225 is referenced in most of Australia's bilateral safeguards agreements and forms the basis for the application of physical protection measures in Australia. The IAEA is planning drafting meetings for revision 5 of INFCIRC/225 and further meetings of the Reference Group to oversee development of the entire nuclear security series. Initial drafting indicates that Revision 5 of INFCIRC/225 will be structured around the amended CPPNM.

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 15 May 2008, 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 2007-08. A copy of the IAEA's Safeguards Statement for 2007 is located in Appendix E.

Table 8: Summary of AONM by category, quantity and location at 31 December 2007³¹

Category	Location	Tonnes ³²
Depleted Uranium	European Union, Japan, Republic of Korea, United States	87 249
Natural Uranium	Canada, European Union, Japan, Republic of Korea, United States	21 475
Uranium in Enrichment Plants	European Union, Japan, United States	18 217
Low Enriched Uranium ³³	Canada, European Union, Japan, Mexico, Republic of Korea, Switzerland, United States	12 110
Irradiated Plutonium ³⁴	Canada, European Union, Japan, Mexico, Republic of Korea, Switzerland, United States	113
Separated Plutonium ³⁵	European Union, Japan	1.3
TOTAL		139 165

During the reporting period, Australia exported 10,140 tonnes³⁶ of UOC – U3O8 or U3O8 equivalent – in 79 shipments from the Ranger mine, Northern Territory, and the Olympic

31 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 inconsistencies in the figures due to rounding.

32 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.

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

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

35 Separated plutonium is plutonium recovered from reprocessing, before return to reactors for re-use in reactors for further power generation. This plutonium is used for reactor fuel after being mixed with uranium - termed mixed oxide (MOX) fuel. A significant proportion of Australian obligated separated plutonium is stored as MOX. Separated plutonium holdings fluctuate as plutonium is fabricated as MOX fuel and returned to reactors. On return to reactors the plutonium returns to the "irradiated plutonium" category. During 2007, 0.2 tonne of plutonium was fabricated into MOX fuel and transferred to reactors.

Dam and Beverley mines in South Australia. This corresponds to 8,598 tonnes of contained uranium.

Table 9: Supply of Australian uranium to end-users – as delivered to converters during 2007
(Source: Uranium Industry Section, Department of Resources, Energy and Tourism)

Country	Tonnes UOC (U ₃ O ₈)	% of Total
USA	3 561.54	39.7
Japan	1 549.85	17.1
France	1 931.44	21.4
ROK	399.16	4.4
UK	646.37	7.1
Sweden	280.42	3.1
Belgium	0	0
Germany	294.84	3.7
Finland	0	0
Canada	50.78	0.6
Taiwan	333.39	3.7
TOTAL	9 047.79	100

Table 10: Summary of AONM Transfers, 2007³⁷

	Destination	U (tonnes)
Conversion	Canada	1 953
	European Union ³⁸	3 836
	United States	2 984
Enrichment	European Union	1 955
	United States	466
Fuel Fabrication	Japan	265
	Republic of Korea	378
	United States	494
	European Union	14
Reactor Irradiation	United States	5

The shipper's weight for each UOC consignment is entered on ASNO's record of AONM. These weights, subject to amendment by measured Shipper/Receiver Differences, are the basic source data for ASNO's system of accounting for AONM in the international nuclear fuel cycle. ASNO 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 also notified the IAEA of each export to non-nuclear-weapon states pursuant to Article

36 It should be noted that this figure is for the financial year 2007-08, so is different to the quantity received by end-users (see Table 9) which is for the calendar year 2007.

37 Figures are for transfers completed between jurisdictions from 1 January to 31 December 2007. 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.

38 Includes transfers from Cameco (Blind River) and Springfields in UK.

35(a) of Australia's IAEA safeguards agreement as well as to NWS under the IAEA's Voluntary Reporting Scheme. Receiving countries similarly reported receipts to the IAEA.

Bilateral Agreements

Reporting

Reports from ASNO's counterpart organisations were mostly received in a timely fashion and in the agreed format, which enabled analysis and reconciliation with ASNO's records. Figures provided in Table 9 and Table 10 are based on ASNO's analysis of all available information at the time of publication.

Australia/Russia Nuclear Cooperation Agreement

On 7 September 2007 the then Australian Foreign Minister, Mr Alexander Downer, and the head of Russia's Federal Atomic Energy Agency, Mr Sergey Kiriyenko signed a new safeguards agreement. The new agreement will replace the existing (1990) agreement between Australia and Russia, and 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. The agreement, along with a national interest analysis was tabled in Parliament for review by the Joint Standing Committee on Treaties (JSCOT) on 14 May 2008. JSCOT held one hearing during this reporting period, on 16 June 2008.³⁹

Silex Technology

Silex Systems Limited has wound back its operations in Australia after the sale of its enrichment technology to the US Company General Electric. It has exported or dismantled most of its equipment and is only providing limited support to the development of General Electric's test-loop based on SILEX technology in Wilmington, North Carolina. ASNO visited the test-loop under construction in May 2008 and met with officials from the US Nuclear Regulatory Commission to discuss ongoing matters related to the Australia/US Silex agreement, associated security arrangements and update to the Classification guide. ASNO envisages continuing cooperation with USA on safeguards arrangements for a commercial Silex plant and ongoing stewardship and protection of SILEX technology.

Multilateral meeting on nuclear safeguards agreements

In January 2008 Australia participated in a meeting with USA, Canada and Euratom on bilateral nuclear safeguards agreements – in particular to gain a common understanding of the policies and mechanisms for the tracking obligated nuclear material. Further meetings are planned with a view to eventually providing outreach to countries inexperienced in tracking nuclear material obligations and universalising best practice.

39 Outside this reporting period, JSCOT held a further three hearings in July, August and September, and tabled its report on 18 September (available at www.aph.gov.au/house/committee/jsct/14may2008/index.htm). The Government will consider JSCOT's recommendations and respond in due course.

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:

- Dr Annette Berriman's membership 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 Australian delegation to the IAEA Board of Governors meeting in September 2007 and the 2007 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 IAEA Deputy Director General for Safeguards Dr Olli Heinonen, the IAEA Deputy Director for Nuclear Applications, Dr Werner Burkart and other IAEA Directors responsible for Safeguards. 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.

Contribution to DFAT policy development and diplomatic activity

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

ASNO has a close and supportive working relationship with the Australian Mission in Vienna, particularly with the Australian Ambassador in the role of Australian Governor on the IAEA Board of Governors. ASNO plays a major role in providing the Mission with timely and comprehensive advice on IAEA reports and briefing materials. ASNO analyses are frequently shared with the IAEA Secretariat and with 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
- Syria's reported undeclared reactor program.

IAEA Standing Advisory Group on Safeguards Implementation

SAGSI is the international group of experts appointed by and advising the IAEA Director General on safeguards issues. ASNO's Dr Berriman is a member of SAGSI. The main safeguards implementation issues considered by SAGSI during the reporting year were the State evaluation process; the IAEA's draft Vision 20/20 study and long term strategic planning; state-level technical objectives; the Integrated Safeguards approach for geological repositories; the Safeguards Implementation Report; enhanced cooperation between the IAEA and national safeguards systems; and the IAEA Department of Safeguard's Quality Management System.



Members of SAGSI at the May 2008 Plenary meeting in Vienna.

Improved Nuclear Safeguards: Addressing Practical Issues in the Region



Participants at the IAEA Regional Technical Meeting on Additional Protocol Implementation.

ASNO has an ongoing program of assistance to regional states in understanding the context, obligations and practical implementation of IAEA safeguards including the Additional Protocol. As part of this program, from 19-23 November 2007, ASNO (using AusAID regional aid program funds) together with the IAEA (with financial support from the Republic of Korea (ROK)) conducted a Regional Technical Meeting on Additional Protocol Implementation in Sydney. Twenty-eight officials from Bangladesh, China, Indonesia, Japan, ROK, Malaysia, the Philippines, Thailand, Vietnam, the IAEA and Australia participated.

The practical issues discussed during the meeting covered Additional Protocol obligations, IAEA rights, how to collect information required by the Additional Protocol; preparation of Additional Protocol declarations; facilitating complementary access; resolving IAEA questions, export controls, and experiences in implementing the Additional Protocol.

Representatives of states which have only just signed the Additional Protocol (in a few cases within a couple of weeks), said that the meeting provided them with the background and breadth of knowledge to take further steps towards Additional Protocol implementation in their states.

Australian Safeguards Support Program

The resources available to the IAEA are not sufficient to allow all necessary safeguards R&D programs to be conducted "in-house". Safeguards are an evolving discipline and ASSP – the Australian Safeguards Support Program – assists the IAEA develop the concepts, equipment and procedures needed to meet new challenges in a cost-effective way. The ASSP comprises collaborative work with ASNO's counterparts and expert groups as well as a number of safeguards projects formally agreed with the IAEA. ASNO is the national manager for the ASSP, coordinating activities with other Australian agencies as well as undertaking several tasks internally. These projects are outlined below. ASSP financial details can be found on page 61.

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.

During the reporting period ASNO completed a report entitled "Potential for production of proliferation sensitive materials in research reactors" and submitted this report to the IAEA. The task remains active and ASNO is awaiting an opportunity to begin the next sub-task in the series.

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. During the reporting period this involved a consultancy by Ms Judith Hazel of ASNO for the IAEA's Division of Safeguards Information Management.

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. In August 2007 the developer of the PBMR (a private South African company) proposed a confidentiality agreement to allow the exchange of information necessary for the project to proceed. Consideration of the agreement by ANSTO had not been completed at the end of the reporting period.

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 unequivocally 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.

New Australian Safeguards Support Program tasks in the reporting period

Experimental investigation of Behaviour of Trace Elements in Uranium during the concentration and conversion processes

During the reporting period ANSTO agreed to take on a new support program task relating to the way in which trace element concentrations change as material enters the front end of the fuel cycle. The IAEA hopes that this work will contribute substantively to efforts to determine the origin of material that is located during inspection activities (tracing materials back to their points of origin).

Use of Multi-sensor Data for Monitoring and Detecting Signatures Relevant to the Nuclear Fuel Cycle

During the reporting period Defence Imagery and Geospatial Organisation (DIGO) made a senior analyst available for an IAEA meeting held in Paris. The purpose of the meeting was for the IAEA to gather information on available imagery-based techniques that could be used to identify signatures relevant to particular steps in the nuclear fuel cycle and then determine whether it would be possible to incorporate the use of these signatures into IAEA verification activities. DIGO made a substantive contribution to the success of the Paris meeting and the contribution was greatly appreciated by the IAEA. ASNO is grateful to DIGO for its efforts on behalf of the IAEA and hopes that it will be possible to continue these efforts in future years.

Updates to fuel cycle manuals

During the reporting period the IAEA proposed a new task related to updating elements of the basic fuel cycle training manuals used in the training of IAEA inspectors. The IAEA has requested that Australia help with the preparation of a new manual relating to the mining and milling of uranium. ASNO hopes to be able to complete the task over the next year with the support and assistance of Geoscience Australia (GA) and ANSTO.

Cooperation with other States Parties

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

ASNO staff presented papers at the July 2007 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. Training has been provided to 180 professionals in 14 countries in the Asia Pacific region over the past 12 months. All of this work was well received and led to requests for further assistance. Key contributions included:

- hosting an IAEA Regional Technical Meeting on Additional Protocol Implementation for Asian participants to discuss practical issues associated with implementing Additional Protocols (further details in a separate article in this report)
- hosting a regional State System of Accounting for and Control of Nuclear Material (SSAC) Training Course (see boxed text)
- lectures by ASNO officials at training activities in Thailand, Vietnam, Indonesia, China and the USA.

National Safeguards and Additional Protocol Training

An IAEA Regional Training Course on National Safeguards and the Additional Protocol was conducted by ASNO in Sydney from 31 March to 11 April 2008. This course was part of ASNO's long-standing program to improve regional adherence to nuclear non-proliferation and nuclear security obligations, by providing practical training and experience to relevant regional officials. It was the seventh major course of its type to be held in Australia since 1986.

Twenty-two students from Australia, China, Indonesia, Iraq, Japan, Malaysia, ROK, Thailand, USA, and Vietnam attended along with seventeen lecturers and observers from Australia, the IAEA, Indonesia, Japan and the USA. The knowledge gained by the participants at this intensive workshop will assist regional states in fulfilling their international obligations under the NPT, and ensuring nuclear material is properly identified and controlled.



Participants, lecturers and observers at the Sydney course.

The two-week course covered:

- International, national and facility-level nuclear safeguards
- legal instruments and IAEA requirements
- verification techniques and approaches
- nuclear material accounting
- preparation and submission of reports and declarations to the IAEA
- effectiveness of State Systems
- exports of nuclear-related equipment
- sharing experiences of national safeguards authorities.

Students undertook exercises to practice the techniques learned. To assist with this work ANSTO's recently shut-down HIFAR reactor was used as a model facility for many of the exercises. Participants visited the reactor to gain a better understanding of the technical and safeguards aspects of a real facility, and learn how to apply this to their own facilities.

The course was funded jointly by the Australian Government's overseas aid program (through AusAID), the four-year joint Australian Nuclear Agencies program "Nuclear and Radiological Security Enhancement in the Asia-Pacific Region" (NRSE) and the IAEA.



Students filling in Additional Protocol declaration forms during a group exercise.

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 Chemicals⁴⁰ and of the 42 facilities with CWC-relevant chemical production, processing or consumption activities during 2007 (March 2008)⁴¹
- Article VI declaration of eight chemical research/industrial facilities anticipated activities during 2008 with CWC Scheduled Chemicals (September and October 2007)
- Article X, paragraph 4, declaration of Australia's national chemical defence program (April 2008)
- responses to OPCW Third Person Notes including routine clarification of the operational status of chemical plants and chemical trade
- routine responses to OPCW notifications and amendments/corrections to inspector details and deletions or additions to the OPCW inspectorate.

The OPCW conducted four Article VI routine facility inspections in Australia during the reporting period to verify declarations. In July 2007 OPCW inspectors conducted sequential visits to two discrete organic chemical (DOC) production facilities in Western Australia. In November 2007, inspectors visited a further DOC facility, in Victoria. The inspection in February 2008 of a facility in Victoria that processes a CWC Schedule 2 chemical saw the first use by the OPCW at an Australian industrial chemical facility of sampling and analysis techniques. The use of such techniques is further discussed at page 15 of this report. All inspections proceeded smoothly and the OPCW team verified relevant declarations as well as the absence of undeclared CWC Scheduled chemical production (in particular Schedule 1), in accordance with the inspection mandates. ASNO facilitated the inspections, and appreciated the support and cooperation by industry.

⁴⁰ 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.

⁴¹ Declared information was obtained mainly from industrial facilities subject to reporting obligations of the permit and notification system defined under the *Chemical Weapons (Prohibition) Act 1994*.



Facility and ASNO representatives with the OPCW Inspection Team during a routine industry inspection in Western Australia.

Legislation and Regulation

The permit and notification system continued to operate well and was further refined. During the reporting period:

- three new consumption permits were issued authorising the acquisition, retention, use and transfer of Schedule 1 chemicals for protective and research purposes
- one permit was renewed and a new permit was issued authorising production of Schedule 1 chemicals for research purposes
- one permit was renewed authorising the processing of Schedule 2 chemicals
- three permits were renewed authorising the production of Schedule 3 chemicals
- 55 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 2008

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	4	10	1	3

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

In June 2007, ASNO wrote to all Commonwealth, State and Territory Police Commissioners and to the Department of Defence to confirm which riot control agents (RCAs) are available for use for law enforcement purposes in Australia. The responses confirmed that Australia's initial declaration of three RCAs submitted to the OPCW in 1997, as required under the CWC, remains current. The opportunity was also taken to remind law enforcement agencies of their obligations under the *Chemical Weapons (Prohibition) Act 1994* of reporting any finds of suspected old chemical weapons to ASNO.

ASNO continued to assist the Department of Defence to finalise standard military 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.

In March 2008, civilian contractors discovered six heavily corroded World War II chemical munitions (British designed, light-cased Mk1 5 x 30lb and 1 x 250lb bombs) which were uncovered during clearance of Defence land near Lithgow, NSW. Four of the 30lb munitions were not fully intact. In April 2008 a further three similar 250lb munitions were discovered at the same site and these were removed safely together with another nine others from the same pit in July 2008. None of these munitions contained any hazardous fill. Testing of any residual liquid inside the intact munitions (suspected of being sand and ground water) showed no evidence of any chemical warfare agent fill. This site was the same location for earlier old chemical weapons finds reported in previous annual reports. All munitions have been assessed as unusable due to weathering and will be destroyed by cutting in half and disposed as scrap metal. ASNO's report of the discovery to the OPCW falls outside the period of this report.



World War II chemical munitions uncovered near Lithgow. Photo courtesy of the Department of Defence.

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

Support for the OPCW and its Working Groups

To demonstrate Australia's support for the work of the OPCW during the first decade of implementation, Australia's then Ambassador to the Netherlands and Permanent Representative to the OPCW, Mr Stephen Brady, attended a high-level international symposium in Berlin from 25-27 April 2007, just prior to the reporting period. Organised by the German Foreign Office in cooperation with the German Institute for International and Security Affairs, the symposium was held to coincide with the tenth anniversary of the entry-into-force of the CWC and the establishment of the OPCW.

Australia participated in the two major events that were held in The Hague to mark the CWC's 10th anniversary, namely, an Academic Forum (18-19 September 2007) and an Industry and Protection Forum (IPF) (1-2 November 2008). The anniversary flagship event was a High-Level Meeting held in New York on 27 September 2007, during the 62nd Session of the United Nations General Assembly.

Australia considers that the OPCW has an important role to play in reducing the threat of, and in responding to, chemical terrorism. Accordingly, Australia continues to support the efforts of like-minded countries and contribute to discussions in the OPCW's Open-Ended Working Group on Terrorism. To this end, the OPCW IPF's workshop dedicated to safety and security at chemical plants was most welcome.

ASNO provided briefing for Australia's participation in meetings of a working group preparing for the 2nd Review Conference of the CWC which was held in The Hague from 7-18 April 2008. ASNO worked closely with the Australian Embassy in The Hague and with other States Parties in negotiating the final text of the report of the Review Conference. The final

report maintained strong support for the CWC and the ongoing implementation of its provisions. Outcomes of the Conference were consistent with Australia's views, however initiatives to strengthen verification of its provisions did not gain consensus support.

ASNO continues to provide input to discussions in The Hague regarding certain aspects of the Convention's declaration and verification provisions that were not fully defined at entry-into-force, primarily through Australia's representative to the OPCW. Australia's endeavours 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.

Cooperation with the OPCW and other States Parties

ASNO continued its engagement with the OPCW on CWC implementation issues and with regard to meeting the assistance requests of other States Parties under the Action Plan on Article VII (National Implementation Measures). Dr Veronica Borrett, General Manager of the University of Melbourne's Bio21 Institute, was nominated by ASNO and accepted by the OPCW as one of about 20 qualified experts from around the world that the OPCW may call upon to assist with investigations of alleged use of chemical weapons or riot control agents as a method of warfare (no such inspections have yet occurred under the Convention). Dr Borrett actively participated in an OPCW training workshop for qualified experts held in The Hague from 28 January to 1 February 2008.

ASNO has had extensive and useful dealings with other States Parties, especially in the region, including in conjunction with the OPCW. ASNO worked closely with the industry cluster facilitators (from Japan and Switzerland) in negotiation of the final text of the decision on "Guidelines Regarding Declaration of Import and Export Data for Schedule 2 and 3 chemicals"⁴² that was agreed at the 53rd session of the OPCW Executive Council. The purpose of the decision is to help reduce discrepancies of declarations of trade in CWC Schedule chemicals.

ASNO organised and facilitated a visit to Canberra and Sydney by the OPCW's Technical Secretariat from 16-17 June 2008. At the Technical Secretariat's request, the visit programme was designed to help clarify Australia's offer of assistance and protection against chemical

weapons use, or threat of use, as required under Article X of the Convention. A range of government agencies that will potentially be involved in the provision of assistance engaged in round-table discussions on the practical issues surrounding the coordination and delivery of assistance to other States Parties if requested. The Technical Secretariat was appreciative of Australia's efforts and transparency in providing tours of stored items of protective and detection equipment managed by the Department of Defence and Emergency Management Australia. The Australian Federal Police hosted a visit to its CBRN Data



Emergency Management Australia (EMA) representative giving OPCW officials a tour of the EMA's cache of equipment for protective and detective purposes. Photo courtesy of EMA.

⁴² Decision number EC-53/DEC.16* of 27 June 2008.

Centre's mobile analytical laboratory which could be considered for deployment in the region, in response to chemical weapons use, if requested by the OPCW.

ASNO continued to be proactive in its work with the OPCW, with Australian representation at the following meetings held in The Hague: the ninth Annual Meeting of CWC National Authorities, the 12th Conference of the CWC States Parties (December 2007) and the 2nd Review Conference (April 2008).

Domestic Outreach

As part of ASNO's continuing industry outreach program, in January 2008 a survey was circulated to more than 450 Australian chemical and trading companies, the purpose of which was 3-fold: to raise awareness about the CWC, how it impacts on industry and traders, and to help identify any activities requiring additional declarations under the CWC. As a result of the survey, ASNO identified several possible new facilities producing DOCs. ASNO also conducted a number of on-site visits to regulated facilities in Melbourne including: facilities that process or consume Schedule 2 chemicals; facilities which produce Schedule 1 chemicals for research purposes; and DOC facilities.



Facility representative with the OPCW Inspection Team during a routine industry inspection in Victoria.

ASNO also conducted outreach with a number of Commonwealth, State and Territory laboratories to inform them about legislative requirements for facilities using Schedule 1 chemicals for counter-terrorism analytical purposes. This included a presentation to the chemical warfare agent laboratory network (CWALN) at the National Institute for Forensic Science, Melbourne, in November 2007 and correspondence to the CWALN and the public health laboratory networks.

ASNO was consulted by the Department of Health and Ageing regarding the development of regulations relating to ricin threshold setting (Schedule 1 chemical) as required under the *National Health Security Act 2007*. This Act came into effect as a result of the COAG "Report on the Regulation and Control of Biological Agents [that could be used as weapons]" (finalised in November 2006) which addresses the deficiency in current Australian regulations through the establishment of a national regulatory regime. ASNO also continued to strengthen collaboration with the Plastics and Chemicals Industries Association, the

Australian Pesticides and Veterinary Medicines Authority and the National Industrial Chemicals Notification and Assessment Scheme.

As part of outreach efforts to ensure traders of security-sensitive chemicals apply the correct tariff and Australian Harmonised Export Commodity Classification codes, ASNO collaborated with the Defence Export Control Office in updating its CD ROM for chemical traders entitled "International Chemical Trade Control – Information for Australian Importers and Exporters of Chemicals" Version 3.0 published in January 2008. Copies of the CD ROM will be distributed to import permit holders and requesting industry survey participants, and are available on request or from ASNO's website (www.dfat.gov.au/cwco).

ASNO also consulted with the Australian Customs Service to reduce misclassifications of Customs codes by traders or brokers and to ensure that corrected codes are updated in the Customs systems before goods are cleared. Such measures will help improve the detection of unauthorised trade and the accuracy of trade statistics for CWC-Scheduled chemicals published by the Australian Bureau of Statistics.

International Outreach

Australia places great importance on international CWC compliance and best practice. ASNO, in conjunction with Japan (the main financial contributor), and the Philippines Government, organised an "Industry Workshop on Implementing the Chemical Weapons Convention" for the Philippines chemical industry in July 2007 (see boxed text).

ASNO participated in the fifth regional meeting of National Authorities of Asian States Parties, held in Doha in September 2007, which was jointly organised by the OPCW and the Government of Qatar. ASNO's Dr Meyer delivered several presentations on Australia's CWC implementation practices, including Australia's system for tracking trade in chemicals.



Participants at the 5th Regional Meeting of National Authorities of CWC State Parties in Asia, Doha, Qatar, 4-6 September 2007. Photo courtesy of the Government of Qatar.

ASNO continued to exchange chemical trade data regarding CWC-Scheduled chemicals with key trading countries to improve the quality and accuracy of their respective declarations to the OPCW. ASNO also met with visiting officials from Japan's Ministry of Economy, Trade and Industry in August 2007 and shared lessons learned from Australia's experience in implementing the CWC.

Manila Chemical Weapons Convention Workshop: Getting industry on-side in the Philippines

The joint efforts of ASNO, the Arms Control and Counter-Proliferation Branch of DFAT and Australian Embassies in Manila, Tokyo and The Hague ensured that a CWC workshop for government and industry representatives in Manila on 11-12 July 2007 succeeded in raising awareness about the Convention and its impact on the chemical industry.

This *Industry Workshop on Implementing the CWC* was a trilateral capacity building event organised by the Philippines, Japan and Australia. The Philippines Department of Foreign Affairs requested assistance to sensitise the chemical industry to the detailed declaration and inspection requirements of the CWC, which ASNO offered to provide in conjunction with Japan. The Organisation for the Prohibition of Chemical Weapons (OPCW), also participated.



Dr Meyer (ASNO) presenting Australia's experiences in implementing the CWC to participants at the Industry Workshop held in Manila 11-12 July 2007.

While it had been ten years since the Philippines joined the Convention, the workshop was timely in providing the opportunity to commence wider consultations within the Philippines on the establishment of a permanent national authority and its newly drafted CWC legislation. This legislation should enable the Philippines to more fully implement the requirements of the Convention. The workshop facilitated valuable discussion between the Philippines Government and industry as well as among government representatives. Australia's efforts were greatly appreciated including arranging participation by representatives from Australia's peak industry body, the Plastics and Chemicals Industries Association and the Australian Customs Service.

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 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. A list of Australia's IMS facilities and their status is at Appendix F.

Specific advances during 2007-08 in relation to Australian hosted IMS stations included:

- operation of the IMS noble gas system at the Darwin radionuclide station in a testing and evaluation phase
- negotiation of a memorandum of understanding (MOU) to facilitate the installation and operation of an infrasound monitoring station on the Cocos Islands
- completion of survey of site requirements, and planning to install radionuclide and infrasound stations at remote locations
- transition to new Global Communications Infrastructure for CTBT monitoring facilities, following the awarding of a new data transmission contract by the PrepCom.

The abovementioned MOU articulates key understandings on the use of land on part of West Island, Cocos (Keeling) Islands for construction and operation of a CTBT infrasound station. The parties to the MOU are ASNO, as the CTBT National Authority, Geoscience Australia as the builder and operator of the station, and the Attorney General's Department (which administers the Cocos (Keeling) Islands for the Commonwealth). The MOU, which was signed on 30 June 2008, provides for use of lands initially for a period of twenty years, but with an option to extend for up to a further twenty years.

Work to plan and build the remaining four Australian-hosted IMS stations continued during the year. These will be at remote locations (including in Antarctica), so installation of each station requires planning and preparation over several years. At 30 June 2008, specific proposals were in train to install two of the final four stations by 2009, and one further by 2011.

Legal and administrative measures

ASNO continues to fund Geoscience Australia to carry out nuclear test monitoring through its network of seismic stations. This arrangement, set out in a letter of understanding between Geoscience Australia and DFAT, has been administered by ASNO on behalf of DFAT since 1 July 2000. ASNO is satisfied that Geoscience Australia has met its requirements under the letter of understanding during the reporting period. ASNO and Geoscience Australia also reviewed the arrangement during the year. They found that it remains adequate for

Australia's requirements prior to entry into force of the CTBT, but that verification of an in-force CTBT will require additional activities.

As well as its use for Treaty verification, data from the CTBT's monitoring system have the potential to contribute to civil and scientific purposes. Following the 2004 Boxing Day tsunami, the PrepCom, Australia and other states recognised the contribution that data for the IMS can make to the early detection of seismic events which could trigger a tsunami. In 2005, 'test' arrangements were agreed for the release of selected IMS data to tsunami warning organisations, including the Joint Australian Tsunami Warning Centre (JATWC), subject to the development of more permanent release arrangements. ASNO, with Geoscience Australia, has negotiated such permanent arrangements for the JATWC based on a model arrangement had been developed by the PrepCom for the release of IMS data to UNESCO-recognised tsunami warning organisations. At 30 June 2008 a draft Arrangement with the PrepCom was close to finalisation. The proposed Arrangement will allow the provision of primary seismic, auxiliary seismic and hydroacoustic data to the JATWC. It will increase the number of stations from which data are provided under the test arrangements.

Support for the PrepCom and its Working Groups

ASNO contributes to the technical work of the PrepCom, in particular through the technical working group sessions of the PrepCom, in conjunction with Australia's Mission in Vienna and with technical specialists from Geoscience Australia and ARPANSA. ASNO also coordinates instructions to Australian delegations at many CTBTO meetings, in particular those dealing with verification of the CTBT.

The CTBT includes the possibility for on-site inspection (OSI) to determine whether a nuclear explosion has taken place in a particular area. ASNO's Malcolm Coxhead, as the Task Leader for the elaboration of an Operational Manual on the conduct of OSI, continued to chair discussions on this subject at the PrepCom's technical working group. Discussions over 15 days of meetings during the year consolidated draft texts on discrete inspection topics into a model text for the manual, and agreed on a method of work for its refinement before entry into force of the Treaty. The preparation of a single model text represents a valuable advance in work on the manual, however a number of significant issues remain to be resolved before it can be finalised.

Work by the PrepCom to develop capacity to conduct an OSI will be tested in a major inspection exercise in Kazakhstan in September 2008. Australian experts, including from ASNO, have participated in planning for the exercise during the year.

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 two Australians participated in such activities.

Outreach

ASNO assisted with efforts during the year to promote engagement in, and support for, the CTBT by regional countries included contributions to the following activities:

- Workshop on International Cooperation for States in the Pacific, Samoa, 8-9 May, 2008 - which sought to encourage support for remaining CTBT signatures/and or ratifications by states and examine capacity building measure in the region for nuclear monitoring and tsunami warning
- National Data Centre workshop, Jakarta, 5-6 June 2008 - to promote the establishment, operation and management of National Data Centres in the ASEAN region, and to demonstrate the application of IMS data for civil and scientific purposes, including for tsunami warning.

ASNO also provided information on the CTBT to domestic stakeholders. Together with DFAT, ASNO coordinated the visit to Australia in May 2008 of the Executive Secretary of the CTBTO Organization, Ambassador Tibor Tóth.



On 12 May, 2008 Foreign Minister Stephen Smith meets with Ambassador Tibor Tóth (right), Executive Secretary of the CTBT Organization's Preparatory Commission.

OUTPUT 1.7: OTHER NON-PROLIFERATION REGIMES

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

Performance Measures

- Strengthened export controls supported through participation in the Nuclear Suppliers Group (NSG).
- Provided assistance to Indonesia as part of the International Non-proliferation Export Control Program.
- Initiated cooperation with the United Kingdom on verification measures for key aspects of disarmament, including the verifiable elimination of nuclear weapons.

Performance Assessment

Nuclear Suppliers Group

ASNO made a substantial contribution to the NSG, including through Mr John Carlson's participation in both the intersessional and the annual plenary meetings. The focus of NSG discussions during this reporting period has been the need to strengthen the criteria for the transfer of sensitive nuclear fuel cycle technology, with debate centred on whether to limit the transfer of SNT to a "black box" basis (i.e. no transfers of technology). These considerations are ongoing.

Commodity Identification Training

ASNO joined with officials from the US National Nuclear Security Agency (NNSA) in providing 'Commodity Identification Training' in Indonesia under the NNSA International Non-proliferation Export Control Program. The purpose of this outreach was to train border guards and customs officials worldwide to combat the threat posed by the illicit smuggling of WMD-related equipment and technology.

Disarmament Verification

The UK is developing ideas for a verification regime that can underpin nuclear disarmament, with current research focusing on techniques for measuring unique attributes of nuclear warheads without disclosing sensitive information. ASNO has recently begun cooperation with UK experts in developing concepts in areas such as containment and surveillance techniques for storage and dismantlement of warheads. ASNO will host a workshop for UK and Australian experts in late 2008 to further this cooperation.

Other

ASNO has contributed input to the Australia Group, the COAG review of hazardous chemicals and the Global Initiative to Combat Nuclear Terrorism. ASNO has also actively followed the discussions on the Fissile Material Cut-off Treaty at the Conference on Disarmament although, regrettably, negotiations remain stalled.

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, disarmament and non-proliferation.
- Cooperation on technical issues of common interest with agencies such as ANSTO, ARPANSA, Defence and the Australian Intelligence Community.

Performance Assessment

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

During the year ASNO provided advice and analysis on a range of developments in the nuclear fuel cycle and sensitive nuclear technology. 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 non-proliferation and safeguards aspects of nuclear supply to India. ASNO prepared incoming Government briefs and contributed input into similar DFAT briefing. ASNO prepared 48 ministerial submissions and provided briefings for Ministers, Departments and Parliament on specific issues, including to Joint Standing Committee on Treaties on the Russia nuclear cooperation agreement. Stakeholders acknowledged that briefings were useful and timely.

Further, ASNO provided 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 provided special briefing materials and additional assistance to both the Australian Mission to the IAEA in Vienna and the Australian Mission to the OPCW in The Hague, as well as to Australian missions in Washington, Geneva, London, Moscow, and Beijing.

ASNO has worked closely with other departments on issues covering the Global Nuclear Energy Partnership, SILEX and the proposed Olympic Dam expansion.

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 Australia's WMD non-proliferation objectives are widely understood, and that debate on nuclear issues is soundly based. This has involved extensive liaison with industry, tertiary institutions and non-governmental institutions.

During the year ASNO made submissions to JSCOT with respect to the Russia nuclear cooperation agreement. ASNO also promoted non-proliferation obligations and objectives in the science and academic community, including through making presentations at various national and international fora.

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, including in areas such as a code of conduct for ethical mining. These discussions covered investment, education, fuel cycle developments and knowledge management.

ASNO recommenced its series of seminars on non-proliferation relevant technologies during the reporting period. The aim of the seminars is to provide clear, understandable and accurate information on concepts relevant to officials involved in Australia's broader non-proliferation and counter-proliferation efforts.

ASNO continued its CWC industry outreach program to ensure compliance with statutory obligations, and conducted a survey of the chemical industry to raise awareness of the CWC in Australia.

ASNO, together with DFAT, hosted a visit to Australia by Executive Secretary of the CTBT Organization's Preparatory Commission, Ambassador Tibor Tóth, which included visits to the Australian National University and Geoscience Australia.

ASNO's website, www.asno.dfat.gov.au, contains a large amount of information on Australia's non-proliferation policies, treaty and statutory obligations and safeguards agreements as well as notification and permit application forms.

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, Mr Stephen Smith 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*.

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

Mr John Carlson 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 in August 2007. Dr Geoffrey Shaw was promoted to the position and started in January 2008, after serving as the Special Assistant for Policy to the Director General of the IAEA.

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.

In 2007-08 ASNO achieved an average staff level of 14.4 (against an approved level of 16).

Figure 6: ASNO's Organisational Structure

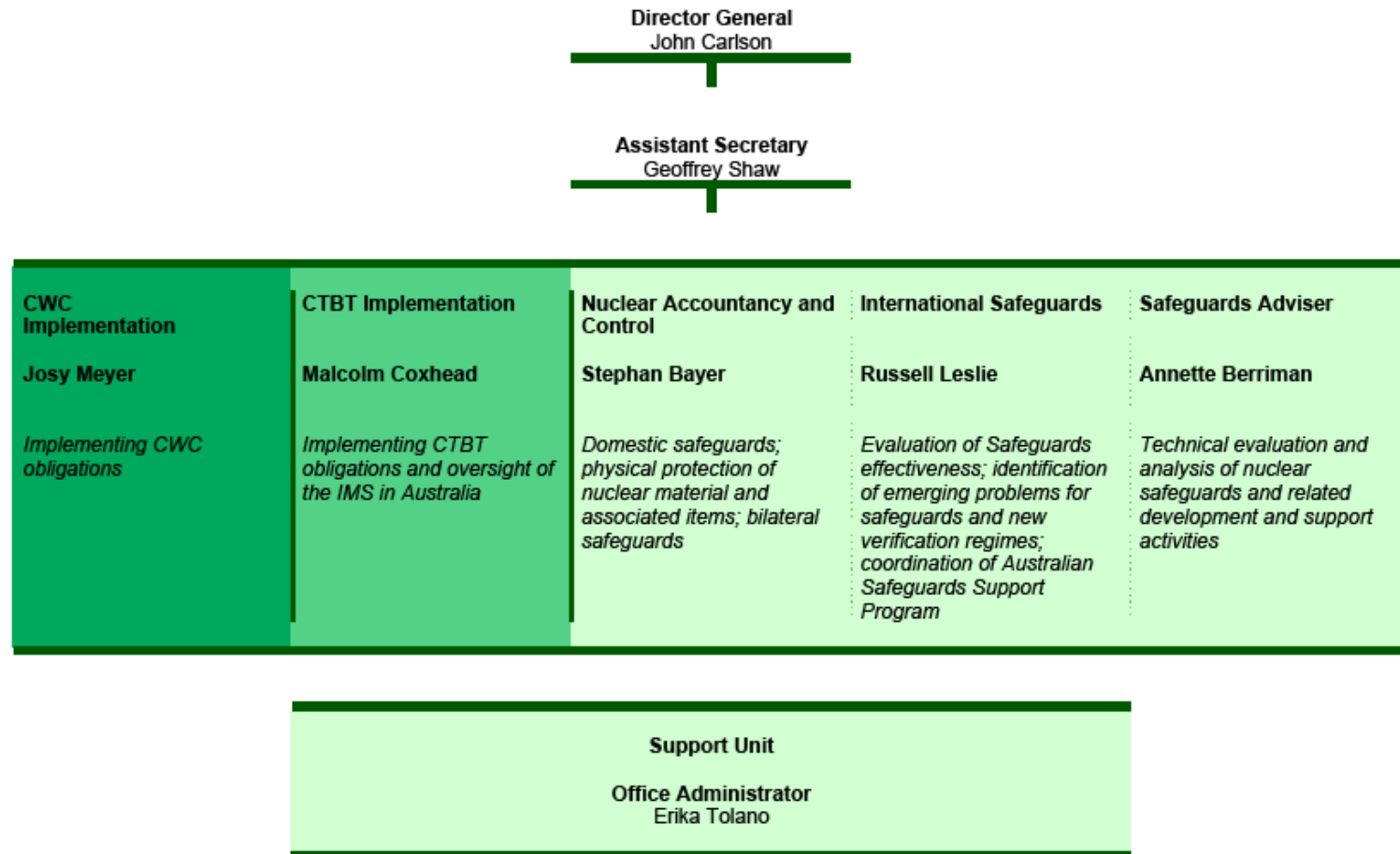


Table 12: ASNO Staff at 30 June 2007

	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)

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 one staff member attended a nuclear materials accountancy training course in the US. Further details are in Table 13.

Table 13: Training and Development Activities

Training and Development Activity	Person Days
Formal DFAT courses	22
Structured work unit & on-the-job training including planning days	38
Seminars, workshops, conferences, overseas negotiations & IDCs	46
External formal courses	46
Academic study	13
Other (IAEA Consultancy)	30
TOTAL	195

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 Costs⁴³

		2006-07	2007-08
Salaries ⁴⁴		\$1 578 279	\$1 723 376
Running Costs	General	\$424 230	\$335 093
	Seismic monitoring ⁴⁵	\$570 388	\$576 776
	Nuclear & radiological security enhancement for Asia and the Pacific	\$252 483	\$204 370
	Sub-Total	\$1 247 101	\$1 116 239
TOTAL		\$2 825 380	\$2 839 615

Uranium Producers Charge

ASNO is responsible for the implementation of the Uranium Producers Charge. This charge is payable on each kilogram of UOC production (set in 2006 to 5.6012 cents per kilogram). In 2007-08, the charge yielded \$455,315 for Consolidated Revenue.

Australian Safeguards Support Program

The cost of the Australian Safeguards Support Program (ASSP) totalled approximately \$496,689 in 2007-08. This amount included \$287,702 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 \$208,987. The 2007-08 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.

43 Excludes GST.

44 Includes Long Service Leave accruals.

45 Undertaken by Geoscience Australia.

Appendixes

APPENDIX A WORLD NUCLEAR ENERGY, JUNE 2008

Table 15: World Nuclear Energy, June 2008⁴⁶

	Operating Reactors		% of Total Electricity in 2007	Reactors under Construction	
	Total	Capacity (GWe)		Total	Capacity (GWe)
United States*	104	100.6	19.4	1	1.2
France*	59	63.3	76.9	1	1.6
Japan*	55	47.6	30	1	0.9
Russian Federation	31	21.7	16	7	4.7
Germany*	17	20.5	27.3		
Republic of Korea*	20	17.5	35.3	3	2.9
Ukraine	15	13.1	48.1	2	1.9
Canada*	18	12.6	14.7		
United Kingdom*	19	10.2	15.1		
Sweden*	10	9	46.1		
China*	11	8.6	1.9	6	5.2
Spain*	8	7.5	17.4		
Belgium*	7	5.8	54.1		
Taiwan* ⁴⁷	6	4.9	19.3	2	2.6
India	17	3.8	2.5	6	2.9
Czech Republic*	6	3.6	30.3		
Switzerland*	5	3.2	40		
Bulgaria*	2	1.9	32.1	2	1.9
Finland*	4	2.7	28.9	1	1.6
Slovak Republic*	5	2	54.3		
Brazil	2	1.8	2.8		
Hungary*	4	1.8	36.8		
South Africa	2	1.8	5.5		
Mexico*	2	1.4	4.6		
Lithuania*	1	1.2	64.4		
Argentina*	2	0.9	6.2	1	0.7
Romania*	2	1.3	13		
Slovenia*	1	0.7	41.6		
Netherlands*	1	0.5	4.1		
Armenia	1	0.4	43.5		
Pakistan	2	0.4	2.3	1	0.3
Iran				1	0.9
TOTAL	439	372.3	(est.) 16.0	35	29.3

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

46 Countries having bilateral agreements with Australia covering use of AONM are marked with an asterisk. These countries operate 369 power reactors, which produce around 14% of total world electricity and about 86% of world nuclear energy. In addition Australia has an agreement with Russia which covers processing on behalf of third countries. Australia has signed a new agreement with Russia (see page 38) which, upon entry into force, will allow for the use of AONM in Russian nuclear power plants.

47 Supply of AONM to Taiwan 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 2008

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 ⁴⁸	15 January 1982
Philippines	11 May 1982
Japan	17 August 1982
Switzerland	27 July 1988
Egypt	2 June 1989
Russia ⁴⁹	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)	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.

48 The Euratom agreement covers all 27 member states of the European Union.

49 A new agreement with Russia was signed on 3 September 2007 – this has yet to enter into force.

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

APPENDIX C STATUS OF ADDITIONAL PROTOCOLS

At 30 June 2008, there were 74 states (plus Taiwan) with significant nuclear activities⁵¹. 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 Additional Protocol or had an Additional Protocol approved by the Board of Governors (Table 18).

Table 17: States with Additional Protocols in force at 30 June 2008

State			
Afghanistan	Estonia	Latvia	Poland
Armenia	Fiji	Libya	Portugal
Australia	Finland	Lithuania	Republic of Korea
Austria	France	Luxembourg	Romania
Azerbaijan	FYROM	Madagascar	Russia
Bangladesh	Georgia	Malawi	Seychelles
Belgium	Germany	Mali	Singapore
Botswana	Ghana	Malta	Slovakia
Bulgaria	Greece	Marshall Islands	Slovenia
Burkina Faso	Guatemala	Mauritius	South Africa
Burundi	Haiti	Monaco	Spain
Canada	Holy See	Mongolia	Sweden
Chile	Hungary	Netherlands	Switzerland
China	Iceland	New Zealand	Tajikistan
Croatia	Indonesia	Nicaragua	Tanzania
Cuba	Ireland	Niger	Turkey
Cyprus	Italy	Nigeria	Turkmenistan
Czech Republic	Jamaica	Norway	Uganda
DR Congo	Japan	Palau	Ukraine
Denmark	Jordan	Panama	United Kingdom
Ecuador	Kazakhstan	Paraguay	Uruguay
El Salvador	Kuwait	Peru	Uzbekistan
TOTAL: 88 states (including 48 NNWS with significant nuclear activities), plus Taiwan			

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

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 38 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 2008

State	State	State	State
Albania	Comoros	Malaysia	Serbia
Algeria	Costa Rica	Mauritania	Swaziland
Andorra	Côte d'Ivoire	Mexico	Thailand
Belarus	Dominican Republic	Moldova	Timor-Leste
Benin	Gabon	Montenegro	Togo
Cameroon	Honduras	Morocco	Tunisia
Cape Verde	Iran	Mozambique	USA
Central African Rep	Kiribati	Namibia	Vietnam
Chad	Kyrgyzstan	Philippines	
Colombia	Liechtenstein	Senegal	

TOTAL: 38 states (including 11 NNWS NPT Parties with significant nuclear activities)

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

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 2008

State	State	State	State
Argentina ⁵²	Egypt	Israel (non-NPT)	Venezuela
Brazil	India (non-NPT)	Pakistan (non-NPT)	
DPRK ⁵³	Iraq	Syria	

TOTAL: 10 states (including 7 NPT Parties with significant nuclear activities)

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

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

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

APPENDIX D IAEA STATEMENTS OF CONCLUSIONS FOR AUSTRALIA 2007

Inventory verification inspections carried out by the IAEA at Australian nuclear facilities and locations are shown in Table 6 (page 31). In addition, the Agency carries out a range of other verification activities, such as short notice inspections, complementary accesses, design verifications and increased data collection and analysis.

The IAEA provides statements of conclusions of inspections under Article 91(b) of Australia's NPT Safeguards Agreement. Table 20 summarises the latest available Article 91(b) statements arising from physical inventory inspections.

Table 20: IAEA Conclusions of Inspections in Australia

Verification Activity	Applicable Facilities	End Date of Material Balance Period	Conclusion
Examination of records	OPAL R&D Laboratories MOATA	13/3/2008 10/3/2008 12/3/2008	'The records satisfied the Agency requirements.'
Examination of Reports to the Agency	OPAL R&D Laboratories MOATA	13/3/2008 10/3/2008 12/3/2008	'The reports satisfied the Agency requirements.'
Application of Containment and Surveillance Measures			'The application of containment and surveillance measures adequately complemented the nuclear material accountancy measures.'
Verification of Domestic and International Transfers	OPAL	13/3/2008	'The domestic and international transfers declared by the operator were verified and the results satisfied the Agency requirements.'
Verification of Physical Inventory	OPAL R&D Laboratories MOATA	13/3/2008 10/3/2008 12/3/2008	'The physical inventory declared by the operator was verified and the results satisfied the Agency requirements.'
Confirmation of the Absence of Unrecorded Production of Direct-Use Material from Material Subject to Safeguards	OPAL MOATA	13/3/2008 12/3/2008	'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	R&D Laboratories	10/3/2008	'The verification activities for timely detection during the material balance period satisfied the Agency requirements.'

The IAEA provides statements of conclusions for states in which strengthened safeguards are in force. These statements are provided under Article 10.c. of the Additional Protocol to Australia's NPT Safeguards Agreement. The Statement for 2007 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, however, final conclusion is pending the results and evaluation of environmental samples:

- *Lucas Heights Science & Technology Centre, Silex Systems Ltd. Research Laboratories;*
- *CSIRO1 – Division of Exploration and Mining, North Ryde, NSW.*

APPENDIX E IAEA SAFEGUARDS STATEMENT FOR 2007

The following is extracted from the IAEA's Annual Report for 2007.

'In 2007, safeguards were applied for 163 States with safeguards agreements in force with the Agency. The Secretariat's findings and conclusions for 2007 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. Eighty-two States had both comprehensive safeguards agreements and additional protocols in force:
 - (a) For 47 of these States⁵⁴, 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 35 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 72 States with comprehensive safeguards agreements in force, but without additional protocols in force.⁵⁵ 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 2007, declared nuclear material in Iran remained in peaceful activities. Progress was made in resolving outstanding safeguards implementation issues. Verification of the correctness and completeness of Iran's declarations remained ongoing.
3. As of the end of 2007, 30 non-nuclear-weapon States party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) had not yet brought comprehensive safeguards agreements with the Agency into force as required by Article III of that Treaty. For these States, the Secretariat could not draw any safeguards conclusions.
4. Three States had safeguards agreements in force that were 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 misuse of the facilities or other items to which safeguards were applied. On this basis,

54 And Taiwan, China.

55 The 72 States do not include the Democratic People's Republic of Korea (DPRK), where the Secretariat did not implement safeguards and, therefore, could not draw any conclusion.

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 remained in peaceful activities or was withdrawn as provided for in the agreements'

APPENDIX F STATUS OF CTBT IMS FACILITIES IN AUSTRALIA

Table 21: Status of Australian CTBT IMS Stations at 30 June 2008

Facility	Status	Operator
Primary Seismic Stations		
Warramunga, NT	Operational and certified against CTBT standards	ANU
Alice Springs, NT	Operational and certified against CTBT standards	GA / US
Stephens Creek, NSW	Operational and certified against CTBT standards	GA
Mawson, Antarctica	Operational and certified against CTBT standards	GA
Auxiliary Seismic Stations		
Charters Towers, QLD	Operational and certified against CTBT standards	GA
Fitzroy Crossing, WA	Operational and certified against CTBT standards	GA
Narrogin, WA	Operational and certified against CTBT standards	GA
Infrasound Stations		
Warramunga, NT	Operational and certified against CTBT standards	ANU
Hobart, TAS	Operational and certified against CTBT standards	GA
Shannon, WA	Operational and certified against CTBT standards	GA
Cocos Islands	Establishment work underway	GA
Davis Base, Antarctica	Site survey completed	GA
Radionuclide Stations		
Melbourne, VIC	Operational and certified against CTBT standards	ARPANSA
Perth, WA	Operational and certified against CTBT standards	ARPANSA
Townsville, QLD	Operational and certified against CTBT standards	ARPANSA
Darwin, NT ⁵⁶	Operational and certified against CTBT standards	ARPANSA
Cocos Islands	Operational and certified against CTBT standards	ARPANSA
Macquarie Island, TAS	Site survey completed	ARPANSA
Mawson, Antarctica	Site survey completed	ARPANSA
Radionuclide Laboratory		
Melbourne, VIC	Operational and certified against CTBT standards	ARPANSA
Hydroacoustic Stations		
Cape Leeuwin, WA	Operational and certified against CTBT standards	GA

⁵⁶ In addition to the IMS particulate monitoring station at Darwin, an IMS Noble gas system is installed and operating in a testing and evaluation phase.

APPENDIX G FREEDOM OF INFORMATION STATEMENT

This statement is provided in accordance with section 8 of the *Freedom of Information Act 1982* (FOI Act) and is correct to 30 June 2008.

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 one FOI request on Russia in 2007-08.

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
- Materials relating to staff development, training, personnel management and general administration

- Customer feedback surveys.

Publications, Presentations and Submissions

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

Nuclear

- John Carlson, *SAGSI: Its Role and Contribution to Safeguards Development*, Institute of Nuclear Materials Management (INMM) 48th Annual Meeting, Tucson, Arizona, USA, 9-13 July 2007.
- John Carlson, *Addressing Proliferation Challenges from the Spread of Uranium Enrichment Capability*, INMM 48th Annual Meeting, Tucson, Arizona, 9-13 July 2007.
- Russell Leslie, John Carlson and Annette Berriman, *Ensuring Effective Safeguards Coverage of States with Small Quantities Protocols*, INMM 48th Annual Meeting, Tucson, Arizona, 9-13 July 2007.
- John Carlson, *Five Decades of Safeguards, and Directions for the Future; an Australian Perspective*, INMM 48th Annual Meeting, Tucson, Arizona, 9-13 July 2007.
- Russell Leslie, John Carlson and Annette Berriman, *Potential for Production of Proliferation Sensitive Material in Research Reactors*, INMM 48th Annual Meeting, Tucson, Arizona, 9-13 July 2007.
- Stephan Bayer, *Establishment of an Asia-Pacific Safeguards Association*, Nuclear Energy Non-Proliferation Workshop III, Daejeon, ROK, 13-15 August 2007.
- Stephan Bayer, *Transparency and Openness*, Nuclear Energy Non-Proliferation Workshop III, Daejeon, ROK, 13-15 August 2007. (This presentation was also given at the Transparency Technology Workshop on Nonproliferation Cooperation in the Asia Pacific, by Dr David Betsill, International Research Fellow, Japan Atomic Energy Agency (JAEA), 20-22 February 2008.)
- John Carlson, *Nuclear Growth and Proliferation Issues*, presented to the 2007 Conference of the Australian Nuclear Association, Sydney, 10 October 2007.
- Russell Leslie, *Australia's Experience – Safeguards and an Expanding National Nuclear Program*, Regional Workshop on Nuclear Material Accounting and Control at Facilities, Beijing, People's Republic of China, 17 October-2 November 2007.
- John Carlson, *Improving Safeguards Efficiency and Transparency*, 5th International Security Conference, Singapore, 21-23 October 2007.
- John Carlson, Director General, ASNO and Sukarman Aminjoyo, Chairman, BAPETEN, *Proposed Asia-Pacific Safeguards Association – Options and a Way Forward*, Consultation Paper, 1 February 2008.
- John Carlson, *Non-Proliferation and Nuclear Security*, Australian Uranium Association Technical Seminar, Adelaide, 6 March 2008.
- Russell Leslie, *Overview of the Nuclear Fuel Cycle*, Canberra, Australia, 1 April 2008.
- John Carlson, *Global Governance Implications of a Nuclear Energy Revival: Non-Proliferation and Safeguards Implications*, Lowy Institute, Sydney, 11 April 2008.
- John Carlson, *Making the Non-Proliferation Regime Work*, Australian National University Nuclear Physics Department, Canberra, 21 April 2008.
- Russell Leslie, *Centrifuge Technology for the Enrichment of Uranium*, Canberra, 1 May 2008
- Russell Leslie, *Overview of Nuclear Reprocessing Technology*, Canberra, 10 June 2008
- Craig Everton, *Developments in the Non-Proliferation Regime, and Implications for Uranium Producers*, AusIMM International Uranium Conference, Adelaide, 19 June 2008.

- Geoff Shaw, *Australia's Efforts to Enhance Regional Safeguards and Nuclear Security*, International Forum on Nuclear Nonproliferation and Peaceful Use of Nuclear Energy in the Asia Region, Tokyo, Japan, 24-25 June 2008.
- Craig Everton, *International Safeguards, Aspects of Planning and Implementing Effective Nuclear Infrastructure*, Richland, Washington, USA, 23-26 June 2008.

Chemical

- John Howell, Josy Meyer and Nick Browne, *The Chemical Weapons Convention: A Guide for Australian Industry Producing, Using or Trading Chemicals*, Canberra, updated July 2007.
- Josy Meyer, *Declarations under Article VI*, Industry Workshop on Implementing the Chemical Weapons Convention, Manila, the Philippines, 11-12 July 2007.
- Josy Meyer, *Implementation of the Chemical Weapons Convention in Australia*, Industry Workshop on Implementing the Chemical Weapons Convention, Manila, the Philippines, 11-12 July 2007.
- Josy Meyer, *OPCW Inspections in Australia*, Industry Workshop on Implementing the Chemical Weapons Convention, Manila, the Philippines, 11-12 July 2007.
- Josy Meyer and Michael Kourteff, *Manila CWC Workshop: Getting Industry on-side in the Philippines*, DFATNEWS, Vol.14(7), July 2007.
- Josy Meyer, *Update on CWC Implementation*, the Plastics and Chemicals Industries Association Regulatory Affairs NSW Meeting, Sydney, 17 July 2007.
- Josy Meyer, *Assistance to States Parties under Article VII*, Fifth Regional Meeting of National Authorities of States Parties in Asia, Doha, Qatar, 4-6 September 2007.
- Josy Meyer, *OCPF Inspections in Australia*, Fifth Regional Meeting of National Authorities of States Parties in Asia, Doha, Qatar, 4-6 September 2007.
- Josy Meyer, *Practical Measures for Controlling and Reporting Import/Export under the CWC*, Fifth Regional Meeting of National Authorities of States Parties in Asia, Doha, Qatar, 4-6 September 2007.
- Josy Meyer, *The CWC and regulatory requirements for laboratories dealing with Schedule 1 chemicals*, Chemical Warfare Agent Laboratory Network Meeting, the National Institute of Forensic Science, Melbourne, 15 November 2007.
- CD ROM, *International Chemical Trade Control: Information for Australian Importers and Exporters of Chemicals*, Version 3.0, January 2008, produced by the Department of Defence in conjunction with ASNO.
- Josy Meyer and Vanessa Masters, *Australian National Paper for the 2nd Review Conference of the CWC, Sequential Inspections*, published by the Organisation for the Prohibition of Chemical Weapons, RC-2/NAT.6, 8 April 2008.

Papers prepared during the reporting period and presented after June 2007

- John Carlson, *Safeguards in a Changing Environment*, Paper for the INMM Annual Meeting, Nashville, 13-17 July 2008.

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 84
Glossary	Mandatory	Page 78
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 6
Significant issues and developments—portfolio	Portfolio departments—suggested	Page 9
Departmental Overview		
Overview description of Office	Mandatory	Page 21
Role and functions	Mandatory	Page 21
Organisational structure	Mandatory	Page 59
Outcome and output structure	Mandatory	Page 27
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 28
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 28
Trend information	Suggested	Page 28-61
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 60
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 58
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 58
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 58
Impact and features of certified agreements and AWAs	Suggested	DFAT AR
Training and development undertaken and its impact	Suggested	Page 60
Occupational health and safety performance	Suggested	DFAT AR
Productivity gains	Suggested	DFAT AR
Statistics on staffing	Mandatory	Page 60
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
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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
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Other Information

Occupational health and safety (section 74 of the <i>Occupational Health and Safety (Commonwealth Employment) Act 1991</i>)	Mandatory	DFAT AR
Freedom of Information (subsection 8(1) of the <i>Freedom of Information Act 1982</i>)	Mandatory	Page 72
Report on performance in implementing the Commonwealth Disability Strategy	Mandatory	DFAT AR
Advertising and Market Research (section 311A of the <i>Commonwealth Electoral Act 1918</i>)	Mandatory	DFAT AR
Ecologically sustainable development and environmental performance (Section 516A of the <i>Environment Protection and Biodiversity Conservation Act 1999</i>)	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.
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 IAEA document INFCIRC/153.
Concise Note	Supplementary explanatory notes on formal reports from a national safeguards authority to the IAEA.
Conversion	Purification of uranium ore concentrates or recycled nuclear material and conversion to a chemical form suitable for isotopic enrichment or fuel fabrication.
CPPNM	Convention on the Physical Protection of Nuclear Material.
CTBT	Comprehensive Nuclear-Test-Ban Treaty.
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization. The Vienna-based international organisation established 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. ^{235}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 (D₂O)	Water enriched in the 'heavy' hydrogen isotope deuterium (hydrogen 2) which consists of a proton and a neutron. D ₂ O occurs naturally as about one part in 6000 of ordinary water. D ₂ O 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.
ICNND	International Commission on Nuclear Non-proliferation and Disarmament.
IDC	International Data Centre. Data gathered by monitoring stations in the CTBT IMS network are 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 different forms of 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 . Ordinary water.
LWR - 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.
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 accountability to mean the difference between operator records and the verified physical inventory. A certain level of MUF is expected due to measurement processes. MUF does not usually indicate "missing" material - because it is a difference due to measurement, MUF can have either a negative or a positive value.
MWe	Megawatts of electrical power.
MWt	Megawatts of thermal power.
Natural uranium	In nature uranium consists predominantly of the isotope ^{238}U (approx. 99.3%), with the fissile isotope ^{235}U comprising only 0.711%.
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 on 20 April 2007.
OPCW	Organisation 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.
²³⁹Pu	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.
SNT	Sensitive Nuclear Technology

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.

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