AUSTRALIAN SAFEGUARDS AND NON-PROLIFERATION OFFICE

ANNUAL REPORT 2004-2005

Director General ASNO

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Cover: Schematic of interiors of the Open Pool Australian Light water reactor under construction at the Lucas Height Science and Technology Centre.

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Australian Government
Australian Safeguards and Non-Proliferation Office

13 October 2005

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

Dear Mr Downer

I submit my Annual Report on the operations of the Australian Safeguards and Non-Proliferation Office (ASNO) for the financial year ended 30 June 2005. 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. Apart from delays in some minor reports (see page 34), all requirements under Australia's safeguards agreement with the International Atomic Energy Agency were met. All Australian Obligated Nuclear Material was accounted for, and ASNO found no unauthorised use of nuclear materials or nuclear items in Australia. All requirements were met under the Chemical Weapons Convention. Activities required in anticipation of the entry-into-force of the Comprehensive Nuclear-Test-Ban Treaty were carried out.

As outlined in this Report, ASNO continued to advance Australia's interests in effective measures against the proliferation of weapons of mass destruction, through our own activities at the domestic, regional and international levels, and through close collaboration with the Department of Foreign Affairs and Trade in Canberra and at diplomatic missions.

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:

- Section One provides a report by the Director General ASNO on key developments in 2004-05 and a view of the year ahead
- Section Two provides a summary of current major issues
- Section Three presents a functional overview of ASNO, including its operating environment and outcomes-outputs structure—the first outcome demonstrates accountability to Government; the second outlines public advocacy and education
- Section Four reports on ASNO's performance during 2004-05, and
- Section Five highlights the key features of ASNO's corporate governance and describes the processes by which ASNO is directed, controlled 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, and
- ecologically sustainable development and environmental performance.

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

ASNO's Outcomes and Outputs Structure (page 27) has changed from that of previous years. The structure now reflects clearer, more targeted outputs as well as the maturity of international regimes against the proliferation of weapons of mass destruction.

Director General's Report

THE YEAR IN REVIEW

International Safeguards Developments

Events over the last year have underscored that nuclear proliferation is one of the greatest challenges currently facing the international community. The Iranian situation has deteriorated, with it becoming clear that Iran is determined to proceed with its uranium enrichment program regardless of international concerns. There are grave doubts this program has an exclusively peaceful purpose, given the long history of Iran's safeguards violations, the secrecy surrounding its nuclear activities, the remaining questions which the International Atomic Energy Agency (IAEA) has not been able to resolve, the lack of any convincing rationale for proceeding with enrichment and the military links to the nuclear program. Efforts are continuing to try to persuade Iran not to proceed with proliferation-sensitive nuclear activities. If Iran refuses to acknowledge the concerns of the international community the issue will go to the United Nations Security Council.[1]

Also during the year the nuclear situation with the Democratic People's Republic of Korea (DPRK) appeared to go backwards. In February 2005, the DPRK claimed that it had produced nuclear weapons, and announced it was suspending its participation in the Six Party Talks. There were positive developments just outside the reporting period, however, with the DPRK returning to the Six-Party Talks in July 2005.[2]

Serious safeguards failures were found in Egypt and the Republic of Korea (ROK), although the IAEA Board of Governors did not consider these constituted non-compliance. Both countries cooperated fully with the IAEA, and the ROK government moved quickly to establish new safeguards regulatory arrangements.

At the practical implementation level, good progress was made in the strengthening of the IAEA safeguards system. The number of Additional Protocols—the instrument by which states give the IAEA additional information and increased access—increased significantly: at 30 June 2005 there were 69 Additional Protocols in force and 39 that had been signed, or approved by the IAEA Board of Governors. Of the 63 non-nuclear-weapon states (NNWS) with significant nuclear activities Party to the Non-Proliferation Treaty (NPT), 43 (i.e. 68%) had an Additional Protocol in force. The Additional Protocol is firmly established as part of the NPT comprehensive safeguards standard. As a result of implementing Additional Protocols, the IAEA reported in its Safeguards Statement for 2004 that for 21 states it had found no indication of undeclared nuclear material or activities.

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1 On 24 September 2005, the IAEA Board of Governors formally found Iran in non-compliance, but held over the timing and content of reporting to the United Nations Security Council for further consideration.

2 In September 2005, the parties to the six-party talks agreed to joint statement of principles under which *inter alia* the DPRK undertook to abandon nuclear weapons and return to the NPT.

Integrated safeguards—the optimum combination of safeguards measures based on a comprehensive safeguards agreement and an Additional Protocol—continued in Australia, Indonesia and Norway, and were introduced in Japan, Hungary and Uzbekistan. The introduction of integrated safeguards in Japan is a particularly important development, given the size and complexity of Japan's nuclear fuel cycle. The application of safeguards in Japan has always been a major component of the IAEA safeguards budget, so the move to integrated safeguards will have major benefits for the overall cost-effectiveness of the IAEA's work.

Substantial further work was completed in developing the new safeguards approaches and procedures needed for integrated safeguards. The Standing Advisory Group on Safeguards Implementation (SAGSI)—the international experts group advising the IAEA which I have the honour to chair—worked closely with the IAEA Secretariat on this task.

Within the Nuclear Suppliers Group (NSG), Australia and many others are pushing for the adoption of the Additional Protocol as a minimum condition for nuclear supply to NNWS. Although at the time of writing there is resistance from some NSG members, the proposal has gained broad acceptance and hopefully will become part of NSG policy.

To further strengthen nuclear export controls, the Minister for Foreign Affairs, Mr Downer announced at the NPT Review Conference in May 2005 that Australia would make the Additional Protocol a condition of supply for Australian uranium sales to NNWS. It is hoped other uranium suppliers will follow suit.

The Iranian situation has highlighted the dangers to the non-proliferation regime of the spread of uranium enrichment and reprocessing technologies. The G8 and others have been developing concepts for an international framework to deal with these proliferation-sensitive stages of the nuclear fuel cycle. These ideas include supply assurances for states that forgo national enrichment and reprocessing programs. In parallel with this work, the IAEA established a group of international experts to look at multilateral approaches. Australia was represented on this group by Mr Lance Joseph, former Ambassador and Governor on the IAEA Board of Governors. This group recommended greater transparency of nuclear supply arrangements, plus development of international supply guarantees. Further, it proposed that sensitive facilities be placed under multilateral control, including regional arrangements based on joint ownership, rights to products or co-management. Governments are currently considering these recommendations, although it is noted that similar suggestions in the past have gained only limited support.

In response to revelations, arising from the IAEA's investigations into safeguards violations by Iran, Libya and the DPRK, about the illicit nuclear supply network organised by the Pakistani AQ Khan, the IAEA has established a major effort to examine international nuclear-related trade in items of proliferation concern. This task will require long-term analysis of the patterns of international trade in nuclear and dual-use items that might indicate whether undeclared nuclear activities are taking place. For this task the IAEA will draw upon the specialist expertise it developed to investigate and analyse weapons of mass destruction (WMD) programs in Iraq.

Although just outside the period covered by this report, I note that the diplomatic conference on the Convention on the Physical Protection of Nuclear Material (CPPNM) held in July 2005 successfully adopted an amendment to the Convention. This strengthens and broadens the

CPPNM's coverage from international to domestic use, storage and transport. This is an important achievement in which Australia played a significant part.

Disappointingly, the Conference on Disarmament remained deadlocked over its work program, including on the proposed Fissile Material Cut-off Treaty (FMCT). We held substantive discussions with several key states this year on how a FMCT might be achieved. These consultations sought to address content, possible verification options and negotiating strategies. We were unable to make progress on the issue.

Mr Andrew Leask, Assistant Secretary ASNO, signs CPPNM Amendment

Also, despite major efforts by the Australian delegation, the NPT Review Conference in May 2005 ended in disarray. It is highly regrettable that the international community was held hostage to the agendas of a few and thereby missed an important opportunity to address seriously critical non-proliferation issues.

Finally, I refer to the Asia-Pacific Nuclear Safeguards and Security Conference held in Sydney on 8-9 November 2004. Participants at this conference, which was opened by the Minister for Foreign Affairs, Mr Downer, and which I chaired, included IAEA Director General Dr Mohamed ElBaradei, ministers or their representatives from 18 countries, and participants from a further five countries and the Pacific Islands Forum. Participants agreed to work together in a sustained and comprehensive effort to enhance the nuclear safeguards and security framework. Further details are given later in this report.

Bilateral Safeguards Developments

Two important developments occurred in the area of Australia's bilateral safeguards.

In late 2004, we began exploratory talks with China on a bilateral safeguards agreement following China's expressed interest in buying Australian uranium. A bilateral safeguards agreement will be a prerequisite to any such trade with China, to which end I visited Beijing in February 2005 to explain Australia's safeguards requirements and assess whether there would be any difficulties in meeting these. Contacts with Chinese officials are ongoing. Just outside the reporting period, on 9 August 2005, the Australian Government announced formal approval of the negotiating mandate for the proposed agreement. This announcement was welcomed by the Australian mining industry.

Also, I am pleased to report that the Australia-Argentina nuclear cooperation agreement is now in force following ratification by Argentina on 12 January 2005.

Domestic Safeguards Developments

With regard to Australia's domestic safeguards, a number of key developments occurred during the reporting period which strengthened our domestic safeguards arrangements.

Early in the year, I gave in-principle approval for the physical protection aspects—building structures etc—of the Australian Nuclear Science and Technology Organisation's Open Pool

Australian Light water (OPAL) reactor, under construction at the Lucas Heights Science and Technology Centre. Loading of fuel for the new reactor is still some months away and will be subject to my final approval.

We assisted in the development of options for the Commonwealth Radioactive Waste Facility to ensure that safeguards and security requirements were taken into account during site selection.

Also, we completed a security risk review of uranium production and transport arrangements in Australia. By virtue of its role as the provider of protective security advice to the Australian Government, the Australian Security and Intelligence Organisation was selected to conduct this review which included a national security threat assessment. The review identified no significant shortcomings while offering some recommendations to further strengthen the protective security arrangements at uranium mines and during transport. This result was expected given that the current threat to uranium ore concentrate (UOC) infrastructure remains very low. UOC is only mildly radioactive, meaning there would be minimal radiological consequences arising from any incident occurring during transport.

Finally, an important development has been the resurgence of the nuclear debate in Australia. This is driven in part by the need to address climate change issues and to find solutions for reducing dependence on fossil fuels in electrical power generation. It is vitally important that this debate is well informed: Australia's economic future will be directly affected by the energy choices made by Australia and our trading partners.

Chemical Weapons Convention Developments

Although maturing as an international regime, there are still challenges to be faced under the Chemical Weapons Convention (CWC). The most pressing of these are: achieving full compliance by CWC States Parties; meeting milestones for the destruction of chemical weapons (CW) stockpiles; and optimising CWC verification procedures.

So far, progress on compliance has been generally uneven. For instance, as of 1 February 2005, only 26% of States Parties had full CWC implementing legislation. These compliance deficiencies do not represent serious breaches, but rather reflect lack of national resources and priority. However, such deficiencies can compromise the object and purpose of the Convention. The Organization for the Prohibition of Chemical Weapons (OPCW) with Member States has sought to address this situation through the institution of the CWC Article VII Implementation Action Plan which imposes a deadline for the implementation of—or at least serious progress towards—*inter alia*, legislation in CWC States by the 10th Conference of CWC States Parties in November 2005. It is evident that many will not meet this deadline, and new strategies will be needed in 2006 to ensure full compliance remains a national priority for CWC States Parties.

With regard to the destruction of CW stockpiles, only one of the six declared CW possessor States Parties—India—is on track to complete the destruction of its stockpile in the timeframe required by the CWC. Regrettably, other countries had to be given extensions to their destruction schedules. In this group, Russia trails with only 2% of its 40 000 tonnes of

CW destroyed to date.[3] Further, the CW destruction program has consumed a greater proportion of the OPCW verification resources than was originally envisaged.

A third issue is the optimisation of CWC verification procedures. When the CWC entered into force, the full details of CWC verification arrangements had not been finalised. Moreover, since that time, the nature of some verification tasks has changed, with unanticipated demands in verifying the destruction of CW stockpiles and, in accordance with the Convention, discrete organic chemical facilities being subject to full verification arrangements only from 2000. Coupled with this are recent changes in OPCW staff tenure arrangements which have caused more rapid personnel turnover in that organisation, including for key groups such as inspectors.

In cooperation with the Australian Embassy in The Hague, we continued to contribute to the development of policies to strengthen the CWC and the organisational effectiveness of the OPCW, including in regard to the above issues. In addition, we sought to lead by setting an example of transparency and through sharing our experiences as a CWC national authority with proven systems in place. This year we increased our outreach to universities and non-government organisations. In addition, we strengthened the regulation of the chemical industry through work with the Department of Defence and the Australian Customs Service.

Comprehensive Nuclear-Test-Ban Treaty Developments

At 30 June 2005, the Comprehensive Nuclear-Test-Ban Treaty (CTBT) had been signed by 175 countries and ratified by 121. Of the 44 specific countries that must ratify the Treaty to trigger its entry into force (EIF), 33 have ratified the CTBT. Although EIF is not yet in sight, the norm against nuclear testing that the CTBT embodies clearly has broad support.

Establishment of the CTBT's verification regime is ongoing. Substantial progress was made on the establishment of an International Monitoring System (IMS) to monitor the globe for evidence of explosive nuclear testing. At 30 June 2005, over 60% of the IMS network was operational. Of Australia's 21 planned IMS facilities, 16 are operational with 1 being certified in 2004-05.

Other Non-Proliferation Developments

This year the Australia Group celebrated a significant milestone—its 20th anniversary. We continued to support strongly this key export control regime in which Mr Andrew Leask chairs the Implementation Meetings. This year the regime was strengthened through revising current controls on industrial fluid-transfer pumps, sprayers and genetically modified organisms to assist enforcement and help exporters better understand their obligations.

The 2005 Biological Weapons Convention (BWC) Meeting of Experts was the last in the three-year program of work adopted at the 5th Review Conference in 2002. This year's work focused on the content, promulgation and adoption of codes of conduct for scientists. Led by Mr Leask, the Australian delegation played a strong and constructive role. This work program kept the critically important BWC in the international spotlight and provided BWC States Parties with detailed information and strategies for enhancing domestic implementation of the Convention. For Australia this has formed the basis of input to the

3 The speed of CW destruction in Russia should be improved by a number of new CW destruction facilities which will come online over the next few years. These facilities are largely subsidised by Western countries.

Council of Australian Governments (COAG) review of hazardous materials. Also, it has given us a platform for BWC outreach in Australia's region.

We have contributed to the Government's counter-terrorism measures through strengthening our permit systems and by participating in various working groups and committees. Also, in response to concerns about the potential threat of chemical, biological, radiological and nuclear (CBRN) related terrorist activity, we joined the Government's CBRN Strategy Group which is a high-level committee that provides Government policy oversight for civilian CBRN issues.

THE YEAR AHEAD

Several important issues will drive our work in 2005-06.

On the international nuclear front, the work of the IAEA will remain vital to Australia's interests. Reaching a resolution of the Iranian nuclear situation will be a major challenge for all parties concerned, as will be resolution of the DPRK nuclear issue. There remains an urgent need to deal effectively with the problem of illicit trafficking in proliferation-sensitive technology. This is one of the matters expected to be addressed by the Special Committee on Safeguards and Verification that is being established by the IAEA Board of Governors. A priority will be to ensure that this Special Committee has a credible and focused work program.

SAGSI, amongst others, will need to address in detail the means and ways of further strengthening safeguards, further developing the implementation of integrated safeguards while ensuring the necessary level of effectiveness. ASNO will continue to work closely with the IAEA and our counterparts around the world in this endeavour, including through the Australian Safeguards Support Program.

We will continue to assist regional countries not only to strengthen their safeguards arrangements but also to enhance their ability to implement their broader non-proliferation obligations. Through our international outreach programs, we will work hard to promote the Additional Protocol as the current safeguards standard and press for the Additional Protocol to become a condition of nuclear supply—something the 2005 NPT Review Conference failed to do—and assist regional states to implement the Additional Protocol effectively. Moreover, now that the CPPNM has been extended to domestic use, storage and transport, we will strongly encourage regional states to ratify the amended Convention.

We will work closely on a whole-of-government basis to develop a response to new United States policy on India, ensuring that the objectives of the non-proliferation regime are advanced.

Bilaterally, we expect to progress the negotiation of a nuclear cooperation agreement that would provide for uranium supply to China.

On the domestic front, we expect this year to approve the security system for the OPAL reactor and will work closely with the Australian Nuclear Science and Technology Organisation and the Australian Radiation Protection and Nuclear Safety Agency on this demanding task.

Regarding the CWC, the year ahead will be a challenging period for us. We have a substantial CWC national and international work program. Also, there will be new demands associated with Australia taking a rotating seat on the OPCW Executive Council, as well as staff turnover in ASNO's two-person CWC Implementation Section.

CTBT EIF is an important priority for the Government, and in late 2005 Australia will begin a two-year period as coordinator of international efforts to promote CTBT ratifications and CTBT EIF. Australia's international outreach efforts are likely to include technical assistance and will promote the development of CTBT verification more generally.

With all IMS stations on the Australian mainland operational by the end of 2005, we will turn our attention to the significant challenge of installing stations in Antarctica and on remote islands (Macquarie Island and Cocos Islands).

Australia will host at least three activities in 2005 to promote the development of CTBT verification. These include field testing of CTBT on-site inspection (OSI) geophysical equipment and a workshop on OSI development in October 2005, and a training course on the use of IMS data for CTBT verification in November 2005. ASNO is organising these activities jointly with Geoscience Australia, and they will involve around 50 international participants.

Finally, we will closely follow nuclear fuel cycle developments worldwide and, as a centre of specialised expertise, contribute to the nuclear debate in Australia.

John Carlson
Director General ASNO

Current Topics

HAS THE NPT OUTLIVED ITS USEFULNESS?

Recent and ongoing violations of the Non-Proliferation Treaty (NPT), particularly the cases of the Democratic People's Republic of Korea (DPRK) and Iran, as well as the failure of the 2005 NPT Review Conference to agree to any final declaration, have led some to question whether the NPT may be reaching the end of its useful life. Other factors prompting this perception include the frequent charges that the nuclear-weapon states have not lived up to their disarmament obligations, and the assertions by Iran and its supporters that the NPT guarantees the right of any country to establish the entire nuclear fuel cycle—specifically, enrichment and reprocessing, the proliferation-sensitive stages of the fuel cycle.

Are the critics right, is the NPT in trouble? And what are the implications, particularly with the prospect of more countries—including in Australia's region—deciding in favour of nuclear energy?

An effective non-proliferation regime benefits all states

In considering the present state of the NPT and its future prospects, it is worth recalling the context in which the Treaty was developed. In the 1960s it was thought the proliferation of nuclear weapons was inevitable, and it was predicted there would be some 25 to 30 nuclear-armed states before the end of the 20th century. Since its conclusion in 1968, the NPT has helped to establish conditions under which proliferation, while not stopped, has been substantially slowed. Today, in addition to the five nuclear-armed states that existed then—the United States, Russia, the United Kingdom, France and China—there are only four that have or are believed to have nuclear weapons: the three non-NPT parties—India, Israel and Pakistan—and the DPRK.

No state would want a return to the situation of the 1960s. All states have a strong interest in maintaining an effective non-proliferation regime. Paradoxically, this is the case even for the nuclear weapon aspirants; they imagine they would be joining a select group of nuclear-armed states. Their perceived advantage would be negated—indeed they would be much worse off—if their proliferation simply prompted their neighbours to do likewise.

The perception that nuclear deterrence has been effective—a perception supported by the fact that to date there has been no nuclear war—has led some to imagine that nuclear weapons are a source of strategic stability, and that states with nuclear weapons are under constraints requiring them to act responsibly. This is an optimistic reading of history—in fact we know that the United States and the former Soviet Union came close to nuclear war on a number of occasions, and there have been grave concerns about the prospect of nuclear war between India and Pakistan. There can be no doubt that the greater the number of states with nuclear weapons, the more likely these are to be used, whether deliberately or through miscalculation and mistake—or through terrorism.

While it is clear that all states have a strong interest in the non-proliferation regime, it is equally clear that not all appreciate this. One of the great foreign policy challenges is to refocus the minds of policy makers on the security benefits of the NPT and the common interest in increasing the Treaty's effectiveness.

Has the NPT been effective, and how?

As noted above, the NPT has been successful in slowing proliferation. This can be attributed to the combination of the political commitment by most states to the objective of non-proliferation, and a technical mechanism—safeguards applied by the International Atomic Energy Agency (IAEA)—for verifying that this commitment is being honoured. If there was no verification, or if verification was ineffective, the objectives of the Treaty would be undermined over time by wide-spread cheating. At worst, NPT Parties could produce nuclear weapons and stockpile them for rapid deployment. At best, NPT Parties would become 'virtual' weapons states, establishing fissile material production capabilities—uranium enrichment plants, or reprocessing plants together with suitable reactors—enabling them to produce nuclear weapons within months. Either situation would lead to an unstable and dangerous security environment. Instead, for the great majority of NPT Parties, their non-proliferation commitment has been reinforced by the assurance provided by verification that other NPT Parties are similarly honouring this commitment.

IAEA safeguards are not the only measure underpinning the Treaty. Other important measures include: nuclear export controls, particularly restraints on the supply of proliferation-sensitive (enrichment and reprocessing) technology; national intelligence activities; information-sharing between governments and with the IAEA; domestic regulation of nuclear materials and technology; and—especially important—political incentives and sanctions in support of the non-proliferation norm (in other words, the willingness of the international community where necessary to take compliance action).

What is the NPT 'bargain', and why do many parties feel that the bargain has not been maintained?

The common description of the NPT is that it is a 'two-way bargain' between the nuclear-weapon states (NWS) who commit to nuclear disarmament and the non-nuclear-weapon states (NNWS) who undertake not to seek nuclear weapons. This is simplistic; the NPT is rather more complex than that. For a start, it is a *three-way* bargain—the commitment by the NNWS not to seek nuclear weapons is given not only to the NWS, but very importantly, to fellow NNWS. It is essential to the security of NNWS that they do not find themselves facing nuclear threats from other NNWS.

Regarding nuclear disarmament, critics of the NWS overlook two points. First, in fact substantial arms reductions have been made by the major NWS—the United States and Russia—who have reduced deployed warhead numbers from 10 000 each in 1991 to 6 000 each in 2002, and are proceeding to levels of between 1 700 and 2 200 by 2012. Clearly there is more to be done, but it is not helpful to ignore that considerable progress has already been made. Second, the disarmament commitment in the NPT (Article VI) places nuclear disarmament into the context of a commitment by all NPT Parties to work towards a treaty on general and complete disarmament under international control. Thus the NPT recognises the link between nuclear disarmament and other weapon types. Clearly there are limits to how far nuclear disarmament can proceed if there is a threat of proliferation of other weapons of mass destruction (WMD) or, especially, a threat of further proliferation of nuclear

weapons. An effective nuclear non-proliferation regime is an essential condition for nuclear disarmament.

The other part of the NPT 'bargain' now gaining greater attention is the right to benefit from nuclear energy, which Iran and its supporters are interpreting as a right to develop the entire fuel cycle. This is a misreading of the NPT. The NPT (Article IV) speaks of the right of all parties to use *nuclear energy* for peaceful purposes. This was never intended to mean development of *any* nuclear technology.

Nuclear energy as such—the use of reactors to generate electricity—does not present a proliferation risk. It has long been recognised, however, that the spread of technologies for producing fissile material—enrichment and reprocessing—could threaten non-proliferation objectives. When the NPT was negotiated it was envisaged that the NWS would provide enrichment and reprocessing services for the NNWS.[4] Further, in terms of the NPT itself the right to use of nuclear energy is not unqualified, but is subject to the other provisions of the Treaty—including the commitment against seeking nuclear weapons and the commitment to place all nuclear material under IAEA safeguards. It is disturbing that the state most vociferous about this 'right'—Iran—has been selective in its observance of NPT provisions. It is even more disturbing that Iran has supporters despite its track record of NPT violations.

Ultimately, the NPT is a treaty on *non-proliferation*, not technology acquisition. Clearly there is a need to establish an international framework to deal with legitimate concerns about access to the benefits of nuclear science and technology. This is discussed further below.

Do proliferation challenges show the break-down of the NPT?

The NPT cannot 'prevent' proliferation, any more than national laws can prevent crime. The NPT establishes a standard of behaviour, together with an objective mechanism—IAEA safeguards—for identifying non-compliance and a process for dealing with non-compliance.

Obviously it is a serious concern that some NNWS have attempted to pursue nuclear weapons, but this does not demonstrate a failure of the NPT. It is precisely because of the possibility of non-compliance that the Treaty includes a verification mechanism. The purpose of verification is two-fold: to provide a means for NPT Parties to demonstrate their compliance; and to detect non-compliance. In this respect, international law is little different to domestic law—when a crime is committed no-one calls for the scrapping of the criminal law on the basis that it is not working, but rather, for more effective law enforcement.

In fact, the issue of whether proliferation efforts show the NPT is not working is quite complex, requiring careful analysis. Important questions include:

- has there been a failure of verification? and/or
- has there been an inadequate response by the international community when verification has identified non-compliance?

An essential verification objective is to ensure the risk of detection is sufficiently high to deter a would-be proliferator. If the risk of detection is low, the deterrence factor—and the credibility of the verification system—will suffer accordingly. Perhaps the most serious technical challenge that has emerged to IAEA safeguards is the detection of undeclared

4 This has in fact happened; United States, Russian, French and United Kingdom entities are the leading suppliers of fuel cycle services, on a commercial basis, to the world's civil nuclear industry.

nuclear activities, especially centrifuge enrichment plants.[5] The recent cases of Iran (which had engaged in undeclared nuclear activities for almost 20 years) and Libya (which was able to buy a centrifuge plant off the shelf through the AQ Khan criminal supply network) shows the need for improvements across the board in detection methodology and information-sharing, as well as in national controls over manufacture and trade in sensitive technologies. The IAEA's capabilities are improving, but further assistance from governments is required.

Deterrence has two aspects: the risk of detection (just discussed) and the risk of enforcement action. Risk of detection will hold no fears if the proliferator is confident there will be little or no consequences. This is an issue of fundamental importance for the NPT—if proliferators find they can violate the Treaty with impunity the Treaty really will be in trouble. Here, there is a two-stage process: first, non-compliance is to be determined by the IAEA Board of Governors; and second, a non-compliance case is to be reported to the United Nations (UN) Security Council.

It is of serious concern that both stages of making compliance decisions have become highly politicised. For example, in 1993 when the IAEA first reported the DPRK to the Security Council for non-compliance, and in 2003 when the DPRK announced withdrawal from the NPT, the Council was deadlocked over the need to take action. The mechanism of the Six-Party Talks was established outside the Security Council to attempt to resolve the DPRK nuclear problem by negotiation. Negotiation is an essential aspect of resolving international disputes, but to have the Security Council itself step aside from its responsibilities sets a worrying precedent.

Now, with the Iranian case, even at the first stage of the non-compliance finding process, the IAEA Board of Governors appears divided along political lines on what should be a largely technical decision based on examination of facts. It is uncertain what will happen when the case gets to the Security Council. It is absolutely essential that the Security Council—especially the five Permanent Members—unite in the interest of upholding the non-proliferation regime. If narrow national political or economic priorities predominate, the non-proliferation regime will be seriously weakened.

Alternatives to the NPT?

A good way to appreciate the benefits of the NPT is to contemplate the alternatives. A view expressed by some academics, for instance, is that non-proliferation has failed and we need to move to an era of 'proliferation management'. By this reasoning, effort should be redirected from non-proliferation to the development of new rules of behaviour, particularly a framework of deterrence. The idea seems to be to develop common understandings of when nuclear weapons might or might not be used, to try to establish some predictability and stability into a nuclear-armed world.

There are some obvious problems in this approach: it assumes governments will act rationally, and does not allow for accidents and miscalculations. Most tellingly, if the rationale for scrapping the NPT is that rules-based systems are not effective, why should new rules of deterrence be any more successful?

5 The ongoing program to strengthen IAEA safeguards, with particular attention to undeclared activities, has been described in previous ASNO Annual Reports.

Without the NPT we would find ourselves in a world where a large number of states—the 25 to 30 predicted in the 1960s?—would be nuclear-armed or could rapidly cross the threshold. Such a world would be inherently unstable. There would be some similarities to pre-1914 Europe—heavily-armed states facing each other in an atmosphere of intense suspicion, where it might take just an assassin's bullet to set in train an uncontrollable series of escalations.

Meeting the challenges to the NPT

The greatest challenge for the non-proliferation regime is the weakening of political support for the NPT itself. This can be seen in the most recent NPT Review Conference held in May 2005, which failed to agree to any final document, notwithstanding that proliferation is widely seen as one of the most serious issues in contemporary international affairs.

In most cases this loss of support is not occurring deliberately, but rather appears to be the result of neglect, or lack of appreciation of the national security benefits of an effective non-proliferation regime. Many developing countries seem to regard proliferation as a 'North/South' issue which is important only to the 'North'—and therefore can be used by the 'South' (developing countries) as a bargaining chip in other political arguments because it is not intrinsically important to their interests. It is difficult to understand this perspective, since existing proliferation cases have emerged from the ranks of developing countries. The consequences of the wider spread of nuclear weapons will be just as serious, if not more so, for developing countries as for the 'North'.

For many countries the focus of their interest in the NPT now seems to be almost exclusively disarmament and technology acquisition. The non-proliferation core of the Treaty has receded in importance. As noted earlier, disarmament will not progress further in a world where proliferation is becoming an increasing problem. For those who genuinely wish to encourage further disarmament, the best contribution they can make is to support the non-proliferation aspects of the Treaty. An important objective for NPT supporters should be to impress on governments generally the major security benefits of the Treaty for all countries, and to try to achieve a more considered approach by national representatives in international fora such as the IAEA, the UN and future NPT Review Conferences.

Another critical challenge for the NPT is the further spread of proliferation-sensitive technologies. Here, it is disturbing to see that many governments have been taken in by Iran's manipulation of this issue. Priority needs to be given to development of an international framework to deal with sensitive stages of the fuel cycle. Key elements could include criteria for assessing the acceptability of enrichment and reprocessing projects, and assurance of supply of nuclear fuel for countries that forswear development of enrichment and reprocessing.

Mention has also been made of the challenge of strengthening the IAEA's detection capabilities for undeclared nuclear activities. This involves technical and political aspects. At the technical level is the need to improve detection methods. At the political level, there is the need to extend the IAEA's authority to require information and physical access, through universalisation of the Additional Protocol.[6]

6 These issues are discussed in detail in previous ASNO Annual Reports.

The final challenge is for the members of the Security Council to accept their responsibilities and take compliance action where this is required.

Far from outliving its usefulness, the NPT is as important today as it ever has been, even more so given current proliferation challenges. Arguably, it is only by luck that the world has survived the last 60 years without nuclear war. This does not allow governments to be complacent about the dangers of proliferation. Proliferation threatens the vital national interests of all countries, rich and poor, strong and weak, 'North' and 'South' alike, and it is imperative that all support the Treaty and IAEA safeguards with a vigour and commitment not currently in evidence.

CURRENT PROLIFERATION CHALLENGES

A number of significant challenges to the nuclear non-proliferation regime have emerged, involving Iran, the DPRK and Libya. In addition, significant safeguards failures have come to light in Egypt and the Republic of Korea.

Iran

Since 2002 the IAEA has been investigating undeclared nuclear activities in Iran.[7] Through these investigations, the IAEA has uncovered some 20 years of Iranian research, development, testing and manufacture of equipment and facilities to produce enriched uranium and to separate plutonium—activities claimed to be for peaceful purposes but which are also required for a nuclear weapon program. These activities were undertaken without reporting to the IAEA and Iran therefore failed to meet its obligations under its safeguards agreement and the NPT.

The IAEA has consistently reported a lack of adequate transparency and cooperation on the part of Iran. Although Iran claims to be cooperating, the IAEA continues to unearth new facts—as late as May 2005 the IAEA reported that Iran had undertaken plutonium experiments more recently that previously declared.

There is strong international concern about Iran's continued push to acquire a substantial uranium enrichment capability. Iran argues it needs to be self-sufficient in the nuclear fuel cycle to support a nuclear power program. However, the extent and timing of Iran's activities, the covert nature of the program, its links to illicit procurement networks, and the lack of an economic rationale for developing uranium enrichment are inconsistent with a peaceful civil nuclear power industry.

A number of members of the IAEA Board of Governors had concluded in 2003 that Iran was in non-compliance with its safeguards agreement, and that the case should be reported to the Security Council in accordance with the IAEA Statute. Some other members of the IAEA Board of Governors argued that the best prospect for a resolution would be within the IAEA, and action to report Iran to the Security Council should be deferred. The IAEA Board of Governors called on Iran to suspend all enrichment-related and reprocessing activities while the IAEA's investigations continued, and the United Kingdom, France and Germany commenced negotiations with Iran, to try to reach a settlement under which Iran would cease these activities in exchange for access to power reactor technology, fuel supply assurances

7 See reports in ASNO Annual Reports for 2002-03 and 2003-04.

(which in any event Russia has provided already), and a range of security, economic, diplomatic and technological benefits.

Iran has argued all along that it has no intention of ceasing enrichment for more than a temporary period, maintaining that it has the right to pursue sensitive technologies as part of the 'inalienable right' to nuclear energy provided in Article IV of the NPT. Other countries have noted that rights under Article IV must be exercised in accordance with Article III—acceptance of safeguards—and Article II—non-pursuit of nuclear weapons. Iran has clearly violated Article III and is widely believed to be in violation of Article II. Iran cannot comply with the NPT selectively, asserting rights under some provisions while violating others.

At the time of writing, Iran has broken the suspension of enrichment-related activities by resuming uranium conversion at Isfahan, and the matter is being considered again by the IAEA Board of Governors. Iran may be reported to the Security Council later this year.[8]

It is disturbing to find that Iran is not convinced its national interests are best served by maintaining a strong non-proliferation regime. Iran's breaches of the NPT represent a clear strike at both the spirit and the letter of the NPT and the IAEA safeguards system. Iran may consider that being on the threshold of establishing nuclear weapon capability will give it strategic advantage, but this 'advantage' will be short-lived if neighbouring countries are prompted by its actions to pursue the same path.

Almost equally disturbing is that the international community is far from united in condemnation of Iran's actions. Many developing countries are supportive of Iran's claims to the right to proliferation-sensitive technology, regardless of the numerous treaty breaches involved in developing this capability, and regardless, it would seem, of the impact on strategic stability in the Middle East. Others seem reluctant to alienate Iran because of economic factors, energy supply considerations, and so on. This lack of resolve to uphold the NPT only weakens the Treaty, to the detriment of all, including Iran itself.

Australia has consistently urged Iran to recognise that, due to the long history of treaty violations, there is, in the words of the IAEA Director General, a 'confidence deficit', as a consequence of which it will take some considerable time before the international community could have any confidence that proliferation-sensitive nuclear activities in Iran have a purely peaceful purpose.

Democratic People's Republic of Korea

International relations with the DPRK deteriorated following its expulsion of IAEA inspectors in December 2002 and its announcement in January 2003 of withdrawal from the NPT.[9] Moreover, efforts to bring the DPRK back into the international nuclear community were upset by a DPRK announcement that it has produced nuclear weapons. A series of Six-Party Talks involving China, the DPRK, Japan, the ROK, Russia and the United States is underway to try to resolve the DPRK nuclear issue.[10]

8 On 24 September 2005 the IAEA Board of Governors formally found Iran in non-compliance but deferred the timing and content of reporting to the Security Council for further consideration.

9 See reports in ASNO Annual Reports for 2002-03 and 2003-04.

10 Outside the period of this Report, these talks appear to have made progress, with agreement in September 2005 to a series of principles for resolution of the nuclear issue.

Libya

In 2003, Libya renounced its nuclear and other WMD programs. The major element in Libya's nuclear program was centrifuge technology and a design for a nuclear weapon acquired from a network of illicit suppliers from countries in Europe, Africa, Asia and the Middle East, known as the AQ Khan network (which also supplied Iran and the DPRK). In addition, Libya had planned to obtain a substantial centrifuge installation through the Khan network—more than sufficient to support a nuclear weapon program.

Libya has been cooperating with the IAEA since December 2003 in verifying and dismantling its nuclear program, and has signed an Additional Protocol.

Other significant safeguards failures

During 2004-05 the IAEA Board considered two further cases of safeguards failures, involving Egypt and the ROK.

In the case of **Egypt**, in November 2004 the IAEA reported to its Board of Governors on the discovery of a number of undeclared nuclear activities. The experiments were in the areas of uranium conversion, extraction of uranium from phosphates, uranium and thorium irradiation experiments, and reprocessing experiments. Many of these pre-dated the entry-into-force of Egypt's safeguards agreement, in 1982. Egypt explained that these past reporting failures were due to a lack of understanding of its obligations under the safeguards agreement, particularly as regards very small quantities of nuclear material. The Board concluded that while the safeguards failures were a matter for concern, they represented shortcomings in safeguards regulation and reporting by Egypt, rather than anything more serious.

In the case of the **ROK**, in November 2004 the IAEA reported to its Board of Governors that undeclared nuclear activities had taken place at various times over an extended period from 1979 to 2000. These involved chemical enrichment experiments (which terminated in 1981), plutonium separation (conducted in 1982), laser enrichment (AVLIS) experiments (conducted in 2000) and the production of uranium metal. In the case of enrichment and reprocessing experiments, only very small (gram) quantities of material were involved. These activities have now ceased.

The ROK has stated that these activities were carried out by 'rogue scientists' at a research institution, the Korean Atomic Energy Research Institute (KAERI), without the knowledge of the safeguards regulatory agency and without government authorisation. The ROK informed the IAEA that indigenously produced, undeclared natural uranium metal was used for the AVLIS experiments and that some imported materials, namely depleted uranium and natural uranium metal, were also used in other experiments.

The IAEA Board of Governors concluded that the failure to report these activities was a serious concern, but welcomed the corrective actions taken by ROK authorities and its active cooperation with the IAEA to resolve all outstanding issues. IAEA investigations are continuing.

The ROK situation demonstrated the strength of the Additional Protocol over traditional safeguards—a number of the undeclared activities had come to light as a result of

environmental sampling by the IAEA and through the wider access rights provided by the Additional Protocol.

ASNO has established that no Australian Obligated Nuclear Material (AONM) was involved in these activities (see Output 1.3).

One of the problems in the ROK case was that the safeguards regulatory agency, the Technical Center for Nuclear Control (TCNC), was part of KAERI—clearly not a situation conducive to effective regulation. The ROK has since reorganised the regulation of its nuclear industry and passed new legislation. This includes the creation of a new regulatory authority, the National Nuclear Management and Control Agency (NNCA), which replaces TCNC and is independent of KAERI. The ROK is planning further action to strengthen NNCA's independence in 2006.

DEVELOPMENTS IN UNITED STATES POLICY ON NUCLEAR COOPERATION WITH INDIA

The following development occurred just outside the period of this report, but is discussed here because it will have a prominent place in nuclear policy work over the coming year or so. On 18 July 2005 United States President George W Bush and India's Prime Minister Manmohan Singh issued a joint statement which covered, *inter alia*, cooperation on non-proliferation and security matters.[11] President Bush noted India's strong commitment to preventing the proliferation of WMD and stated that as a responsible state with advanced nuclear technology India should acquire the same benefits and advantages as other such states.

President Bush said he will work to achieve full civil nuclear energy cooperation with India as it realizes its goals of promoting nuclear power and achieving energy security. He would seek agreement from the United States Congress to adjust United States laws and policies. The United States would work to adjust international regimes to enable full civil nuclear energy cooperation and trade with India, including but not limited to expeditious consideration of fuel supplies for safeguarded nuclear reactors at Tarapur.

Prime Minister Singh said India would:

- separate civil and military nuclear facilities and programs in a phased manner as well as voluntarily place civil facilities under IAEA safeguards
- conclude an Additional Protocol with respect to civil nuclear facilities
- continue India's unilateral moratorium on nuclear testing
- work with the United States for a multilateral Fissile Material Cut Off Treaty
- refrain from transfer of enrichment and reprocessing technologies to states that do not have them, and support international efforts to limit the spread of these technologies, and
- ensure that the necessary steps have been taken to secure nuclear materials and technology through comprehensive export control legislation and through harmonization and adherence to Nuclear Suppliers Group (NSG) Guidelines.

11 Joint Statement between President George W. Bush and Prime Minister Manmohan Singh; 18 July 2005; www.whitehouse.gov/news/releases/2005/07/20050718-6.html.

The United States and India will establish a working group to take the phased implementation action necessary to progress the commitments set out in the joint statement. Progress will be reviewed when President Bush visits India in 2006.

No doubt one of the considerations behind this change in United States policy is the fact that India is one of the world's major growth areas in electricity consumption. India's electricity demand is expected to increase as much as ten-fold by 2050. If this demand is met mainly by coal there would be significant environmental and greenhouse gas emission consequences. As part of a diversification of energy sources India plans to expand its nuclear power capacity, from the current level of 3% of total electrical output to 25% by 2050—effectively a 100-fold increase in nuclear capacity. It is essential that this program is based on high safety standards—but this would not be helped by continued denial of modern technology and cooperation.

India's preparedness to take a leading role in combating the proliferation of WMD is a vital aspect of its new international profile. Notably, India recently passed comprehensive WMD export control legislation, and has announced that it will abide by the NSG Guidelines and the Missile Technology Control Regime. It remains the case, however, that as a non-Party to the NPT, India is not eligible for nuclear cooperation under current internationally-established export control arrangements (there is a limited exception under NSG Guidelines for safety items).

The full scope safeguards standard—that nuclear materials and items should not be provided to a NNWS unless that state accepts IAEA safeguards on all of its nuclear activities—was introduced to promote adherence to the NPT. Now that only three states—India, Israel and Pakistan—remain outside the NPT, and given that none of these appears likely to change its position on joining the NPT in the foreseeable future, it might be asked whether the full scope safeguards requirement can be effective in drawing these three into the Treaty. In treating India as a special case, however, it is essential that states within the NPT should not be encouraged to withdraw in the belief that a relaxation of the full scope safeguards standard for India would also be available to them. It has to be clearly established that the case of a state that has remained outside the NPT from the beginning, but otherwise supports non-proliferation principles, would be treated very differently from that of a state that has accepted the NPT's commitments and subsequently seeks to renounce them.

The Australian Government is examining this issue very closely. Australia welcomes India's intention to accept non-proliferation commitments, and sees this as a very positive development. On the other hand, as noted above, it is essential to ensure that states of uncertain non-proliferation commitment within the NPT are not encouraged to believe they can withdraw and expect to be treated on a similar basis. Maintaining the integrity of the non-proliferation regime will be a major priority.

As a non-NPT Party, India is not eligible for supply of Australian uranium. No consideration is being given to changing this policy.

POSSIBLE URANIUM EXPORTS TO CHINA

China plans a four-fold increase in the use of nuclear energy over the next 15 to 20 years in order to power its industrial expansion and reduce its dependency on fossil fuels. In late

2004, China expressed interest in buying Australian uranium. While outside the reporting period, it should be noted that on 9 August 2005 the Australian Government announced in-principle support to sell uranium to China subject to the successful negotiation of a bilateral safeguards agreement. This announcement was welcomed by the Australian mining industry.

Messrs John Carlson and Nick Doulgeris visited Beijing in February 2005 for exploratory talks with Chinese officials on a possible nuclear cooperation agreement. That dialogue is ongoing. At this stage, it is difficult to predict how quickly a bilateral safeguards agreement between Australia and China might progress. If agreement is reached *ad referendum*, the legal processes in each country are likely to take several months before the agreement could enter into force. In Australia's case the agreement would be subject to Parliamentary and public scrutiny through the treaty review procedures of the Joint Standing Committee on Treaties.

Consistent with current policy and practice, the main elements of an Australia-China safeguards agreement would be:

- Australian Obligated Nuclear Material (AONM) will be used only for peaceful purposes and will not be used for any military purposes
- AONM will be covered by arrangements under China's safeguards agreement with the IAEA
- transfers to third parties, enrichment to 20% or more in the isotope ^{235}U and reprocessing may not take place without Australia's prior consent, and
- detailed Administrative Arrangements between ASNO and its Chinese counterpart will set out nuclear accounting and reporting procedures applying to AONM.

In addition, the agreement is likely to establish an umbrella for cooperation in areas of nuclear science and technology of mutual interest.

China of course is a NWS, and some people have asked how Australia could be sure that AONM was not used in nuclear weapons. In this regard it is noted Australia has long-standing safeguards agreements with the other four NWS. Assurance that AONM is not used in nuclear weapons would come from a combination of factors: China's willingness to undertake a legally-binding treaty-level commitment to this effect; the safeguards arrangements that would apply; and the factual circumstances, as outlined below.

First, Australian uranium would not be supplied to China for unspecified uses. Rather, it would be bought by power utilities for electricity generation. The facilities in which AONM was processed and used would be consistent with this. Monitoring of AONM in China would be based on safeguards procedures applied at facilities where AONM is handled in accordance with China's safeguards agreement with the IAEA and the Administrative Arrangements concluded with Australia. AONM is not eligible for use in military facilities and China's safeguards agreement with the IAEA excludes such facilities. ASNO would cross-check reports on AONM provided by China for consistency with information from the IAEA and other sources.

Finally, China has no reason to seek to divert civil material for its military program. While, unlike the other NWS, China has not stated officially that it has ceased production of fissile material for nuclear weapons, unofficial statements indicate such production ended by about

1991. Fissile material stockpiles built up before then are believed to be ample for meeting China's military requirements.

TSUNAMI WARNING AND THE CTBT INTERNATIONAL MONITORING SYSTEM

Even before the devastating tsunami of 26 December 2004 had struck the coast of Indonesia, clear signs of a major earthquake were showing up on seismometers in the region. There is a big difference between detecting a quake and protecting coastal populations, but the fact that seismic waves propagate more than ten times faster than a tsunami means that seismic detection will often be the first indication of such an event. Accordingly, seismic monitoring should have a key role in tsunami alert arrangements.

It has been recognised for some years that data from Comprehensive Nuclear-Test-Ban Treaty (CTBT) International Monitoring System (IMS) stations could contribute to a wide range of civil and scientific uses as well as monitoring for signs of nuclear test explosions. Work to establish the IMS began in the late 1990s, and more than half of all IMS stations are now operating, as well as the CTBT's International Data Centre (IDC) in Vienna. The IDC draws the data from all IMS stations together at a central location and carries out analyses to identify seismic and other events which may be of relevance to the test ban.

Several IMS seismic stations in the South East Asian region picked up the major earthquake off Indonesia on 26 December 2004 within four minutes of its occurrence. This may not have been soon enough to provide warning to the devastated coast of Sumatra, but with suitable arrangements in place it could have helped warn people in countries like Sri Lanka, India and Thailand.

Although indications of the earthquake were visible to the IDC quite quickly, the design and current operational arrangements of the IDC did not permit a timely reaction. The design of the IDC, as well as IMS stations, is focused on detecting and analysing the quite small events that could be evidence of nuclear testing. This type of analysis may take hours or days.

In response to the tragedy of the 26 December tsunami, the CTBT Organization (CTBTO) Preparatory Commission (PrepCom) has recognised the important potential contribution of the IMS for disaster warning, and has begun to test arrangements for sharing key IMS data with tsunami alert organisations. Australia too is looking to benefit by incorporating real-time data from particular IMS stations into the new Australian Tsunami Warning System.

How to share IMS data has long been a subject of difficult discussion in the PrepCom, with a number of countries expressing concerns about the potentially sensitive nature of IMS data. However, in recognition of the terrible consequences of the tsunami, most were quickly ready to find ways for the PrepCom to contribute to future alert arrangements. Some differences remain, based on perceptions by one or two countries about what should be priorities before entry into force of the Treaty. Australia's view has consistently been that IMS data can make many useful contributions outside the sphere of arms control, and that the IMS should support these as far as possible.

2004 ASIA-PACIFIC NUCLEAR SAFEGUARDS AND SECURITY CONFERENCE

From 8-9 November 2004, regional countries attended the Asia-Pacific Nuclear Safeguards and Security Conference in Sydney. Participants in the conference included Ministers or their representatives from Australia, Brunei Darussalam, Cambodia, Canada, China, Fiji, Indonesia, Japan, the Republic of Korea, Laos, Malaysia, New Zealand, Papua New Guinea, the Philippines, Singapore, Thailand, United States and Vietnam. Also attending the conference were representatives of Burma, East Timor, France, Russia, the United Kingdom, the IAEA and the Pacific Islands Forum Secretariat. Mr John Carlson chaired the meeting.

Participants expressed their firm resolve to combat nuclear weapons proliferation and the threat of nuclear terrorism. Further, participating countries agreed to work together in a sustained and comprehensive effort to enhance the nuclear safeguards and security framework. It was recognised that a strong nuclear safeguards and security framework was essential to realising the benefits of peaceful use of nuclear energy. In addition, the meeting noted that effective nuclear safeguards and security measures were vital not only for countries with nuclear power programs or research reactors, but also for those where radioactive materials are used for medical, industrial and scientific purposes.

Two types of threat to nuclear security were identified: the proliferation of nuclear weapons among states, and the potential for terrorist acts involving nuclear facilities and nuclear and radioactive materials. The meeting recognised that nuclear non-proliferation, nuclear disarmament and the peaceful uses of nuclear technology were closely interrelated.

Asia-Pacific Nuclear Safeguards and Security Conference, 8-9 November 2004. From right to left: the Hon Alexander Downer MP, Minister for Foreign Affairs; Dr Mohamed ElBaradei, Director General, IAEA; Professor Dr Azhar Djaloeis, Chairman, Indonesian Nuclear Energy Control Board; and Mr John Carlson, Director General ASNO (Chair). Photographer: Jason McCormack.

Meeting participants agreed to work together in a sustained and comprehensive effort to expand and enhance the nuclear safeguards and security framework. They agreed priority would be given to:

- global implementation of the IAEA's strengthened safeguards system as the current safeguards standard under the NPT

- strengthening the protection of nuclear materials and facilities
- ensuring the effective control and protection of radioactive sources, consistent with their safe use
- implementing effective domestic controls on nuclear and radioactive materials and relevant equipment and technology, including export controls
- ensuring effective national nuclear security capability, including technical capacity for the detection of illicit trafficking of nuclear and radioactive materials and relevant equipment and technology
- early and comprehensive implementation of UN Security Council Resolution 1540, and
- making effective use of the extensive IAEA assistance available in relation to the security of nuclear and radioactive materials.

The conference was a practical example of Australia's strong commitment to working with Asia-Pacific countries to combat nuclear weapons proliferation and the emerging threat of nuclear and radiological terrorism.

FISSILE MATERIAL CUT-OFF TREATY

The concept of a Fissile Material Cut-Off Treaty (FMCT)—under which further production of fissile material for nuclear weapons use would be prohibited—has been under discussion for many years. Negotiation of the FMCT is to take place in the UN Conference on Disarmament (CD), but lack of agreement on the CD's work program has prevented a start on the FMCT. Meanwhile ASNO has been active in the development of ideas for the prospective treaty.

An important element in the FMCT concept has always been effective international verification. In 2004 the United States announced that it had concluded effective international verification of the FMCT was not realistically achievable. The United States supported early conclusion of the FMCT to establish cut-off as an international norm, but was concerned that negotiation of a verification regime would seriously delay the treaty.

The United States-based Arms Control Association invited Mr John Carlson to contribute an article on this topic. This was published in January/February 2005, under the title *Can a Fissile Material Cut-Off Treaty be Effectively Verified.*[12] In this article, Mr Carlson suggested that the basic issue of the practicability of verification needed to be separated from the question whether the detailed verification system should be part of the principal treaty instrument. In considering the question of verifiability, it was important not to confuse the two issues.

Before discussing verification aspects, it is essential to appreciate that for most states, which are NNWS NPT Parties, comprehensive safeguards applied by the IAEA are sufficient to meet FMCT requirements. Thus what is under consideration with FMCT are commitments—and a verification system—appropriate for the NWS and the non-NPT Parties (India, Israel and Pakistan).

12 John Carlson; *Arms Control Today*; January/February 2005; pp.25-29. Also available at www.asno.dfat.gov.au.

Regarding verification as such, the issue of 'effectiveness' is primarily a matter of judgment. No verification system can be 100 per cent effective—states evaluating verification results and any states considering violating their treaty commitments will draw their own conclusions about the risks involved with verification: on the one hand the risk of false assurance, and on the other, the risk of detection. A threshold detection capability is essential, but exactly what this threshold should be will involve qualitative judgment. One important aspect of this issue is the fact that no major state relies on verification alone, but will also take into account national intelligence information.

A further aspect of FMCT verification is that the verification objectives and technical parameters have yet to be developed and/or negotiated. In a broad technical sense FMCT verification can be expected to resemble IAEA safeguards. However, there are many differences. The objective of IAEA safeguards in NNWS is to detect acquisition of sufficient fissile material to produce a single nuclear weapon—possession of even one nuclear weapon can have profound consequences in terms of the strategic status of a hitherto 'NNWS'. For states that already have hundreds or even thousands of nuclear weapons, however, trying to detect diversion of sufficient fissile material to produce one nuclear weapon would not be very meaningful—the detection objectives need to reflect the circumstances of the states involved.

An FMCT verification system replicating current IAEA safeguards would be impracticable—the costs would be some 2-3 times the current IAEA safeguards budget—and unwarranted. Instead, for nearly a decade ASNO has promoted a 'focused approach' to FMCT verification. On the basis that existing fissile material stocks would be outside the FMCT, and the treaty would prohibit *new* production of fissile material for weapons, ASNO proposes concentrating verification activities on facilities where fissile materials—in this context highly enriched uranium and separated plutonium—are produced, i.e. enrichment and reprocessing facilities, and on fissile materials leaving those facilities.

The focused approach would have three elements: routine verification activities for declared enrichment and reprocessing facilities and relevant product; verification activities aimed at detection of possible undeclared enrichment and reprocessing facilities; and complementary measures aimed at transparency and confidence-building.

Detecting undeclared enrichment and reprocessing activities would be challenging in NWS. But using new methods, many being developed for use in implementing the IAEA's Additional Protocol—such as more effective information collection and analysis, satellite imagery, possibly wide-area environmental sampling and challenge inspection-type arrangements—it would be possible to establish a credible FMCT verification system.

The issue of delay in negotiating the verification arrangements goes to the issue of *treaty architecture*. The CD was responsible for negotiation of the Chemical Weapons Convention (CWC), a complex treaty which contains both the basic political commitments and the detailed verification details. Such a treaty would take a considerable time to negotiate, and has a number of disadvantages, including the politicisation of the technical aspects of treaty development, and the inflexibility of the resulting product (e.g. revising CWC verification details would require treaty amendments). By contrast, the NPT itself is a better model. Here, the basic political commitments were set down in the principal treaty, and the verification system—the model IAEA safeguards agreement—was developed in subsequent, more technical, negotiations. The verification negotiations were progressed quite quickly,

taking around 18 months. Applying the NPT model, the political treaty could be negotiated in the CD, and the verification system could be developed in Vienna-based negotiations (drawing on the expertise of those engaged on IAEA safeguards issues).

AUSTRALIA'S URANIUM EXPORTS

Nuclear power currently provides around one sixth (or 16%) of the world's electricity, making a substantial contribution to reducing greenhouse gas emissions and providing a viable alternative to fossil fuels for large-scale electricity generation. At 30 June 2005, there were 441 nuclear power reactors in operation in thirty countries (plus Taiwan, China), with a total electrical generating capacity of almost 370 GWe (see Appendix A). During 2004-05, power reactors produced an electrical output of around 2600 TWh.[13]

Australia holds about 40% of the world's reasonably assured uranium resources recoverable at less than US$40/kg, or 29% of such resources recoverable at less than US$80/kg.[14] In 2004, Australia's Ranger and Olympic Dam mines were respectively the world's second largest (11.6% of world uranium production) and third largest (9.2% of world uranium production) uranium producers.[15] Globally, uranium mining currently provides only about 60% of global industry requirements, with the balance coming from down-blending of excess weapons material and from 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 2004-05 Australia exported 11 215 tonnes of uranium ore concentrates (UOC)—U_3O_8 or U_3O_8 equivalent—corresponding to 9510 tonnes contained uranium. These exports were valued at A$475 million. This quantity of uranium is sufficient for the annual fuel requirements of approximately 50 reactors (each of 1000 MWe), producing around 380 TWh[16] of electricity in total—some one and a half times Australia's total electricity production.[17]

Overall Australia was the world's second largest uranium exporter after Canada, meeting about 14% of the world's annual uranium requirements. Effectively, Australian uranium supplied about 2% of total world electricity production. Countries using Australian uranium avoid carbon dioxide emissions roughly equivalent to Australia's entire annual carbon dioxide emissions from all sources.

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 and bipartisan position whereby Australia exports uranium only under stringent safeguards conditions.

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13 IAEA Data Services.
14 From *Uranium 2003: Resources, Production and Demand*, a joint report by the OECD NEA and the IAEA.
15 From RWE NUKEM Market Report, Volume 19 May 2005.
16 Based on a comparison of TWh of electricity generated from nuclear power and uranium required for each country eligible to use AONM. Source: *Uranium 2003: Resources, Production and Demand*.
17 Australia's gross electricity production in 2004-05 is estimated to be 239 TWh (not accounting for transmission losses which amount to about 20%). Source: *Australian Energy, National and State Projections to 2019-20*, ABARE eReport 04.11, August 2004.

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

Australia carefully selects the countries with which it will conclude a bilateral safeguards agreement. In the case of NNWS, it is a minimum requirement that IAEA safeguards apply to all existing and future nuclear activities in that country. In the case of 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 19 nuclear cooperation agreements covering 36 countries (see Appendix B).[18] 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; and depleted uranium munitions. The principal conditions for the use of AONM set out in Australia's bilateral safeguards agreements are:

- AONM will be used only for peaceful purposes and will not be diverted to military or explosive purposes, and that IAEA safeguards will apply
- Australia's prior consent must be sought for transfers to third parties, enrichment to 20% or more in the isotope ^{235}U and reprocessing[19]
- 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, and
- 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

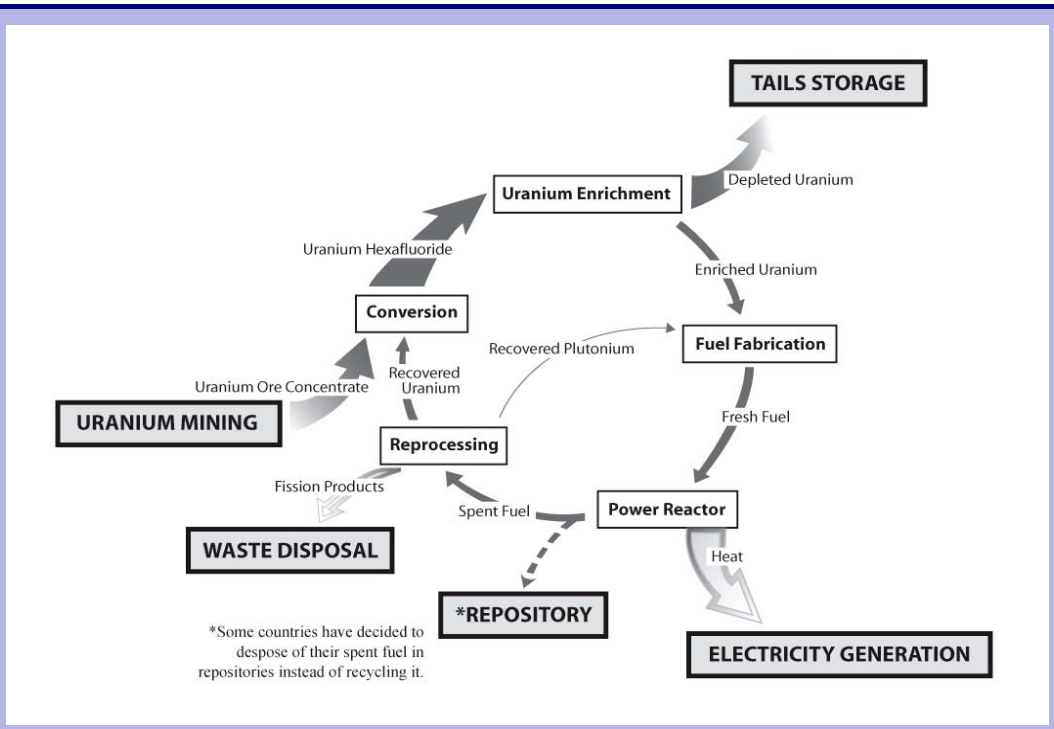
18 Twenty-five of the countries making up this total are European Union member states.

19 Consent has been given to reprocessing on a programmatic basis to Euratom, France, Japan, Sweden and Switzerland.

- 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, and
- reconciliation of any discrepancies with counterparts.

At the NPT Review Conference in May 2005, the Minister for Foreign Affairs announced that Australia would make ratification of an Additional Protocol a condition of supply for uranium to NNWS, thus further strengthening our non-proliferation measures. It is hoped that other uranium suppliers will follow suit. A summary of the status of Additional Protocols is at Appendix C.

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 *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 consolidated into a single entity 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 Director General ASNO. These changes confirmed arrangements that had been in place informally for several years.

The principal focus of ASNO's work is on international and domestic action to prevent the proliferation of WMD—nuclear, chemical and biological weapons. Thus, ASNO's work relates directly to international and national security. In particular, ASNO is working to strengthen the operation of relevant treaty verification regimes and their supporting technical methods. Furthermore, ASNO performs important domestic regulatory functions, ensuring that Australia is in compliance with treaty commitments and that the public is protected through application of appropriate security standards for WMD-related materials.

Nuclear Safeguards Functions

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT)is the centrepiece of the international nuclear non-proliferation regime. Since its entry into force (EIF) in 1970, the NPT has become almost universal, with 189 NPT Parties. Only three states—Israel, India and Pakistan—remain outside the NPT. A fourth—the Democratic People's Republic of Korea (DPRK)—announced its withdrawal from the NPT in 2003, but the validity of this withdrawal has not been determined.

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

The *Nuclear Non-Proliferation (Safeguards) Act 1987* (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, and
- the Convention on the Physical Protection of Nuclear Material (CPPNM).

The Safeguards Act also establishes a system for control over nuclear material and associated items in Australia through requirements for permits for their possession and transport. Communication of information contained in sensitive nuclear technology is also controlled through the grant of authorities.

Nuclear Regulation in Australia

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

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

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

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

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

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

- ensuring the effective operation of the Australian safeguards system
- ensuring the physical protection and security of nuclear material and items in Australia

- carrying out Australia's obligations under Australia's safeguards agreement and Additional Protocol with the IAEA
- carrying out Australia's obligations under Australia's safeguards agreements with other countries and Euratom
- operating Australia's bilateral safeguards agreements and monitoring compliance with the provisions of these agreements
- undertaking, co-ordinating and facilitating research and development in relation to safeguards, and
- 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), which entered into force on 29 April 1997, bans the development, production, possession and use of chemical weapons and requires the monitored destruction of chemical weapon stockpiles. Moreover, the CWC requires the declaration of activities associated with certain dual-use chemicals and provides for relevant chemical facilities to be subject to inspections conducted by the Organization for the Prohibition of Chemical Weapons (OPCW).

As of 30 June 2005, there were 169 States party to the CWC. While Australia does not possess chemical weapons, like many countries it has relevant dual-use chemical activities. Australia is active in ensuring that the CWC is effective in promoting international security. Australia signed the CWC in January 1993 and ratified it in May 1994.

The *Chemical Weapons (Prohibition) Act 1994* (CWC Act)was enacted on 25 February 1994 and entered into force at the same time as the CWC. The CWC Act gives effect to Australia's obligations, responsibilities and rights as a State Party to the CWC. In particular, the CWC Act:

- prohibits activities connected to the development, production or use of chemical weapons, including assisting anyone engaged in these activities, whether intentionally or recklessly
- establishes permit and notification systems to provide a legal framework for the mandatory provision of data to ASNO concerning facilities with certain chemical activities
- provides for routine compliance inspections of declared facilities and challenge inspections of any facility or other place in Australia by OPCW and ASNO inspectors, and
- provides for procedures should another CWC State Party seek clarification concerning compliance with the CWC at any facility or other place or by any person in Australia.

The CWC functions of the Director General ASNO are set out in section 87 of the CWC Act. These include:

- ensuring the effective operation of the CWC Act
- carrying out or coordinating, on behalf of Australia, the obligations that Australia has under the CWC
- facilitating inspections if Australia's compliance with the CWC is challenged, and

- carrying out such duties and exercising such powers as are conferred under this Act, its regulations or under any other Commonwealth law.[20]

Comprehensive Nuclear-Test-Ban Treaty Functions

The Comprehensive Nuclear-Test-Ban Treaty (CTBT) bans all nuclear explosions. The CTBT was adopted by the United Nations General Assembly on 10 September 1996 and, at 30 June 2005, had been signed by 175 states and ratified by 121. Australia signed the CTBT on 24 September 1996 and ratified the Treaty on 9 July 1998.

The *Comprehensive Nuclear-Test-Ban Treaty Act 1998* (CTBT Act) was assented to on 2 July 1998, but could not be brought into effect, absent entry-into-force of the Treaty, until 2003.[21] The CTBT Act:

- gives effect to Australia's obligations as a Party to the CTBT
- prohibits the causing of any nuclear explosion at any place under Australian control
- prohibits Australian nationals from causing a nuclear explosion in any place
- establishes a penalty of life imprisonment for an offence against the Act, and
- provides a framework for the establishment and operation of facilities in Australia for the CTBT International Monitoring System (IMS).

Not all provisions of the CTBT Act are in force. Specifically, Part 3, Part 4, Divisions 2 and 3, and sections 66, 67, 73, 76 and 77 of the Act will come into effect only when the Treaty enters into force for Australia.[22]

Section 64 of the CTBT Act sets out ASNO's CTBT functions. These include to:

- carry out Australia's obligations under the CTBT
- act, on behalf of Australia, as the main point of contact for liaison with the CTBT Organization and with other States Parties to the CTBT
- facilitate verification of compliance with provisions of the CTBT
- arrange for the establishment and operation of, and collection of data from, Australian facilities for the CTBT IMS, and
- facilitate inspections of places in Australia if Australia's compliance with the CTBT is challenged.

In addition, ASNO:

- establishes and maintains other legal, administrative and financial arrangements to give effect to the CTBT in Australia
- participates in the development and implementation of Australian policy relevant to the CTBT
- promotes understanding of CTBT verification, including by acting as an interface between technical and policy specialists

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20 This includes Regulation 5J of the Customs (Prohibited Imports) Regulations 1956.

21 The *Non-Proliferation Legislation Amendment Act 2003* amended the commencement provisions of the CTBT Act so that key provisions could be proclaimed ahead of CTBT entry-into-force. 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.

22 These provisions deal with Australia's relationship with the future CTBT Organization and with inspection functions—matters which will be relevant after the Treaty's entry into force.

- contributes to the development of Treaty verification, through the CTBT Preparatory Commission (PrepCom) and its working groups, and
- arranges for the establishment and operation of, and collection of data from, Australian facilities for the CTBT IMS.

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.

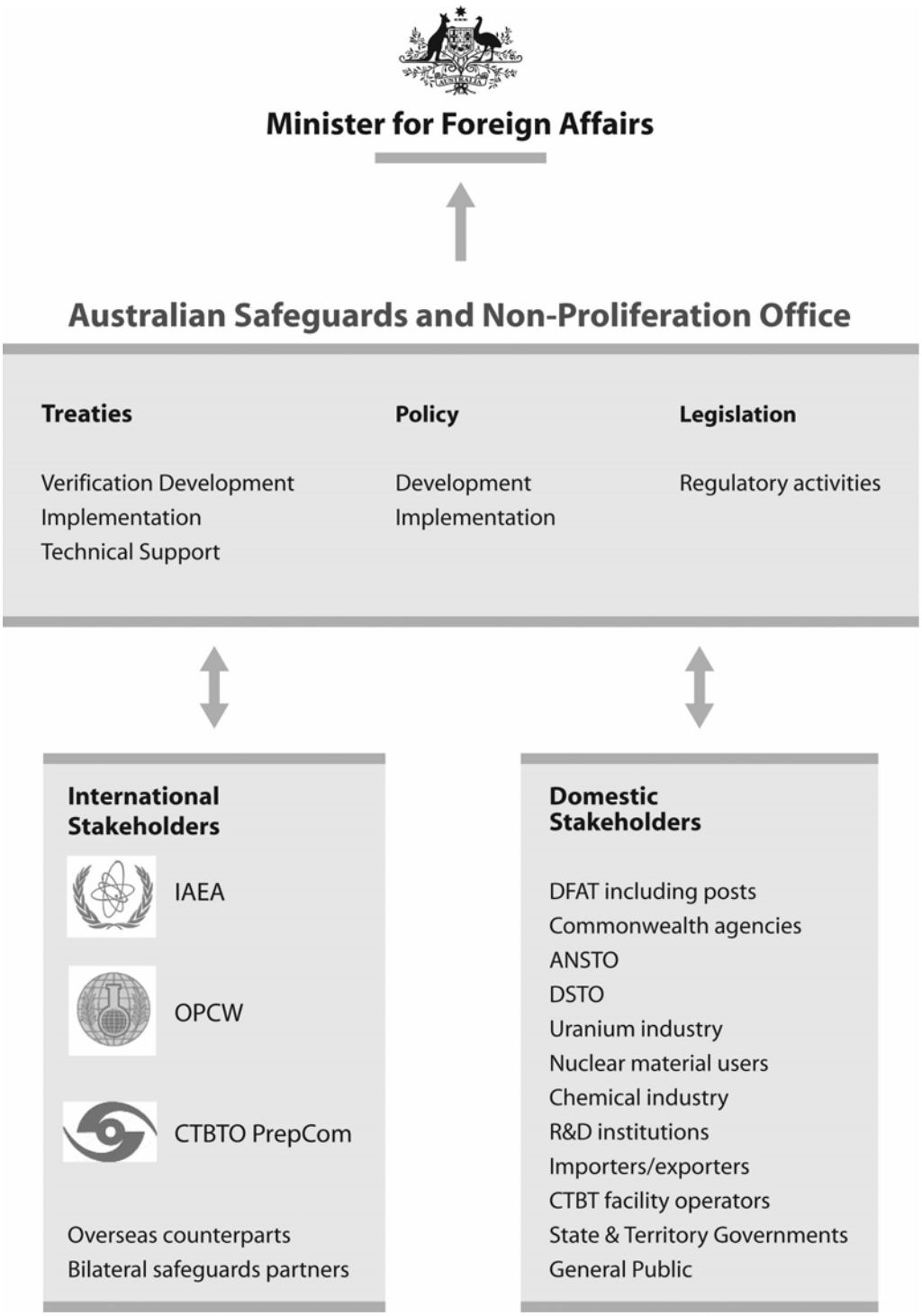
The *South Pacific Nuclear Free Zone Treaty Act 1986* (SPNFZ Act), which came into force in Australia on 11 December 1986, gives effect to Australia's obligations, responsibilities and rights under the Treaty. The SPNFZ Act also establishes the framework for SPNFZ Treaty inspections. Safeguards Inspectors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

Biological Weapons Convention

ASNO provides technical support to the Department of Foreign Affairs and Trade and other agencies in multilateral and domestic efforts to further the objectives of the Biological Weapons Convention (BWC). If international agreement is reached on comprehensive verification and other strengthening measures, it is envisaged that ASNO would undertake BWC regulatory responsibilities similar to those it performs under the CWC.

Operating Environment

Figure 2: ASNO's Operating Environment



Outcomes and Outputs Structure

Figure 3: ASNO's Outcomes and Outputs Structure

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

Performance

OUTPUT 1.1: NATIONAL SAFEGUARDS SYSTEM

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

Performance Measures

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

Performance Assessment

International Obligations

Reporting

With the minor exception outlined below, ASNO met all of Australia's obligations during the reporting period as they related to the submission of declarations and notifications on nuclear materials and facilities in Australia under Australia's safeguards agreement with the IAEA.

A small number of accounting reports for 'other locations'—holders of small quantities of nuclear material around Australia—due to be submitted to the IAEA by 30 June 2004 were a month overdue. This was due to increased workload from stricter IAEA reporting requirements (see Table 1 below), together with software problems.

ASNO reported Australia's nuclear material inventory to the IAEA on a monthly basis. In particular, ASNO regularly audited and reported on the inventory at the Lucas Heights site of the Australian Nuclear Science and Technology Organisation (ANSTO), the principal location in Australia of nuclear material subject to IAEA safeguards. Due to the strengthening of the IAEA safeguards system, and ASNO's desire to be as transparent as possible, the information provided to the IAEA has increased significantly in recent years.

Table 1: ASNO Reports to the IAEA, 1999-2005, by facility

Facility	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
ANSTO research laboratories	193	220	466	485	539	498
HIFAR	79	61	38	70	103	103
ANSTO vault storage	19	0	17	1	23	22
Moata reactor (defuelled)	15	2	0	13	0	11
OPAL reactor (under construction)	0	0	0	0	0	0
SSL laboratories	0	0	0	92	59	34
Other locations	3	6	4	2 028	2 483	2 198
TOTAL	**309**	**289**	**525**	**2 689**	**3 207**	**2 866**

Table 2: ASNO Reports to the IAEA, 1999-2005, by data type

Type of Data	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Inventory Change Report	98	90	191	754	813	496
Physical Inventory Listing	156	142	253	785	951	1 135
Material Balance Report	55	57	81	127	118	139
Concise Note	0	0	0	1 023	1 325	1 096
TOTAL	**309**	**289**	**525**	**2 689**	**3 207**	**2 866**

Table 3: Nuclear Material in Australia at 30 June 2005

Category	Quantity	Intended End-use
Source Material		
UOC	1 198 tonnes	Exports for energy use pursuant to bilateral agreements
	3 tonnes	Storage
Natural Uranium (other than UOC)	11 236 kg	Research and shielding
Depleted Uranium	14 071 kg	Research and shielding
Thorium Ore Residues	59 tonnes	Storage/disposal
Thorium (other than Thorium Ore Residues)	1961 kg	Research, industry
Special Fissionable Material		
^{235}U	101 035 grams	Research, radioisotope production
^{233}U	4 grams	Research
Plutonium (other than ^{238}Pu)	2 016 grams	Research, neutron sources

Table 4: Associated Items in Australia at 30 June 2005

Category	Quantity	Intended End-use
Associated Material		
Deuterium and heavy water	17.5 tonnes	Research, reactors
Nuclear grade graphite	113.85 tonnes	HIFAR, Moata and storage
Associated Equipment		
HIFAR	1	Reactor
HIFAR coarse control arms	11[23]	Reactor components
HIFAR safety rods	4[24]	Reactor components
OPAL control rod drives	6	Reactor components
OPAL reactor reflector vessel	1	Reactor component
OPAL reactor core grid	1	Reactor component
Moata	1	Reactor[25]
Fuel charging and discharging machines	2	Reactor components
Gas centrifuge components	-	Dismantled
SSL equipment	-	Enrichment R&D

23 Six in reactor, five spare.
24 Two in reactor, two spare.
25 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.

During the reporting period, a small amount of material unaccounted for (MUF) was recorded, with respect to low enriched uranium. This was because the Physical Inventory for ANSTO's R&D laboratories was greater than the Book Inventory by 6.92 grams of uranium element and 0.22 grams of ^{235}U isotope. This level of MUF is to be expected given the measurement uncertainties and processing losses for enriched uranium in the laboratories' operations. A 0.06 kg MUF (depleted uranium) was also recorded in other locations (i.e. locations other than Lucas Heights). This MUF was primarily due to recalculation of weight on one batch of material.

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.

ASNO continued to monitor R&D by Silex Systems Limited (SSL) on its innovative method of separating uranium isotopes using laser techniques. During the year, SSL reached the stage of seeking a partner to commercialise the technology. SSL is also carrying out R&D on stable isotope enrichment, particularly for silicon. This is quite different to SSL's uranium enrichment technology. ASNO has assessed that the silicon technology has no potential for nuclear application at present, and will continue to monitor developments to ensure this assessment remains current.

Legislation and Regulation

ASNO arranged amendment of the Nuclear Non-Proliferation (Safeguards) Regulations 1987 to adjust the rate at which the Uranium Producers Charge is levied (see Uranium Producers Charge under Financial Management).

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 of permits and authorities was carried out in a timely manner.

ASNO was active during the year in the granting of new permits. This follows the re-regulation of depleted uranium and reflects more rigorous IAEA requirements introduced in recent years.

Table 5: Status of Safeguards Permits and Authorities at 30 June 2005

Permit or Authority	Current Total	Granted	Varied	Revoked	Expired
Possess nuclear material	58	7	5	0	0
Possess associated items	22	1	4	0	0
Transport nuclear material	18	1	3	0	1
Transport associated items	0	0	0	0	0
Establish a facility	1	0	0	0	0
Communicate information contained in associated technology	17	0	4	0	0
TOTAL	**116**	**9**	**16**	**0**	**1**

Notice of all permit changes were published in the Commonwealth Gazette as required by the Safeguards Act (section 20 (1)).

ASNO Inspections

During the reporting period, ASNO carried out 25 domestic inspections to ensure that requirements of permits and authorities were being met. This number is down significantly from 2003-04[26] due to a combination of increased priorities in other areas (especially major developments at Lucas Heights) and unforeseen delays in filling a staff vacancy. Overall, ASNO found no indication of unauthorised access to or use of nuclear materials or nuclear items in Australia.

Figure 4: Nuclear Inspections by ASNO, 2004-05, by type of permit holder

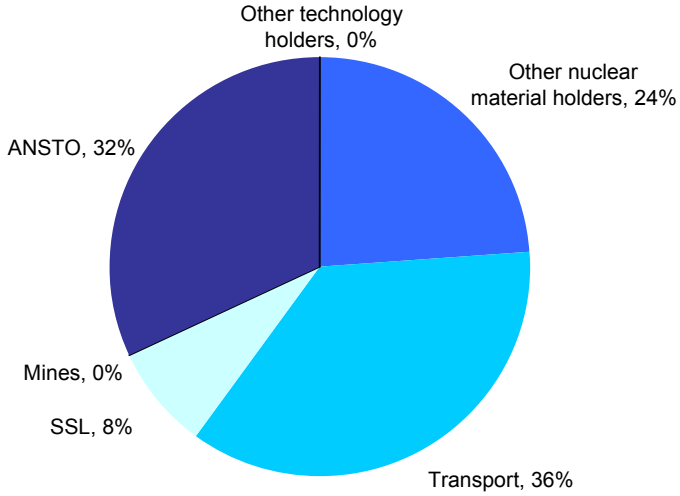
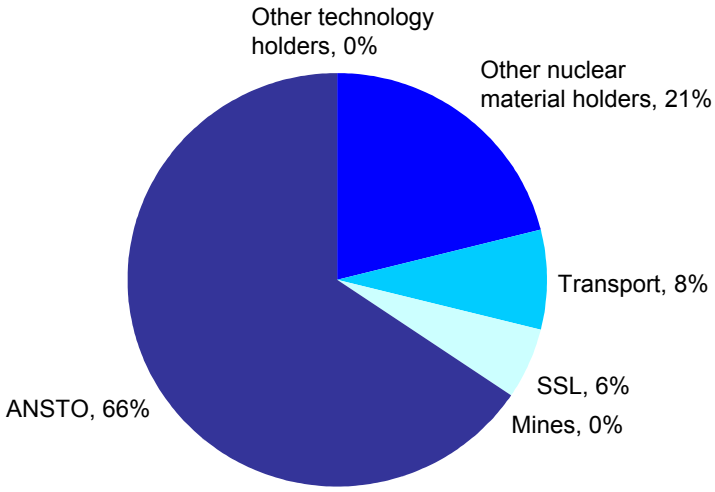


Figure 5: Nuclear Inspections by ASNO, 2004-05, by effort for each type of permit holder



26 For locations other than ANSTO.

The inspection of other permit holders during the year was largely focussed on the trial of a new transport route for uranium ore concentrate (UOC) which is being developed by Heathgate Resources and Western Mining Corporation (now BHP Billiton). The new route, which will involve the transport of UOC via rail from Adelaide to Darwin and then overseas by ship, was trialled between mid-January and April 2005. The trial involved the transport of 48 containers in 11 shipments. ASNO audited security plans and inspected arrangements throughout the trial. The trial was completed without incident

Some holders of small quantities of nuclear material were inspected, largely to educate them in security, reporting and inspection requirements. All permit holders were cooperative.

IAEA Inspections

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

ASNO facilitated IAEA access to Australian facilities and relevant locations as required. Particular attention was paid to the timing of inspections of the new Open Pool Australian Light water (OPAL) reactor so as not to impede the major time constraints on construction of the reactor. ASNO also coordinated IAEA access to SSL's laboratories to ensure SSL's classified technology was not compromised.

Mr Nick Doulgeris (middle) with IAEA Inspectors and ANSTO staff undertaking a Physical Inventory Verification, April 2005

Table 6: IAEA Safeguards Inspections and Complementary Accesses, 2004-05

Date	Facility	Type
7-10 Dec 2004	HIFAR	Short Notice Inventory Verification Inspection
	SSL Laboratories, ANSTO's R&D Laboratories	Complementary Accesses
13 Dec 2004	Other locations	Complementary Access
14-15 Feb 2005	OPAL reactor	Design Information Verification Inspection
16 Feb 2005	Other locations	Routine Inventory Verification Inspection
17-18 Feb 2005	SSL Laboratories	Design Information Verification Inspection
29 Mar–1 Apr 2005	HIFAR, ANSTO's R&D Laboratories	Routine Inventory Verification Inspection, Design Information Verification Inspection
4 Apr 2005	SSL Laboratories	Routine Inventory Verification Inspection, Design Information Verification Inspection
15-16 Jun 2005	SSL Laboratories	Design Information Verification Inspection

The IAEA raised a question during the period about an old radioactive waste disposal ground near Lucas Heights, known as the Little Forest Burial Ground. After investigation and discussion with the IAEA and ANSTO, ASNO extended the definition of the Lucas Heights site to include this waste disposal area. The IAEA followed up in December 2004 with a complementary access to the burial ground where water samples were taken from environmental monitoring wells.

Dr Stephan Bayer (centre) with ANSTO staff member (left) and IAEA inspector taking water samples at Little Forest Burial Ground, December 2004

Following this complementary access, the IAEA enquired about another area near the Lucas Heights site, identified using satellite imagery, that appeared to have similar features to the Little Forest Burial Ground. The question was whether this indicated any undeclared nuclear activities. ASNO and ANSTO investigated the area and concluded it was an old municipal nightsoil disposal area. Supporting documentation was provided to the IAEA and Agency Inspectors visited the site in April 2005 at which time they took photographs, radiation readings and soil samples. ASNO understands this issue has been resolved to the IAEA's satisfaction.

Dr Annette Berriman (left), ANSTO staff member and IAEA inspectors taking samples in night soil disposal area, April 2005

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

At 30 June 2005, 360 IAEA staff members were declared as Agency Inspectors pursuant to the Safeguards Act. This includes nine new IAEA staff members who were designated as Agency Inspectors to Australia in 2004-05.

IAEA Design Verification of the OPAL Reactor

ANSTO is well advanced in its project to replace its currently operating research reactor, HIFAR, with the new 20MWt Open Pool Australian Light water (OPAL) reactor. OPAL's function is to generate neutrons for scientific research and irradiations (e.g. irradiation of various materials for medical isotope production and silicon for semiconductor manufacture).

ASNO has been providing information to the IAEA and facilitating inspections of the facility throughout the construction process. IAEA Inspectors visited the OPAL reactor on 14 and 15 February 2005 to verify design information for the facility as a whole. On 15 to 16 June 2005, IAEA inspectors returned to verify design information for the reactor's reflector tank. The reflector tank is one of the key components of the reactor and has high safeguards significance as it defines important capabilities of the reactor.

The reflector tank contains 5400 litres of heavy water and serves the dual purpose of containing and slowing down neutrons to maximise the available neutron flux. When the reactor commences operation, the reflector tank (housing the reactor core) will be exposed to high fluxes of radiation and will be covered by 13 metres of water.

These IAEA inspections ran smoothly and were effective in addressing IAEA access requirements. Verifying the reflector tank design was an important milestone in the IAEA's verification of the total design of the OPAL reactor.

ASNO gratefully acknowledges the cooperation and planning of the IAEA and the OPAL reactor project staff at ANSTO.

Safeguards inspectors observing the reflector tank at the OPAL reactor, February 2005

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

Performance Assessment

International Obligations

ASNO's inspections confirmed that current physical protection arrangements were being implemented satisfactorily in 2004-05 in accordance with Australia's obligations under the CPPNM, IAEA guidelines, relevant bilateral safeguards agreements and the *Nuclear Non-Proliferation (Safeguards) Act 1987*. ASNO also met Australia's international shipment notification obligations under the CPPNM.

The main focus of physical protection assessment by ASNO continued to be the physical protection measures applied by ANSTO at Lucas Heights, given that all nuclear material in Australia categorised by the IAEA as Category I, II and III is located at this site. Particular attention was paid to arrangements in place for the new OPAL reactor and associated site upgrades at the Lucas Heights Science and Technology Centre. ASNO was satisfied that appropriate security features are incorporated in the facility's design and proposed operating procedures. It is anticipated that ASNO will begin inspection of installed systems in towards the end of 2005 and in 2006.

Inspections were also made of SSL's arrangements for the protection of its sensitive R&D information. ASNO was satisfied that appropriate security measures are in place to protect SSL's technology against unauthorised access and proliferation.

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. Consultations with ASNO's counterparts indicated that internationally agreed physical protection standards were being applied to AONM in relevant countries.

Protecting Australia's Uranium

Inspections of the physical protection measures applied at Australia's uranium mines were deferred this year awaiting the completion of a full review of security, commenced in 2003-04. The report by the Australian Security Intelligence Organisation consultants contracted to carry out this work was delayed due to departure of key staff, and is expected to be

completed by September 2005. ASNO notes that the operators of all three current mines in Australia—Ranger, Olympic Dam and Beverley—along with the mine under development at Honeymoon have always been responsive to ASNO's requirements for physical protection inspections and the application of appropriate security measures.

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

In November 2004, ANSTO shipped spent fuel rods from the High Flux Australian Reactor (HIFAR) to France for reprocessing. ASNO approved the security plan and witnessed the casks being shipped by road from Lucas Heights to Port Botany. The event passed without incident.

Strengthening the CPPNM

In 2004-05, ASNO worked hard with a small core group to muster support for adoption at a diplomatic conference of a well-defined amendment to the CPPNM. The amendment proposed to extend the remit of the CPPNM to cover domestic use, storage and transport. It also proposed to criminalise acts of sabotage against nuclear facilities and trafficking in nuclear materials. Further, it proposed the integration of the Fundamental Objectives and Principles of Physical Protection which were developed by a legal and technical expert group and endorsed by the IAEA Board of Governors in 2001. These principles and objectives are reproduced at Appendix E. Although outside the reporting period, it should be noted that these amendments were adopted at a diplomatic conference in July 2005.

OUTPUT 1.3: BILATERAL NUCLEAR 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 accounted for satisfactorily. The IAEA validated through its transit matching system that, at 18 June 2005, there were no outstanding unconfirmed shipments to Australia (i.e. imports) and at 10 March 2005 there were no unconfirmed shipments from Australia (i.e. exports). Based on the IAEA's Safeguards Statement for 2004, 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 2004-05. A copy of the IAEA's Safeguards Statement for 2004 is at 0.

Table 7: Summary of AONM by category, quantity and location at 31 December 2004[27]

Category	Location	Tonnes[28]
Depleted Uranium	European Union, Japan, Republic of Korea, United States	74 143
Natural Uranium	Canada, European Union, Japan, Republic of Korea, United States	19 311
Uranium in Enrichment Plants	European Union, Japan, United States	10 392
Low Enriched Uranium[29]	Canada, European Union, Japan, Mexico, Republic of Korea, Switzerland, United States	9 598
Irradiated Plutonium[30]	Canada, European Union, Japan, Mexico, Republic of Korea, Switzerland, United States	86
Separated Plutonium[31]	European Union, Japan	0.4
TOTAL		**113 531**

27 Figures are based on yearly reports to ASNO in accordance with Australia's bilateral agreements and other information held by ASNO. There may be minor discrepancies in the figures due to rounding.

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

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

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

31 Separated plutonium is plutonium recovered from reprocessing. The figure for separated plutonium is not accumulative, but fluctuates as plutonium is fabricated with uranium as mixed oxide (MOX) fuel and returned to reactors for further power generation. On return to reactors the plutonium returns to the 'irradiated plutonium' category. During 2004, 0.2 tonnes of plutonium was fabricated into MOX fuel and transferred to reactors.

ASNO officers visited all major bilateral partners to reconcile the AONM accounts. Technical discussions were held with ASNO's counterpart organisations in the United States, Canada, France, the United Kingdom and Euratom. These discussions covered accession of new member states to the European Union, mechanisms for the reconciliation of AONM inventories and transactions under Australia's bilateral safeguards agreements, plus a range of technical issues germane to operation of Australia's bilateral safeguards agreements. Although outside the reporting period, Japan and the Republic of Korea (ROK) were visited in July 2005.

An important issue for ASNO was to establish whether any AONM had been involved in the undeclared nuclear experiments conducted in the ROK (see Current Topics). ROK authorities assured ASNO that no AONM was involved. ASNO notes that no AONM was transferred to the ROK until 1986, so AONM could not have been involved in the experiments that took place before that date. For the subsequent experiments, the IAEA's investigations showed that the nuclear material used was produced from indigenous sources. Accordingly, ASNO is satisfied that no AONM was involved.

During the reporting period, Australia exported 11 215 tonnes[32] of uranium ore concentrates (UOC)—U_3O_8 or U_3O_8 equivalent—in 64 shipments from the Ranger mine, Northern Territory, and the Olympic Dam and Beverley mines in South Australia. This corresponds to 9510 tonnes of contained uranium. Uranium exports in 2004-05 were valued at $475 million.

In recent years, the number of shipments of uranium has increased. This is mostly due to smaller, more frequent shipments although production levels have also risen. In terms of ASNO's workload, the effort for ASNO is similar for each shipment regardless of size. ASNO has managed this increase in workload through enhanced use of information technology systems enabling a wider group of office staff to carry out the work.

Table 8: Supplies of Australian uranium shown by end-user, 2004

Country	Tonnes UOC (U_3O_8)	% of Total
United States	3 513.89	38.4
Japan	2 292.49	25.0
France	939.06	10.3
Republic of Korea	930.00	10.1
Sweden	400.95	4.4
United Kingdom	382.84	4.2
Germany	249.48	2.7
Spain	200.00	2.2
Canada	136.08	1.5
Finland	112.03	1.2
TOTAL	**9 156.82**	**100.0**

32 It should be noted that this figure is for the financial year 2004-05, so is different to the quantity received by end-users (see Table 9) which is for the calendar year 2004.

Exporters shipped Australian UOC to conversion facilities in the United Kingdom, the United States, France and Canada (see Table 9).

Table 9: Summary of AONM Transfers, 2004[33]

	Destination	U (tonnes)
Conversion	Canada	2 086
	European Union	2 145
	United States	3 982
Enrichment	European Union	2 907
	United States	206
Fuel Fabrication	Japan	193
	Republic of Korea	45
	United States	219
Reprocessing		0

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

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. In the case of the United States, ASNO has been working with the United States Department of Energy (DOE) to resolve a number of discrepancies in balancing accounts. These are mostly minor in nature. The figures provided in Table 8 and Table 9 are based on ASNO's analysis of all available information at the time of publication. However, resolution of these outstanding issues may give rise to small adjustments to ASNO's accounts.

Transfer of SSL's Technology

No new transfers of SSL's associated technology were undertaken during the year. Arrangements established by ASNO with the United States, which govern both the way in which the technology is to be protected and its use for exclusively peaceful purposes, continued to cover items and information already transferred. Messrs John Carlson and Nick Doulgeris held discussions with United States counterparts on the possibility of SSL obtaining new development partners in the United States.

33 Figures are for transfers completed between jurisdictions from 1 January to 31 December 2004. Figures do not include transfers of AONM made within the fuel cycle of a state (or of Euratom), return of heels (residual UF_6 remaining in cylinders), or damaged product.

Silex Laser Enrichment Project

An Australian private sector company, Silex Systems Ltd (SSL), is currently developing a technology to enrich uranium for use in nuclear reactor fuel to produce electricity. Some critics have questioned why the Australian Government allows SSL to continue its R&D into this laser enrichment technology for uranium and have raised a number of concerns.

One issue raised is whether the United States' classification of SSL's technology as 'restricted data' indicates the technology will be used for military purposes. Because SSL had an American commercial partner until 2003, Australia and the United States concluded a treaty-level agreement in 2000 to classify the technology in accordance with international obligations to protect sensitive nuclear technology. As a result, the technology is classified as 'restricted data' under United States law and as 'associated technology' under Australian law, as the legal mechanism for ensuring that access to the technology is limited to authorised, security-cleared individuals. The Australia-United States Agreement specifies that the technology will be used only for peaceful purposes, and all enriched uranium produced with SSL's technology will be subject to IAEA safeguards.

The issue has also been raised as to whether SSL's development of uranium enrichment technology is consistent with Australia's commitments under the NPT. There is no conflict of interest between Australia's position on non-proliferation and legitimate development of enrichment technologies such as that being developed by SSL. SSL is subject to strict controls to ensure the project complies with Australia's obligations under the NPT. As outlined in this report, ASNO ensures non-proliferation requirements are met and that all nuclear technology and materials are fully safeguarded by the IAEA.

Claims have also been made that SSL has received Government funding for its R&D. These claims are incorrect. SSL has no connection to the Australian Government. Although SSL leases premises and has purchased equipment from ANSTO, SSL's technology is not related to previous ANSTO laser enrichment work. It is not a secret project—SSL maintains an informative website and the company is listed on the Australian Stock Exchange. The project has been reported in detail in ASNO Annual Reports since 1996-97.

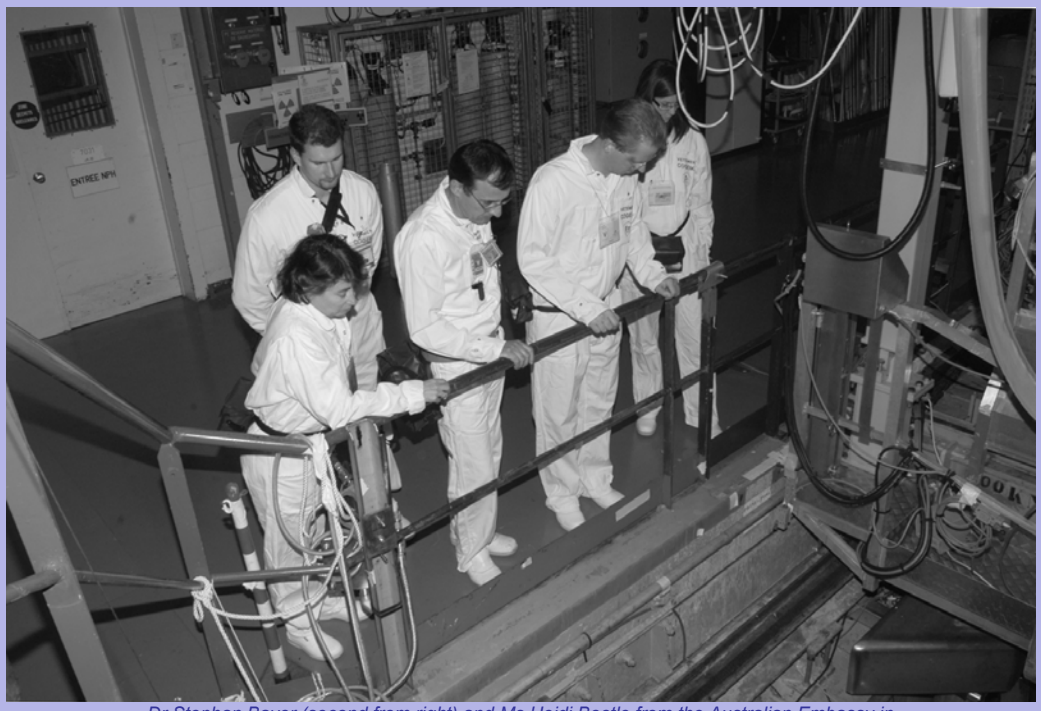
Finally, there have been claims that laser enrichment technology in general is particularly proliferation-prone because it can be established on a small scale—'in a garage'. In fact the technology is not particularly compact. A commercial scale plant may be smaller than a comparable centrifuge plant, but at smaller throughputs the overall size would be similar. The SSL process does not lend itself readily to proliferation as the technology is very complex and manufacture of components requires extremely specialised capabilities. It is unlikely that laser processes, even when commercially established, will supplant gas centrifuges as the technology of choice for proliferators.

Visit to COGEMA-La Hague Reprocessing Plant

On 10 June 2005, ASNO's Dr Stephan Bayer and Ms Heidi Bootle from the Australian Embassy in Paris visited the COGEMA-La Hague reprocessing plant in Normandy, France. The COGEMA-La Hague facility is one of only a few commercial reprocessing plants in the world and treats over 1000 metric tonnes of spent (mainly power reactor) fuel per year. The visit included a tour of the site's unloading, storage, shearing, dissolution and environmental monitoring facilities.

Since 1999, the COGEMA-La Hague facility has received 1288 spent fuel elements from ANSTO's HIFAR reactor in four separate shipments. Reprocessing of this spent fuel had commenced the day before the visit and a demonstration was given of the reprocessing process including a video replay of the dissolution of the first batch of fuel from HIFAR.

The fuel from HIFAR is dissolved in a parallel line to power reactor fuel and then blended with power reactor fuel before separation of the uranium from the fission products for reuse in the fuel cycle. The remainder, which contains very small quantities of plutonium and most of the radioactivity, is formed into vitrified waste material. Australia's portion of the vitrified waste will be returned to Australia by 2015. Under a contract signed with ANSTO in 1999, the COGEMA-La Hague reprocessing plant will also reprocess fuel from the OPAL research reactor currently being installed at the Lucas Heights Science and Technology Centre.



Dr Stephan Bayer (second from right) and Ms Heidi Bootle from the Australian Embassy in Paris (far right) with facility staff during viewing of the COGEMA-La Hague reprocessing facility

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 states on the development of international safeguards.
- Management of an international outreach program.
- Assessments of developments in nuclear technology.

Performance Assessment

Strengthening International Safeguards

ASNO took an active part in the development and effective implementation of international safeguards during the reporting period. Notable contributions included:

- Mr John Carlson's chairing of the SAGSI
- ongoing management of the ASSP
- provision of international and regional training on nuclear safeguards, the Additional Protocol and related export controls
- participation in the IAEA's Technical Working Groups on safeguarding enrichment technology and nuclear materials accountancy
- participation in the biennial joint meeting of all IAEA Member States' national safeguards support programs
- in conjunction with the Australian mission in Vienna, assisting to develop the draft text of the amended CPPNM (see Output 1.2)
- participation in the Australian delegation to the IAEA Board of Governors meetings in September 2004 and June 2005
- participation in the 2004 IAEA General Conference
- participation in the Australian delegation to the 2005 NPT Review Conference
- participation in experts meetings and discussions with counterparts in other countries
- attendance at conferences, and
- production of publications.

During the reporting period, ASNO was pro-active in maintaining and strengthening contacts with the IAEA. Extensive discussions were held with senior IAEA officials, including IAEA Director General, Dr Mohamed ElBaradei, and IAEA Deputy Director General for Safeguards, Mr Pierre Goldschmidt. 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 issues 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 substantial challenges are posed by the continuing problems with the Democratic People's Republic of Korea (DPRK) and Iran (see Current Topics) and the revelations of the activities of the AQ Khan illicit nuclear technology supply network. Important issues are also raised for the IAEA and national safeguards authorities by the discovery of undeclared fuel cycle activities in the ROK and Egypt (also discussed in Current Topics).

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 her role as 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
- assessment of safeguards breaches in the ROK and Egypt
- development of guidelines to assist the IAEA Board of Governors in reaching decisions on non-compliance issues, and
- 'small quantities protocols'—safeguards arrangements for states with only small holdings of nuclear material.

An important task for ASNO is analysis of the IAEA's annual Safeguards Implementation Report (SIR), which is the principal means of the IAEA to report to Member States on the operation of the safeguards system.

ASNO also provided advice on the interpretation of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) in areas such as withdrawal (Article X) and the right to the benefits of nuclear energy (Article IV). With respect to the last issue, ASNO has also been closely involved in development of an international framework for dealing with sensitive nuclear technology (enrichment and reprocessing).

IAEA Standing Advisory Group on Safeguards Implementation

During the year, SAGSI—of which Mr John Carlson has been a member since 1998 and appointed Chair in July 2001—continued to work closely with the IAEA in the development of integrated safeguards. A particular focus for SAGSI is the further development of the 'State Level Approach', under which safeguards implementation will be adjusted to take account of

state-specific factors. Other issues examined by SAGSI included: how to evaluate safeguards effectiveness and performance, and how to report these to Member States; safeguards for fuel fabrication plants; and safeguards aspects of spent fuel transfers.

Australian Safeguards Support Program

Safeguards are an evolving discipline. The ASSP supports the IAEA to develop concepts, equipment and procedures to meet new safeguards 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. These projects are outlined below.

Environmental Analysis

This project, which is undertaken by ANSTO, is the largest of the ASSP projects.

During the reporting period, significant progress was made on ANSTO's R&D on the applicability of Accelerator Mass Spectroscopy (AMS) for the measurement of isotopes of plutonium in environmental samples.[34] This work, which uses ANSTO's Antares Tandem Accelerator, may lead to ANSTO's AMS facility being certified by the IAEA to measure for plutonium isotopes. The facility is already a certified member of the IAEA's Network of Analytical Laboratories for measurements of ^{236}U and ^{129}I.

ASNO continued to discuss with ANSTO other possible safeguards R&D projects.

Re-Examination of Basic Safeguards Implementation Parameters

This project re-examines basic safeguards implementation parameters such as timeliness goals, significant quantities and the categorisation of nuclear material for safeguards purposes. Contributions under this program during the reporting period included the finalisation of two reports: *Minimum inspection frequencies under Integrated Safeguards* (AUL Report 2005-01) and *Randomized inspections at UDU storage facilities under Integrated Safeguards, Mean Time to Detection* (AUL Report 2005-02).

Information Review and Evaluation

Under this project, ASNO undertakes consultancy work for the IAEA to support the implementation of strengthened safeguards. Contributions under this project during the reporting period included providing:

- open source information to the IAEA on developments in Australia's region, and
- cost-free consultancy by Dr Annette Berriman to the Safeguards Information Technology (SGIT) Division of the IAEA on two occasions for up to six weeks.

Cooperation with other States Parties

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

ASNO staff presented papers at the July 2004 Institute of Nuclear Materials Management annual meeting in Florida in the United States.

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34 ANSTO has previously demonstrated that a tandem accelerator can be used to analyse environmental samples with very high sensitivity and that the AMS is the only technique capable of measuring ^{236}U at the low levels expected in environmental materials (see article on the Australian Safeguards Support Program).

The Australian Safeguards Support Program: Celebrating 25 Years

On 15 March 2005, Australia's Ambassador in Vienna and member of the IAEA Board of Governors, HE Ms Deborah Stokes, held a reception to celebrate the 25th anniversary of the Australian Safeguards Support Program (ASSP). The reception was well attended by IAEA safeguards staff and representatives from 15 other national safeguards support programs. The IAEA expressed warm appreciation for Australia's investment and assistance over the past 25 years and acknowledged Australia's substantial contribution to the success of the safeguards system through the ASSP.

The ASSP is an important, tangible expression of Australia's support for IAEA safeguards. Despite extremely limited resources, Australia has made a significant and sustained contribution to strengthening safeguards through this program. Coordinated by ASNO, major technical contributions have been made by ANSTO , the Department of Defence, the Commonwealth Scientific and Industrial Research Organisation and a number of private companies and consultants. The program is important for ASNO in maintaining technical expertise and appreciation of the practical issues confronting the safeguards system.

During the early 1980s, the ASSP made a substantive contribution to the Hexapartite Safeguards Project (HSP), a joint program undertaken by the IAEA and a group of IAEA Member States to develop a comprehensive scheme to safeguard centrifuge enrichment plants. Australia's contribution to the HSP is one ASSP project still in continuous use by the IAEA.

Another major ASSP project has been the development of technical infrastructure to support the specific capability of ANSTO's Antares Accelerator Mass Spectrometer (AMS) to measure ^{236}U. Through the project, ANSTO successfully demonstrated that a tandem accelerator can be used to analyse environmental samples with very high sensitivity and that AMS is the only technique capable of measuring ^{236}U at the low levels expected in environmental materials. As a result, ANSTO's AMS facility is now a certified member of the IAEA's Network of Analytical Laboratories for measurements of ^{236}U and ^{129}I. This project is currently seeking to extend AMS measurement capabilities to all major actinides of safeguards interest.

Ambassador Stokes accepts a letter of thanks from Nicolai Khlebnikov, Director, IAEA Division of Safeguards Technical Services, in recognition of the ASSP's 25th anniversary

ASNO's Memorandum of Understanding (MOU) with DOE on safeguards research and development continues to operate well. Three new Action Sheets outlining specific work on which the two agencies will cooperate were negotiated and signed during the reporting period.

Ms Margaret Manning, Director, International Cooperation Program, Office of Non-Proliferation and International Security, United States DOE, and Mr John Carlson sign new Action Sheets for the ASNO-DOE MOU, November 2004

International Outreach

ASNO continued its international outreach activities to assist countries in the region with the fulfilment of their non-proliferation and physical protection obligations. All of this work was well received and led to requests for further assistance. Key contributions included:

- an invited presentation by Mr John Carlson on Australia's safeguards and non-proliferation experiences, as well as current challenges and prospects for nuclear energy in the regional context, to the International Seminar on Ensuring Safe, Secure and Peaceful Uses of Nuclear Energy in Sustainable Development: Experiences, Challenges and Future Prospects held in Bali, Indonesia
- hosting an IAEA Regional Seminar for the South Pacific Region on the Implementation of Strengthened Safeguards to assist Pacific Island countries to implement nuclear safeguards and the Additional Protocol, including associated responsibilities regarding export controls (see article)
- a lecture by Mr Nick Doulgeris at a regional safeguards training course held by the Japanese Atomic Energy Research Institute
- participation by Mr Nick Doulgeris as both a lecturer on Australia's experiences in implementing IAEA safeguards and as a course instructor for the International Training Course on Implementation of State Systems of Accounting for and Control of Nuclear Materials held in New Mexico and Tennessee, United States
- in cooperation with Defence, Customs and the DOE, jointly hosting a major training exercise on commodity identification and related export controls in Thailand (see article)
- assisting the Thai Office of Atoms for Peace prepare for the implementation of the Additional Protocol in Thailand, and
- providing a week long course on the performance of non-destructive assay of nuclear materials in Sydney for Indonesian domestic safeguards inspectors.

Outreach Program to Thailand on the Additional Protocol and Export Controls

As part of its international outreach program, an Australian interagency training team, assisted by officials from the United States Department of Energy (DOE), offered a week of training to Thai government and industry officials in Bangkok from 15-19 November 2004. The Australian training team comprised representatives from ASNO, the Department of Defence, the Australian Customs Service and the Department of Foreign Affairs and Trade.

The outreach visit commenced with training on the Additional Protocol, which Thailand anticipates signing in 2006.[35] ASNO provided detailed training on the Additional Protocol including its provisions, obligations and reporting requirements. ASNO also shared Australia's experiences with implementing the Additional Protocol. The DOE provided technical details on the Protocol's list of controlled nuclear equipment.

Over the following two days, Thai officials learned about the regulation and enforcement of export controls in Australia, and learned from DOE how to identify nuclear and other WMD-related commodities. This information was of particular interest as Thailand is seeking to tighten its own controls of such materials and equipment in the wake of recent attempts to divert WMD-related materials through Southeast Asia to countries with illicit WMD programs.

The week finished with an Australian hosted one-day overview of export controls with Australian, United States and Thai presenters. The presence of a large number of Thai exporters and industry bodies helped improve industry awareness of the potential for sensitive exports to end up in the wrong hands.

Officials from the Thai Ministry of Commerce said the seminar and training were of great value to their current review of Thai export controls.

Dr Annette Berriman training Thai officials on the Additional Protocol, November 2004

35 Thailand signed its Additional Protocol on 22 September 2005.

IAEA/United States International Training Course on Implementation of State Systems of Accounting for and Control of Nuclear Materials—Santa Fe, New Mexico and Knoxville, Tennessee, May 2005. Photo courtesy of Los Alamos National Laboratories.

Nuclear Technology Developments

For a number of reasons—including concern about climate change, uncertainty about long-term cost and security of supply for hydrocarbons, and the development of lower cost reactor designs—there is increasing interest in nuclear energy, including in Australia's region. Throughout the reporting period, ASNO monitored developments and sought to ensure that debate was well informed (see Year in Review). Dr Annette Berriman presented a paper on *Proliferation: Threats and Safeguards* to the Nuclear Power for Australia symposium held in Sydney in June 2005.

In addition, ASNO continues to maintain a sound understanding of, and make a constructive contribution to, important international nuclear developments and issues. Australia has a strong interest in ensuring that non-proliferation aspects are factored into new nuclear technologies at an early stage of development. To this end, ASNO supported international work on nuclear technology developments throughout the reporting period.

Seminar for the South Pacific Region on the Implementation of Strengthened Safeguards

On 10 and 11 November 2004, ASNO together with the IAEA conducted a seminar for the South Pacific Region on the Implementation of Strengthened Safeguards. This was the first seminar of its kind to specifically engage officials from the South Pacific. The seminar was jointly funded through the IAEA, the Department of Foreign Affairs and Trade (DFAT) and AusAID.

Twenty two seminar participants (including 12 women) came from the Cook Islands, East Timor, Fiji, Kiribati, Republic of the Marshall Islands, New Zealand, Papua New Guinea, Republic of Palau, Samoa, Solomon Islands, Tuvalu, Tonga and Australia. Two participants each from Fiji and Papua New Guinea, the participant from East Timor and Indonesian lecturers/observers were fully funded by DFAT to attend, and the IAEA funded participants from other South Pacific countries to attend.

The seminar aimed to deepen the understanding among South Pacific States (particularly those that have yet to conclude the related legal instruments) about the role that the strengthened safeguards system plays in reinforcing nuclear security and the non-proliferation of nuclear weapons. It also aimed to facilitate the conclusion and implementation of comprehensive safeguards agreements and Additional Protocols.

Dr Annette Berriman (second from right, front row) with participants at the Seminar for the South Pacific Region on the Implementation of Strengthened Safeguards, November 2004

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

- Implementation of Australia's obligations under the Chemical Weapons Convention (CWC).
- Regulation of CWC-related activities in Australia, involving the chemical industry, research and trade.
- Influence on the formulation of CWC verification policy.
- Cooperation with the Organization for the Prohibition of Chemical Weapons (OPCW) and other CWC States Parties.
- Management of Australia's CWC international outreach.

Performance Assessment

International CWC Obligations

ASNO continued to maintain Australia's strong record of performance in meeting its CWC obligations during the reporting period. In particular, Australia provided accurate and timely annual declarations and notifications to the OPCW. Also, Australia was one of a limited number of CWC States Parties that met the March 2005 deadline for the main annual CWC Article VI declaration. Submissions to the OPCW included:

- Article VI declaration of imports and exports of CWC Scheduled Chemicals[36] and of 48 facilities with CWC-relevant chemical production, processing or consumption activities during 2004 (March 2005)[37]
- Article VI declaration of 10 chemical research/industrial facilities anticipating activities during 2005 with CWC Scheduled Chemicals (September and October 2004)
- Article X, paragraph 4, declaration of Australia's national chemical defence program (April 2004)[38]
- pursuant to Part IV(B) of the Verification Annex, details of the discovery (in May 2004) and destruction (in June and October 2004) of 11 empty 250lb, British-manufactured World War II chemical bombs which had been inadvertently excavated in NSW
- responses to OPCW Third Person Notes including routine clarification of the operational status of chemical plants and Australia's position on the text of the draft OPCW Privileges and Immunities Agreement, and
- routine responses to OPCW notifications of amendments/corrections to inspector details and deletions or additions to the OPCW inspectorate.

Australia continued to demonstrate the accuracy of its declarations through participation in the verification mechanism under the Convention, involving short-notice routine inspections

36 Declared information was obtained from reports by licensed importers and exporters, industry surveys, data exchanges with trading partners and from Australian Customs Service data.

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

38 ASNO worked closely with the Department of Defence and Emergency Management Australia in compiling the data for this declaration which also included additional information, on a voluntary basis, for transparency purposes.

by the OPCW at declared facilities. During the reporting period, there was only one such inspection in Australia, a reduction from the two or three annual number of expected inspections. In November 2004, the OPCW undertook a routine verification inspection of a declared discrete organic chemical facility producing phosphorous, sulphur or fluorine compounds in Western Australia. Through ASNO facilitation and industry cooperation, the OPCW inspection team was able to readily verify the accuracy of Australia's declaration and the absence of Schedule 1 chemicals, in accordance with the inspection mandate.

OPCW and facility representatives during an OPCW Inspection at an industrial chemical facility, Western Australia, November 2004

Legislation and Regulation

The system of permits and notifications continued to operate well and was subject to some refinements. Industry and researchers were very cooperative and their feedback acknowledged the efforts of ASNO for its responsiveness and the efficient and effective domestic implementation of the CWC.

During the reporting period:

- two additional research facilities were granted permits by ASNO under the *Chemical Weapons (Prohibition) Act 1994* (the CWC Act) to produce small quantities of Schedule 1 chemicals
- the operators of another research facility notified ASNO that it no longer required a permit as it had ceased production and storage of Schedule 1 chemicals
- the operators of a Schedule 2 processing facility renewed their permit
- an operator moved Schedule 2 activities to a new facility for which a new permit was issued
- one permit was issued authorising the import of a Schedule 1 chemical
- 16 facilities processing Schedule 2 chemicals below one tonne per annum were identified and requested to notify ASNO of their activities (in accordance with section 31 of the CWC Act) for inclusion for the first time in the aggregate national data declared to the OPCW

- 46 permits authorising the import of Schedule 2 and/or 3 chemicals were issued by ASNO, in accordance with the *Customs (Prohibited Imports) Regulations 1956*, and
- 53 facilities submitted notifications under subsection 29(1) of the CWC Act in relation to production of discrete organic chemicals during 2004.

Table 10: Permits for CWC Scheduled Chemical Facilities at 30 June 2005

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**	**9**	**1**	**11**	**1**	**3**

ASNO continued to liaise with the Australian Customs Service to improve the facilitation, processing and monitoring of imports and exports of CWC Schedule Chemicals. This included participating as a player and presenter in Customs' mock proliferation training scenario in Sydney in April 2005. In conjunction with Customs, ASNO also progressed the development of improved means for Customs officers to identify controlled goods.

ASNO undertook further extensive consultation and outreach across Australia focussed primarily on facilities producing discrete organic chemicals. During 2004-05 the program also included a new focus on Australian universities, and frequently involved collaboration with, and representation of, other government agencies that were unable to attend in person to convey their related regulatory information. ASNO representatives visited approximately 25 facilities and universities during the reporting period, primarily to promote awareness of regulatory obligations and to prepare industrial sites for possible OPCW inspections. ASNO presented its work at the University of Queensland, Griffith University, the University of New South Wales and to the Royal Australian Chemical Institute's 14th annual Professors and Heads of Departments of Chemistry Conference held at the Australian National University in Canberra (January 2005).

ASNO continued to assist the Department of Defence to develop military standard operating procedures for management of old chemical weapons found in Australia. These procedures will help ASNO make timely declarations to the OPCW, facilitate a possible OPCW inspection and ensure appropriate destruction of old chemical weapons. This action was initiated following the discovery of eight empty 250 lb, British-manufactured World War II chemical bombs that were inadvertently excavated at an old military site near Lithgow in NSW, and in particular, the subsequent discovery in May 2004 of a further 11 of the same.[39] All these bombs were found by Defence to have no chemical agent remaining and were classified as "old chemical weapons" based on their age and poor condition. In addressing its international obligations, Australia declared their discovery, and the munitions were destroyed in June and October 2004 by being cut up by Australian Army experts and scrapped, in consultation with the OPCW.

Influence on OPCW verification policy

Primarily through Australia's OPCW representative in The Hague, ASNO has been providing input on the development of CWC verification policy and procedures. Australia's general approach is to make verification as practical and effective as possible, on a risk-benefit basis. Australia's input is substantial and credible because it often draws upon verification-related

39 See 2003-04 Annual Report.

best or good practices that ASNO has put in place domestically, for instance challenge inspection management plans and chemical trade tracking systems. ASNO has been asked to present on these systems in international fora.

Empty World War II Chemical Warfare Munitions found near Lithgow, NSW. Photo courtesy of Department of Defence.

Cooperation with the OPCW and other States Parties

ASNO continued to be proactive and effective in its work with the OPCW. ASNO officers visited the OPCW in The Hague on two occasions during the reporting period to attend the following meetings: the 6th Annual Meeting of CWC National Authorities followed directly by the 9th Conference of the CWC States Parties in November 2004, and the 41st OPCW Executive Council meeting in June 2005. On each occasion, the Australian Embassy in The Hague coordinated a number of additional bilateral meetings in the margins with OPCW officials. These discussions and other correspondence during the year covered a broad range of topics including:

- negotiations on an OPCW privileges and immunities agreement
- action plans for CWC universality and implementation
- 'captive use' of Schedule 1 chemicals
- end-user assurance for Schedule 3 chemical trade, and
- the nomination of an Australian for a position on the OPCW Scientific Advisory Board.

Australia's interests are advanced through the successful nomination of Dr Bob Mathews of the Defence Science and Technology Organisation to hold a position as an independent scientific expert on the OPCW's recently expanded Scientific Advisory Board of 25 members. Dr Mathews also provides scientific and technical advice to ASNO on issues related to the CWC verification regime.

To increase the productiveness of Australia's engagement with the OPCW and other States Parties, ASNO has led the development of a National CWC Strategy. This Strategy outlines the main objectives, responsibilities and operational procedures for Australia and its relevant agencies in dealing with CWC matters internationally and is important in preparing for Australia to assume a rotating position on the OPCW Executive Council in 2006. In particular, the Strategy aims to assist in making the CWC's regulatory systems as effective as possible and to strongly promote States Parties' CWC compliance.

ASNO continued to build and maintain productive working relationships with other CWC States Parties during 2004-05, especially in Australia's immediate region. This engagement predominantly involved sharing experiences and information as a means of ensuring the effectiveness of CWC implementation.

ASNO works closely with a number of States Parties on CWC-related issues including:

- assisting to reconcile declarations of aggregate national data of Australian trade in CWC Scheduled Chemicals
- providing advice and technical documents on CWC issues to a number of regional countries, and
- engaging in ongoing dialogue with the CWC National Authorities in Canada, the United States and the United Kingdom, in particular, in relation to preparations for challenge inspections, tracking trade in CWC Scheduled Chemicals, site selection methodology for inspections at discrete organic chemical production facilities and options for the 10th Conference of the CWC States Parties to ensure Article VII implementation.

Mr John Howell (middle front) at Commodity Identification Seminar in Singapore, January 2005

International Outreach

Australia places great importance on international CWC compliance and best practice, particularly in Australia's immediate region. As a testament to ASNO's performance in these areas, ASNO continues to be approached by CWC States Parties and the OPCW for engagement and assistance on CWC implementation. ASNO responded comprehensively to all such requests during the reporting period, including:

- sharing its implementation experiences at the 2nd Regional Meeting of National Authorities of CWC States Parties in Asia held in Beijing from 20-22 September 2004
- holding bilateral discussions on chemical trade regulation and control with China, Indonesia, Malaysia, Sri Lanka, Pakistan and Thailand in Beijing and with Taiwan in Taipei from 22 to 24 September 2004

- presenting at a seminar on WMD-related commodity identification in Singapore, 25-27 January 2005
- assisting the OPCW on its CWC Article VII implementation action plan under which States Parties are required to report on their progress in implementing the CWC by November 2005, and
- conducting a joint ASNO-OPCW CWC implementation visit to Port Moresby, Papua New Guinea, from 20-22 June 2005 (see article inset) which resulted in draft CWC legislation and a national CWC implementation action plan for that country.

ASNO also engaged on chemical and biological control issues by providing administrative support and a number of presentations at the Australia Group meeting and linked Customs exercise in Sydney in April 2005.

CWC Challenge Inspection Exercise

The Chemical Weapons Convention provides for the OPCW to undertake challenge inspections to investigate claims of CWC-prohibited activities at any facility within the jurisdiction or control of any other Party to the Convention. While no challenge inspection has yet been undertaken, the OPCW Technical Secretariat maintains a high standard of readiness to conduct this type of inspection. Several countries have hosted challenge inspection field exercises to assist the training of the OPCW inspectorate as well as strengthening their own capabilities to receive a possible challenge inspection. Australia has also hosted two practice challenge inspections (not involving the OPCW) at conventional military facilities near Sydney in 1992 and 1997.

Although a CWC challenge inspection is unlikely to be launched against Australia given that Australia has no chemical weapons, the associated potential political and security dimensions, especially for a sensitive site, justify some inspection planning. Australia's planning is currently based on higher management, logistics support and internal site management plans.

In June 2005, Australia conducted its first table-top exercise designed primarily to test aspects of its own domestic preparedness to manage a challenge inspection. The exercise was organised by ASNO in conjunction with the Department of Defence. It was enhanced by the participation of the former Deputy Director-General of the OPCW Technical Secretariat, Dr John Gee.

Thirty representatives from relevant Australian Government agencies actively participated in the inspection exercise. The outcomes demonstrated that Australia's preparedness to receive a challenge inspection could be strengthened by:

- further development and formalisation of a media strategy
- updating planning and logistics documentation, and
- further scoping of non-military capacity for logistics and inspection support.

These lessons are currently being incorporated into Australia's planning process.

Chemical Control Visit to Papua New Guinea

From 20 to 22 June, Mr John Howell participated in a visit to Port Moresby, Papua New Guinea, in conjunction with the OPCW Technical Secretariat. The visit formed part of a series of visits throughout the Southwest Pacific by the OPCW aimed to assist countries to better implement their respective obligations as State Parties to the Chemical Weapons Convention. The agreed Action Plan on Article VII implementation sets a deadline for progress by the 10th Conference of the States Parties, scheduled for early November 2005.

A total of 20 people from 14 relevant organisations actively participated in the Port Moresby visit. Day One of the visit provided an outline of CWC and national obligations. Day Two was dedicated to legislative drafting. Day Three consisted of visits to relevant chemical industries and agencies. ASNO provided technical and operational expertise to the visit and the OPCW provided a legal expert. The OPCW expressed its appreciation for the critical coordination and administrative support provided by the Australian High Commission in Port Moresby as did ASNO for OPCW funding to participate.

Key outcomes from the visit include the development of PNG-specific draft CWC implementing legislation and the preparation of a national action plan which outlined steps, timeframes and responsibilities for progressing the finalisation and enactment of legislation and other CWC reporting requirements. ASNO continues to encourage PNG to execute the action plan including through assisting PNG to identify and declare relevant chemical trade to the OPCW, such as PNG's Schedule 3 chemical imports from Australia.

This type of practical, direct contact approach by the OPCW, supported by ASNO, has proven to be a good model which promotes the universal implementation of the Convention including in Australia's immediate region.

PNG participants at CWC legislation drafting session

OUTPUT 1.6: CTBT IMPLEMENTATION

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

Performance Measures

- Australia's obligations under the Comprehensive Nuclear-Test-Ban Treaty (CTBT) are met.
- Effective legal and administrative mechanisms which support Australia's commitments related to the CTBT.
- Effective contribution to the work of the CTBT Preparatory Commission (PrepCom) and its Working Groups.
- Contribution to Australia's CTBT international outreach efforts.

Performance Assessment

International Obligations

ASNO continues to coordinate work to upgrade, establish and operate facilities within Australia as part of the CTBT International Monitoring System (IMS).[40] Work in this area proceeded smoothly throughout the reporting period, although resolving land use issues ahead of the installation of IMS stations continues to be a significant task for ASNO.

Specific achievements during 2004-05 include:

- commencement of, and substantial progress on, construction work for an infrasound station in Shannon National Park (WA)
- completion of upgrade work on the joint Australia/United States seismic array at Alice Springs (NT) and on radionuclide stations at Townsville (Qld) and Perth (WA)
- certification of IMS stations at Charters Towers (Qld) and Narrogin (WA) as meeting CTBT technical requirements, and
- advancement of planning for new radionuclide and infrasound stations on the Cocos Islands, Macquarie Island (Tas) and in Antarctica.

Australia will host 20 monitoring stations and one laboratory as part of the IMS, the third largest number of IMS facilities hosted by any one country. Of these facilities, at 30 June 2005, 16 are operational, 13 are certified as fully meeting CTBT technical requirements and the remaining three are operating 'substantially to specification'. Construction or upgrade activities are underway on two further Australian stations. A list of Australia's IMS facilities and their status is at Appendix A.

Between April and June 2005, Australian stations participated in the main phase of the first system-wide IMS performance test wherein stations were operated and tested in line with the standards that will apply after entry-into-force of the CTBT. Two Australian stations were also used to test responses to the simulated detection of radionuclide signatures that could

40 This work is being carried out in conjunction with the CTBT's Provisional Technical Secretariat, the institutions constructing and operating the stations (specialist technical agencies and institutions including Geoscience Australia, the Research School of Earth Sciences at the Australian National University and ARPANSA) and relevant Commonwealth and State and Territory agencies. When completed, the IMS will comprise 321 seismic, radionuclide, infrasound and hydroacoustic monitoring stations and 16 radionuclide laboratories around the globe.

be strongly indicative of a nuclear test. This testing led to improvements in operating methods for certain Australian stations and is expected to offer important lessons for effective verification of the CTBT more broadly.

ASNO also continued to coordinate CTBT-related training and other activities for Australians involved in the development of the CTBT verification regime. This included:

- participation by Mr Malcolm Coxhead and Dr Josy Meyer in a table-top CTBT on-site inspection (OSI) exercise in Vienna in November 2004
- introductory training on CTBT OSI for a seismologist from Geoscience Australia (GA)
- attendance by several Australians at CTBT OSI development activities, and
- planning, in conjunction with GA, for a field activity and workshop on CTBT OSI development to be hosted by Australia in October 2005.

Legislation and Regulation

In late 2004, ASNO co-ordinated the development and promulgation of an amendment to regulations under the *International Organisations (Privileges and Immunities) Act 1963*. The amended regulations enable the CTBT's Provisional Technical Secretariat (PTS) to access tax concessions for claims under Australia's Indirect Tax Concession Scheme as they relate to the establishment and operation of IMS facilities in Australia, in accordance with the Agreement concluded between Australia and the PrepCom in 2000. ASNO also assisted the PrepCom to apply for these tax concessions during the reporting period.

ASNO continues to fund GA to carry out nuclear test monitoring through that agency's network of seismic stations. This arrangement, set out in a letter of understanding between GA and DFAT, has been administered by ASNO on behalf of DFAT since 1 July 2000. GA satisfied its requirements under the letter of understanding for the reporting period. ASNO reviewed the terms of the letter of understanding during the year and found that it continued to meet Australia's requirements.

Support for the PrepCom and its Working Groups

During the reporting period, ASNO facilitated Australia's contributions to the work of the PrepCom on development of the CTBT verification regime, which includes the IMS as well as a capacity to conduct OSI to determine whether a nuclear explosion has taken place. Mr Malcolm Coxhead, as the Task Leader for the elaboration of the OSI Operational Manual, continued to reshape and revitalise the way in which the PrepCom Working Group delegates worked on the Manual.[41] The first reading of a draft rolling text (which began in 2001) was completed in February 2005 and a more flexible second round process has been adopted. These developments were widely welcomed by the PrepCom.

A review of the structure of the PTS carried out during the year was co-chaired by Mr Richard Starr from Australia[42] and Ambassador Abdul Rimdap of Nigeria. The report of the review was warmly received by a wide range of delegations as a concrete contribution to the organisational health of the PTS.

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41 Mr Malcolm Coxhead was appointed by the PrepCom Technical Working Group as Task Leader for this task in June 2004.

42 Before retiring, Mr Starr held appointments as Australia's Ambassador for Disarmament in Geneva and Permanent Representative to the UN for Arms Control and Disarmament from 1994 to 1996. He was Australia's chief negotiator for the CTBT negotiations. In 2002-03 Mr Starr led a team that reviewed the CTBT PrepCom's OSI development program.

In addition, ASNO commenced planning for a PrepCom training course on analysis of IMS data which is to be hosted by GA in November 2005 as well as for various other CTBT verification training activities to be undertaken by the PrepCom in 2005-06.

International Outreach

During the reporting period, ASNO assisted DFAT in efforts to encourage states to ratify the CTBT through contributions to representations by Australian missions overseas. ASNO also encouraged ratification where the visit of ASNO staff working on other issues offered a suitable opportunity.

OUTPUT 1.7: OTHER NON-PROLIFERATION REGIMES

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

Performance Measures

- Pro-active and professional contribution to the development and effective implementation of the Biological Weapons Convention (BWC).
- Pro-active and professional contribution to the development of an effective and verifiable Fissile Material Cut-off Treaty (FMCT).
- Strengthened export controls supported through participation in the Australia Group (AG).
- Contribution to the Proliferation Security Initiative (PSI).

Performance Assessment

Biological Weapons Convention

Although ASNO lacks a formal role in regard to the BWC and biological non-proliferation, ASNO's technical and related regulatory expertise is used to provide support on these issues.

Mr Andrew Leask led the Australian delegation to the second and third annual BWC Meeting of Experts in July 2004 and June 2005 (as well as the first such meeting in August 2003).

ASNO also made a strong contribution to the Joint Australian-Indonesian BWC Regional Workshop held in Melbourne in February 2005 which aimed to improve BWC implementation and BWC Confidence Building Measures in the region. It is anticipated that a follow-up workshop will be held in 2006.

Finally, ASNO began preparations for the BWC Review Conference to be held in late 2006.

Fissile Material Cut-off Treaty

With substantive work in the Conference on Disarmament in Geneva stalled, there was no progress towards a FMCT in the reporting period. Nonetheless, ASNO has been active in discussions in key capitals and in specialist journals developing concepts for the negotiation and verification of such a treaty (see Current Topics).

Australia Group

ASNO continues to make a substantial contribution to the AG, intersessionally and through the annual meetings.

Mr Leask was again invited to chair the important implementation meeting which was instrumental in achieving a number of key outcomes in 2005. To address concerns that terrorists might obtain dispersal devices for biological agents, the AG added high risk aerosol sprayers to the biological equipment control list. It revised current controls on pumps and genetically modified organisms to assist enforcement and help exporters better understand their obligations. Further, the AG agreed to examine the addition of up to 25 biological agents to the common control list.

ASNO participated fully in other information exchange and enforcement meetings of the AG, including the very well received Customs workshop which was attended by more than 70 AG representatives.

Proliferation Security Initiative

The PSI is a decisive step taken by over 60 states to address concerns that trade in items of real proliferation significance were in some cases not subject to adequate control or to any effective restraints. The PSI is an exercise in collective security: rather than simply accepting the inevitability of dangerous trade, committed states have taken the decision that they will be proactive to stop such activity. During the year, ASNO contributed to the PSI through reviewing legislation and assisting in planning for a PSI exercise to be carried out in early 2006.

International Steps to Strengthen the Biological Weapons Convention

Over the last three years, States Parties to the Biological Weapons Convention (BWC) have met in Geneva for two weeks in each year to examine ways in which the BWC could be strengthened. These Meetings of Experts involved over 80 States Parties and often other experts from inter-governmental and non-governmental organisations. Mr Andrew Leask has led the Australian delegation to each of these meetings.

In the absence of an international treaty verification mechanism, it is clear that one important way in which the BWC can be strengthened—which would lead to improved domestic, regional and international security—is through enhanced domestic implementation of the obligations and requirements of the BWC by all States Parties. With this objective in mind, the work program for the Experts has addressed the following key issues:

- national measures to implement the prohibitions set forth in the BWC, including the enactment of penal legislation (2003)
- national mechanisms to establish and maintain the security and oversight of pathogenic micro-organisms and toxins (2003)
- enhancing international capabilities for responding to, investigating and mitigating the effects of cases of alleged use of biological or toxin weapons or suspicious outbreaks of disease (2004)
- strengthening and broadening national and international institutional efforts and existing mechanisms for the surveillance, detection, diagnosis and combating of infectious diseases affecting humans, animals and plants (2004), and
- the content, promulgation and adoption of codes of conduct for scientists (2005).

It is envisaged that the work of the Experts will enable a constructive debate at the BWC Review Conference in late 2006 on how to formalise measures to strengthen the Convention. ASNO envisages that such a formal work program might include at least the following:

- endorsement of national strategies to implement BWC obligations
- approval of enhanced confidence building measures, and
- agreement on practical strategies for universalisation of the Convention.

Australia Group Celebrates 20 Years

The year 2004-05 saw the 20th anniversary of the Australia Group (AG). The AG is an informal network of 39 countries plus the European Commission, chaired by Australia, that seeks to harmonise national export controls on materials and equipment suitable for the development of chemical and biological weapons (www.australiagroup.net).

The AG has played a vital role over the past two decades in containing the spread of chemical and biological weapons (CBW). Its work greatly complements work associated with the implementation of the Chemical Weapons Convention and the Biological Weapons Convention.

The Group's common control lists of dual-use chemicals, biological agents and relevant chemical and biological equipment and technologies are based on proliferation risk and are updated regularly.

Issues of interest for the AG include: expanding international outreach activities; combating terrorism through effective awareness raising and stricter controls on sources; controlling brokering and other activities by intermediary agents; and addressing emerging technologies that could be applied to the development of CBW. Means of addressing chemical and biological terrorism is a particular priority, and the informal nature of the AG allows for flexibility and speed in doing so.

Australia Group plenary session, Sydney, 2005.

OUTPUT 1.8: ADVICE TO GOVERNMENT

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

Performance Measures

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

Performance Assessment

ASNO staff has substantial experience in domestic, bilateral and international safeguards, nuclear technology, CWC verification issues and CTBT processes and procedures. ASNO draws on this expertise and an international network of contacts in other agencies and organisation to provide high quality technical and policy advice to the Government and other bodies. ASNO has been able to give the Government sound advice on nuclear safeguards, from both international and domestic perspectives, together with expert advice across the full range of WMD technologies. Some details are given under Output 1.4.

ASNO provided briefing materials and other assistance to the Australian Mission to the IAEA in Vienna mission.

ASNO also provided professional advice to assist Government efforts to address the threat of chemical and biological terrorism. This included:

- extensive contribution to the national review of hazardous materials legislation being undertaken for the Council of Australian Governments (COAG) (see following article)
- advice to all levels of government as a member of the COAG biological working group
- attendance and making presentations at a number of counter-terrorism meetings, and
- activities and publications to raise awareness and provide guidance to chemical companies in regard to chemical counter-terrorism measures.

Australian Government CBRN Strategy Group

Concerns about the potential threat of CBRN related terrorist activity has led to the establishment of an Australian Government CBRN Strategy Group (the Strategy Group), as a high-level committee to provide policy oversight for civilian CBRN issues. Given its regulatory responsibilities and relevant expertise, ASNO has joined this group.

The Council of Australian Governments' Review of Hazardous Materials

In December 2002, the Council of Australian Governments (COAG) agreed to a national review of the regulation, reporting and security around the storage, sale and handling of hazardous materials with the aim of minimising the risk of these materials being used for terrorist purposes.

The COAG review was broken into four parts to facilitate work: ammonium nitrate, radiological sources, harmful biological materials and hazardous chemicals.

ASNO has been a member of and/or contributed substantially to the last three working groups. Ammonium nitrate was given early consideration within the review and a licensing regime is being implemented in all States and Territories for the use, manufacture, storage, transport, supply, import and export of ammonium nitrate.

The review of radiological, chemical and biological materials is continuing. The objectives are to identify hazardous materials of security concern and to propose security measures to minimise the risk of these materials being used for terrorist purposes.

A risk-based approach is being used to identify materials of security concern, which incorporates ASIO intelligence and an analysis of the impact and feasibility of terrorist use of these materials. To minimise the burden on industry, the list of materials will be broken down into tiers according to risk, with proportional security requirements for each tier.

As with ammonium nitrate, materials that are identified as being of highest security concern are likely to be subject to greater controls to ensure, *inter alia*, that they are accessible only to suitable people who will store and handle them safely and securely. Materials of lesser risk would be subject to proportionally less rigorous measures, for example education and security awareness training.

With respect to radiological materials, radioactive sources are the responsibility of ARPANSA and State and Territory radiation regulators, and nuclear material is ASNO's responsibility.

Since 2003 when the IAEA promulgated the Code of Conduct on the Safety and Security of Radioactive Sources, ARPANSA has been working intensively with State and Territory radiation regulators to implement the Code. This work forms the bedrock of the COAG review to strengthen the safe management and control of radioactive sources in Australia. The result will be uniform standards across all jurisdictions, enhanced reporting to a common database and comprehensive export controls.

ASNO's work on security of nuclear material is outlined elsewhere in this Annual Report.

The role of the Strategy Group is to:

- provide whole-of-government strategic direction on CBRN issues
- formulate national policy and advise on prioritisation of programs
- monitor implementation of national strategy and policy decisions
- consider the full spectrum of issues (prevention, preparedness, response, recovery)
- coordinate international and national CBRN policy interactions
- oversight the development of the proposed Australian CBRN Data Centre, and
- focus on countering malicious use of CBRN materials in a civilian context.

Membership of the Strategy Group comprises senior executives from: the Department of the Prime Minister and Cabinet (Chair); ASNO; the Protective Security Coordination Centre; Emergency Management Australia; the Australian Security Intelligence Organisation; the Australian Federal Police; the Department of Foreign Affairs and Trade; the Department of Defence; the Defence Science and Technology Organisation; the Department of Health and Ageing; the Department of Agriculture, Fisheries and Forestry; ARPANSA and ANSTO, as well as the Chair of the National CBR Working Group (NCBRWG).

It is proposed that the Strategy Group will routinely report to the Australian Government Counter-Terrorism Policy Committee and will consult with States and Territories through the National Counter Terrorism Committee and close liaison with the Australian Emergency Management Committee and the NCBRWG. The NCBRWG will continue to provide a CBR forum for consideration of CBR operational and tactical issues.

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

- Management of an effective public education program.

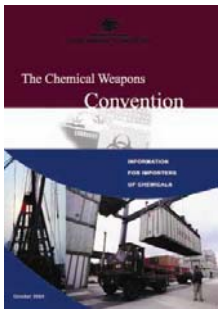
Performance Assessment

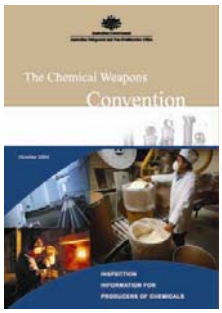
ASNO has taken steps to ensure that the nuclear debate in Australia is factually sound. During the year, Mr John Carlson gave media interviews and wrote to national news editors. Both Mr Carlson and Mr Andrew Leask provided several background briefings to press and non-governmental organisations.

ASNO made a major contribution to the submission by the Minister for Foreign Affairs to the House of Representatives Standing Committee on Industry and Resources with respect to its Inquiry into the Strategic Importance of Australia's Uranium Resources, and provided a background briefing to assist the Committee in its preparations for the Inquiry.

ASNO effectively promoted non-proliferation obligations and objectives in the science and academic community. In particular, awareness was raised of advanced research which could be of use to weapons of mass destruction (WMD) programs. Key activities included:

- a presentation to a meeting of the Professors and Heads of Chemical Departments
- launch of *Lasers, Liberty and Legislation* poster and pamphlet by Mr Craig Everton to the Australian Institute of Physics Congress at the Australian National University, Canberra in January 2005
- outreach to specific universities in Queensland and New South Wales on chemical and biological regulatory obligations relevant to researchers, and
- an invited address by Mr John Carlson to the Australian Society of Nuclear Engineers on the compatibility of nuclear growth with non-proliferation objectives.





ASNO supported the strengthening of regulation of the chemical industry through the publication of two updated brochures for Australian importers and producers of chemicals: *The Chemical Weapons Convention: Information for Importers of Chemicals* and *The*

Chemical Weapons Convention: Inspection Information for Producers of Chemicals. In addition, ASNO collaborated with Defence in the updating and distribution of their information CD-ROM for Australian chemical traders, *International Chemical Trade Control: Information for Australian Importers and Exporters of Chemicals (Version 2.0).*

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*, *Chemical Weapons (Prohibition) Act 1994* and *Comprehensive Nuclear-Test-Ban Treaty Act 1998*—rests with the Minister for Foreign Affairs, the Hon Alexander Downer MP.

Director General ASNO

The Director General ASNO reports directly to the Minister. 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*, and
- Director of the national authority for the Comprehensive Nuclear-Test-Ban Treaty, as established by the *Comprehensive Nuclear-Test-Ban Treaty Act 1998*.

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

Mr John Carlson has held the position of Director General ASNO since the establishment of ASNO on 31 August 1998, having previously held the position of Director of Safeguards since 1989. Mr John Carlson's current appointment is due to expire on 31 December 2006.

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 is Mr Andrew Leask.

ASNO Staff

ASNO has a small core of staff whose day-to-day operations are overseen by the Director General. ASNO staff (other than the Director General) is employed under the *Public Service Act 1999* as a division within the Department of Foreign Affairs and Trade (DFAT). ASNO staff is also employed under the DFAT Certified Agreement. Further details are in Table 11.

Training and Development

ASNO's primary training requirements are professional development of specialist skills. ASNO is proactive in managing this training, in part through a schedule of conference programs. Further details are in Table 12.

Figure 6: ASNO's Organisational Structure

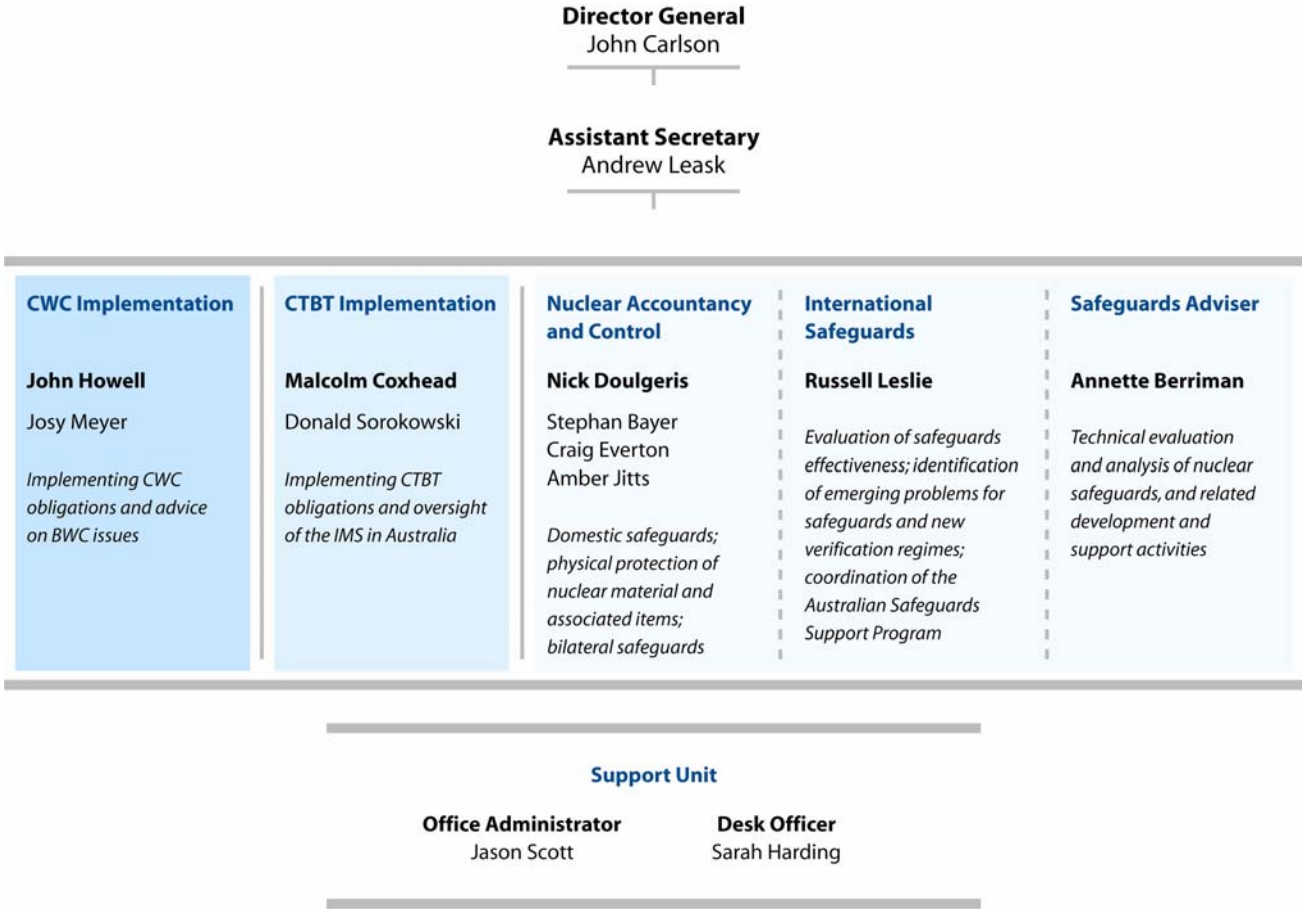


Table 11: ASNO Staff at 30 June 2005

	Male	Female	Total (Approved)
SES B2	1		1 (1)
SES B1	1		1 (1)
Executive Level 2	4	1	5 (5)
Executive Level 1	2	1	3 (3)
APS Level 6	1	1[43]	2 (2)
APS Level 5	0	1	1 (1)
APS Level 4	1	0	1 (1)
TOTAL	**11**	**3**	**14 (14)**

Table 12: Training and Development Activities

Training and Development Activity	Person Days
Leadership/Management	1.0
Professional Development	13.0
Consular	0.5
Finance and Administration	3.0
Security	1.3
Information Technology	0.0
Other	63.5
TOTAL	**82.3**

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 13: ASNO Administrative Costs[44]

		2003-04	2004-05
Salaries[45]		$1 385 637	$1 390 015
Running Costs	General	$430 436	$419 469
	Seismic monitoring[46]	$550 791	$558 915
	Security review of uranium industry	$67 000	$18 100
	Sub-Total	$1 048 227	$996 484
TOTAL		**$2 433 864**	**$2 386 499**

43 A non-ongoing employee.
44 Excludes GST.
45 Includes Long Service Leave accruals.
46 Undertaken by Geoscience Australia.

During the reporting period, actual running costs relative to 2003-04 were reduced in line with the Government's 1% efficiency dividend.

Uranium Producers Charge

The Uranium Producers Charge is payable on each kilogram of uranium ore concentrate production (set in 2004 to 5.8192 cents per kilogram). In 2004-05, the charge yielded $470 026 for Consolidated Revenue.

Australian Safeguards Support Program

The cost of the Australian Safeguards Support Program (ASSP) totalled about $350 000 in 2004-05. This amount included $85 000 for direct expenditure relating to consultancy services and participation in SAGSI. The 2004-05 ASSP budget did not include monies spent on ASSP projects by Commonwealth agencies other than ASNO and ANSTO. Further, it excluded AusAID contributions under the international outreach program and indirect costs such as time, i.e. salaries of ASNO staff.

Performance Indicators

ASNO has tracked its performance against specific indicators relating to core aims and organisational tasks. This information is presented below from two different perspectives. Figure 7 summarises the number of person-days of effort expended in each type of activity. Figure 8 relates to the number of events of each type in which ASNO was involved.

Figure 7: ASNO's Activities and Projects, by percentage of staff time

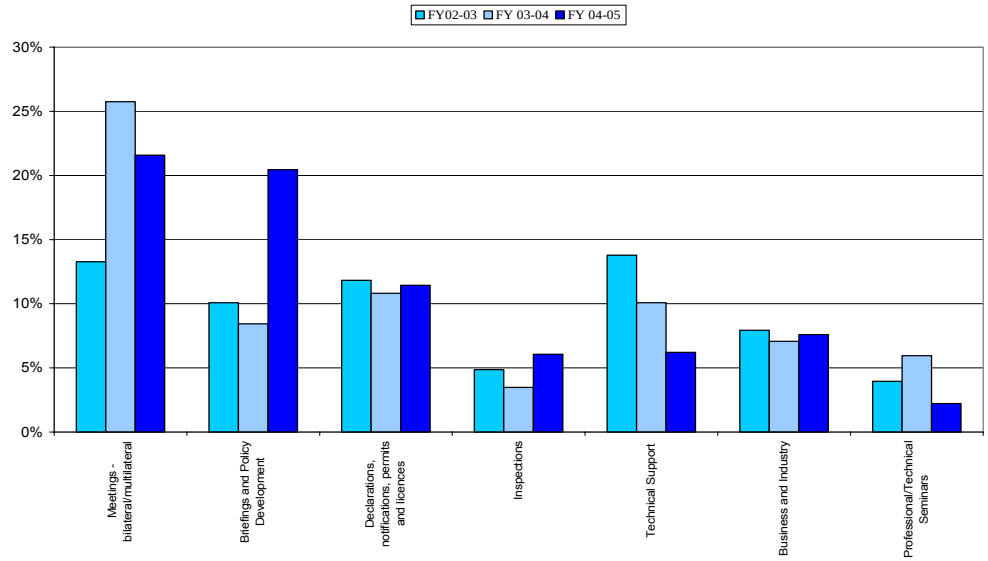
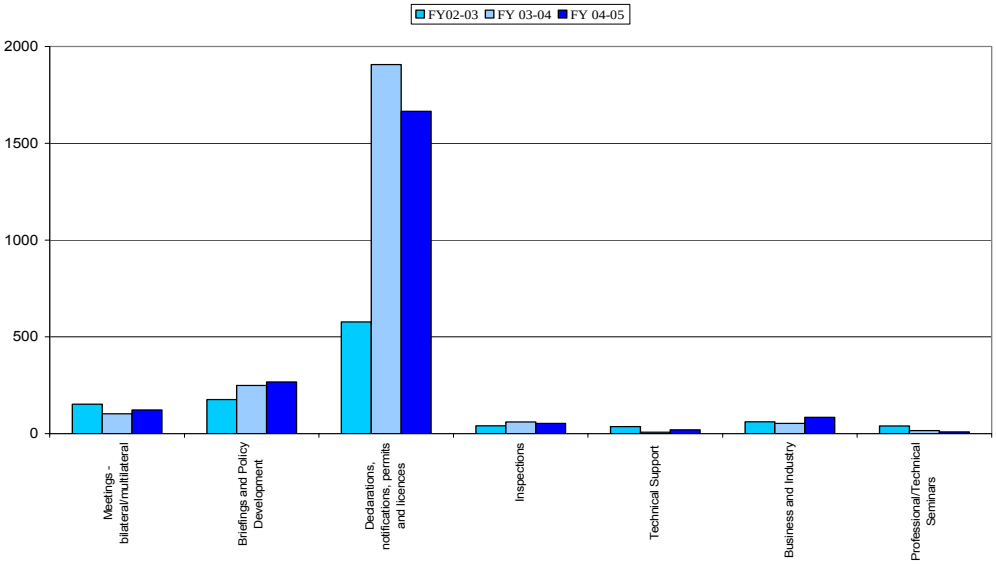


Figure 8: ASNO's Activities and Projects, by type



Appendixes

APPENDIX A WORLD NUCLEAR ENERGY, JULY 2005

Table 14: World Nuclear Energy, July 2005[47]

Country	Operating Rectors		% of Total Electricity in 2004	Reactors under Construction	
	Total	Capacity (GWe)		Total	Capacity (GWe)
*United States	104	99.2	19.9		
*France	59	63.3	78.1		
*Japan	55	46.7	29.3	2	1.9
Russia	31	21.7	15.6	4	3.8
*Germany	17	20.3	32.1		
*Republic of Korea	20	16.8	37.9		
Ukraine	15	13.1	51.1	2	1.9
*Canada	17	12.1	15.0		
*United Kingdom	23	11.8	19.4		
*Sweden	10	8.9	51.8		
*Spain	9	7.6	22.9		
China	9	6.6	2.2	2	2.0
*Belgium	7	5.8	55.1		
*Taiwan[48], China	6	4.9	21.5	2	2.6
*Czech Republic	6	3.5	31.2		
*Switzerland	5	3.2	40.0		
India	15	3.0	2.9	8	3.6
Bulgaria	4	2.7	41.6		
*Finland	4	2.7	26.6		
*Slovak Republic	6	2.4	55.2		
Brazil	2	1.9	3.0		
*Hungary	4	1.8	33.8		
South Africa	2	1.8	6.6		
*Mexico	2	1.3	5.2		
*Lithuania	1	1.2	72.1		
*Argentina	2	0.9	8.2	1	0.7
Romania	1	0.7	10.1	1	0.7
*Slovenia	1	0.7	38.8		
*Netherlands	1	0.5	3.8		
Armenia	1	0.4	38.8		
Pakistan	2	0.4	2.4		
TOTAL	**441**	**367.9**	**(est.) 16.0**	**22**	**17.2**

Sources: Uranium Information Centre and IAEA (www.iaea.org/NewsCenter/Focus/NuclearPower/table_of-reactors.pdf)

47 Countries eligible under bilateral agreements with Australia to use AONM are marked with an asterix. These countries operate 359 power reactors, which produce around 14% of total world electricity and about 90% of world nuclear energy. In addition Australia has an agreement with Russia which covers processing on behalf of third countries.

48 Taiwan is covered by an agreement between Australia and the United States.

APPENDIX B AUSTRALIA'S BILATERAL SAFEGUARDS AGREEMENTS

Table 15: Australia's Bilateral Safeguards Agreements at 30 June 2005

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	15 January 1982
Philippines	11 May 1982
Japan	17 August 1982
Switzerland	27 July 1988
Egypt	2 June 1989
Russia	24 December 1990
Mexico	17 July 1992
New Zealand	1 May 2000
Czech Republic	17 May 2002
United States (covering supply to Taiwan and China)	17 May 2002
Hungary	15 June 2002
Argentina	12 January 2005

APPENDIX C STATUS OF ADDITIONAL PROTOCOLS

At 30 June 2005, there were 71 states (plus Taiwan, China) with significant nuclear activities[49]. Of these states, 5 were nuclear-weapon states (NWS), 63 were non-nuclear-weapon states (NNWS) Party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), and 3 were non-NPT Parties.

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

Of the 63 NNWS NPT Parties with significant nuclear activities, 43 had an Additional Protocol in force.

Table 16: Status of Additional Protocols at 30 June 2005

A. States with Additional Protocols in force at 30 June 2005

State			
Armenia	El Salvador	**Latvia**	**Portugal**
Australia	**Finland**	**Libya** (provisional)	**Republic of Korea**
Austria	**France**	**Lithuania**	**Romania**
Azerbaijan	**Georgia**	**Luxembourg**	Seychelles
Bangladesh	**Germany**	Madagascar	**Slovenia**
Belgium	**Ghana**	Mali	**South Africa**
Bulgaria	**Greece**	Marshall Islands	**Spain**
Burkina Faso	Holy See	Monaco	**Sweden**
Canada	**Hungary**	Mongolia	**Switzerland**
Chile	Iceland	**Netherlands**	**Turkey**
China	**Indonesia**	New Zealand	Tajikistan
Croatia	**Iran** (provisional)	Nicaragua	Tanzania
Cuba	**Ireland**	**Norway**	**United Kingdom**
Cyprus	**Italy**	Palau	**Uruguay**
Czech Republic	**Jamaica**	Panama	**Uzbekistan**
DR Congo	**Japan**	Paraguay	
Denmark	Jordan	**Peru**	
Ecuador	Kuwait	**Poland**	
TOTAL: 69 states plus China, Taiwan (including 43 NNWS with significant nuclear activities)			

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

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

B. States with Additional Protocols signed or approved but not in force at 30 June 2005

State	State	State	State
Afghanistan	**Estonia**	Malta	Senegal
Andorra	Fiji	Mauritania	**Serbia & Montenegro**
Albania	FYROM	Mauritius	**Slovakia**
Algeria	Gabon	**Mexico**	Togo
Benin	Guatemala	Morocco	Tunisia
Cameroon	Haiti	Namibia	Turkmenistan
Cape Verde	Honduras	Niger	Uganda
Colombia	**Kazakhstan**	Nigeria	**Ukraine**
Comoros	Kiribati	**Philippines**	**USA**
Costa Rica	Liechtenstein	**Russia**	
TOTAL: 39 states (including 9 NNWS NPT Parties with significant nuclear activities)			

The remaining 11 NNWS NPT Parties with significant nuclear activities had not signed an Additional Protocol.

C. States with Significant Nuclear Activities that had not signed an Additional Protocol at 30 June 2005

State	State	State	State
Argentina[50]	Egypt	Malaysia[51]	Venezuela
Belarus	India (non-NPT)	Pakistan (non-NPT)	Viet Nam
Brazil	Israel (non-NPT)	Syria	
DPRK[52]	Iraq	Thailand[53]	
TOTAL: 14 states (including 11 NPT Parties with significant nuclear activities)			

50 Argentina and Brazil intend to bring the Additional Protocol into effect in conjunction with their regional safeguards authority, ABACC.
51 Malaysia had an Additional Protocol approved by the IAEA Board of Governors on 22 September 2005.
52 The DPRK gave notice of withdrawal from the NPT on 10 January 2003. The validity of this withdrawal has not been determined. The DPRK is counted here as an NPT Party.
53 Thailand signed an Additional Protocol on 22 September 2005.

APPENDIX D IAEA STATEMENTS OF CONCLUSIONS FOR AUSTRALIA 2004

Inventory verification inspections carried out by the IAEA at Australian nuclear facilities and locations during 2004-05 are shown in Table 6. In addition, the Agency carries out a range of other verification activities, such as short notice inspections, complementary accesses, design verifications and increased data collection and analysis.

The IAEA provides statements of conclusions of inspections under Article 91(b) of Australia's NPT Safeguards Agreement. These are usually received in the financial year following the inspection—which is why the following Table summarises available Article 91(b) statements arising from physical inventory inspections conducted in 2003-04.

Table 17: IAEA Conclusions of Inspections in Australia during 2003-04

Verification Activity	Applicable Facilities	Conclusion[54]
Examination of records	HIFAR R&D Laboratories Vault Storage Other locations	'The records satisfied the Agency requirements.'
Examination of Reports to the Agency	HIFAR R&D Laboratories Vault Storage	'The reports satisfied Agency requirements'
	Other locations	Some reports were late[55]
Application of Containment and Surveillance Measures	HIFAR R&D Laboratories Vault Storage	'The application of containment measures adequately complemented the nuclear material accountancy measures.'
Verification of Domestic and International Transfers	HIFAR	'The international transfers declared by the operator were verified and the results satisfied the Agency requirement'
Verification of Physical Inventory	HIFAR R&D Laboratories Vault Storage Other locations	'The physical inventory declared by the operator was verified and the results satisfied the Agency requirements.'
Verification Activities for Timely Detection	HIFAR R&D Laboratories	'The Verification activities for timely detection during the material balance period satisfied the Agency requirements'

The Open Pool Australian Light water (OPAL) nuclear research reactor is currently under construction at Lucas Heights. As at 30 June 2005 there was no inventory of nuclear material in this material balance area, so the IAEA had not carried out any inventory verification activities there, however the IAEA visited the site in February and June 2005 to verify design information.

In addition, 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

54 The Facility Attachment for SSL's Laboratories has not yet been finalised with the IAEA. The IAEA generally only issues Article 91(b) statements where a Facility Attachment has been agreed. Conclusions for locations outside Lucas Heights are not yet available as inspection activity did not take place until February 2005.

55 See Output 1.1.

Protocol to Australia's NPT Safeguards Agreement. The Statement for 2004 concluded as follows:

> *Access pursuant to Article 4.a.(i) did not indicate the presence of undeclared nuclear material or activities at:*
>
> *Lucas Heights Science and Technology Centre*
> *Silex Systems Ltd*
> *University of Wollongong*
> *Little Forest Burial Ground, Lucas Heights Science and Technology Centre*
>
> *These conclusions are pending the results of environmental samples.*

APPENDIX E FUNDAMENTAL PRINCIPLES AND OBJECTIVES OF PHYSICAL PROTECTION

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

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

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

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

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

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

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

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

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

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

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

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

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

APPENDIX F IAEA SAFEGUARDS STATEMENT FOR 2004

The following is extracted from the IAEA's Annual Report for 2004.

In 2004, safeguards were applied for 152 States with safeguards agreements in force with the Agency. The Secretariat's findings and conclusions for 2004 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. Safeguards activities were implemented for 61 States[56] with both comprehensive safeguards agreements in force and additional protocols in force or being otherwise applied. All declared nuclear material in these States has remained in peaceful nuclear activities or has been otherwise adequately accounted for. In addition:

   a. For 21 of the States, the Secretariat completed sufficient activities and evaluation and found no indication of undeclared nuclear material or activities for the State as a whole. On this basis, the Secretariat concluded that all nuclear material in these States remained in peaceful nuclear activities or was otherwise adequately accounted for.

   b. For 37 States, evaluations regarding the absence of undeclared nuclear material and activities remain in progress.

   c. Three States were found to have been engaged in nuclear activities of varying significance which they had failed to report. Corrective actions are being taken by these States. Verification of the correctness and completeness of their respective declarations is ongoing.

2. Safeguards activities were implemented for 82 States with comprehensive safeguards agreements in force, but without additional protocols in force or being otherwise applied.[57] All declared nuclear material in these 82 States has remained in peaceful nuclear activities or has been otherwise adequately accounted for.[58] One State was found to have been engaged in nuclear activities which it had failed to report. Corrective actions are being taken by the State. Verification of the correctness and completeness of this State's declarations is ongoing.

3. As of the end of 2004, 40 non-nuclear-weapon States party to the NPT had not yet brought comprehensive safeguards agreements with the Agency into force as required

56 Safeguards, including the measures of the Model Additional Protocol, were also applied in Taiwan, China, which has significant nuclear activities. With regard to Taiwan, China, the Secretariat concluded that the nuclear material placed under safeguards remained in peaceful nuclear activities or was otherwise adequately accounted for, while the Secretariat's evaluation regarding the absence of undeclared nuclear material and activities was still ongoing.

57 The Secretariat was not able to perform verification activities in the DPRK in 2004 and could not, therefore, draw any conclusions about the nuclear material or activities for that State.

58 For the 55 States with operative small quantities protocols, the Agency's verification capability is limited. The Agency is taking action to address this issue. It should be noted, however, that the Agency is not aware of any information that would contradict the conclusions drawn in respect of such States.

by Article III of that Treaty. For these States, the Secretariat could not draw any safeguards conclusions.

4. Safeguards activities were implemented at a number of nuclear facilities in three States pursuant to INFCIRC/66/Rev.2-type safeguards agreements. All nuclear material and other items placed under safeguards remained in peaceful nuclear activities or have been otherwise adequately accounted for.

5. Safeguards activities were implemented in selected facilities in four of the five nuclear-weapon States with voluntary offer safeguards agreements in force. All nuclear material placed under safeguards in these facilities has remained in peaceful nuclear activities or has been otherwise adequately accounted for.

APPENDIX G STATUS OF CTBT IMS FACILITIES IN AUSTRALIA

Table 18: Status of Australian CTBT IMS Stations at 30 June 2005

Facility	Status	Operator
Primary Seismic Stations		
Warramunga, NT	Certified against CTBT standards	ANU
Alice Springs, NT	Upgrade underway	GA / United States
Stephens Creek, NSW	Certified against CTBT standards	GA
Mawson, Antarctica	Certified against CTBT standards	GA
Auxiliary Seismic Stations		
Charters Towers, QLD	Certified against CTBT standards	GA
Fitzroy Crossing, WA	Testing and evaluating against CTBT standards	GA
Narrogin, WA	Certified against CTBT standards	GA
Infrasound Stations		
Warramunga, NT	Certified against CTBT standards	ANU
Hobart, TAS	Certified against CTBT standards	GA
Shannon, WA	Establishment underway	GA
Cocos Islands	Site survey underway or completed	GA
Davis Base, Antarctica	Site survey underway or completed	GA
Radionuclide Stations		
Melbourne, VIC	Certified against CTBT standards	ARPANSA
Perth, WA	Certified against CTBT standards	ARPANSA
Townsville, QLD	Certified against CTBT standards	ARPANSA
Darwin, NT	Certified against CTBT standards	ARPANSA
Cocos Islands	Certified against CTBT standards	ARPANSA
Macquarie Island, TAS	Site survey completed	ARPANSA
Mawson, Antarctica	Site survey underway or completed	ARPANSA
Radionuclide Laboratory		
Melbourne, VIC	Testing and evaluation underway for certification against CTBT standards	ARPANSA
Hydro-acoustic Stations		
Cape Leeuwin, WA	Certified against CTBT standards	GA

APPENDIX H FREEDOM OF INFORMATION STATEMENT

This statement is provided in accordance with section 8 of the *Freedom of Information Act 1982* (FOI Act) and is correct to 30 June 2005.

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. No requests for information under FOI were received by ASNO during 2004–05.

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

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

Documents

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

- submissions to the portfolio minister, Cabinet, the Director General ASNO and other government agencies
- records of parliamentary related business such as responses to parliamentary questions on notice, briefings for parliamentary delegations and parliamentarians, possible parliamentary questions, written submissions to parliamentary committees and responses to questions from parliamentary committee inquiries
- records of technical and other reports, literature, media reports and journals relevant to ASNO's responsibilities
- replies to ministerial and departmental correspondence
- papers prepared in whole or in part by ASNO officers for presentation at conferences and meetings
- texts of speeches and press statements on issues related to ASNO's responsibilities
- briefs, reports and documents on international and Australian aspects of policy relevant to ASNO's safeguards, CWC and CTBT responsibilities
- Annual Reports
- treaties, memorandums of understanding and other agreements between the Australian Government and other governments
- documents relating to program and financial management, contracts and tenders
- reviews, evaluations and audit reports on management systems, controls and the efficiency and effectiveness of development programs and activities

- minutes and working documents of the working groups, committees and organisations to which ASNO is party
- guidelines, policies and procedures relating to strategies and corporate planning, project planning and implementation, including risk assessment and fraud prevention policy and strategies
- materials relating to staff development, training, personnel management and general administration, and
- customer feedback surveys.

Publications

ASNO produces a range of publications to increase community awareness and understanding of ASNO responsibilities and issues for which it has expertise. They include:

- Annette Berriman, Russell Leslie and John Carlson, *Information Analysis for IAEA Safeguards*, paper presented at the Institute of Nuclear Materials Management, Orlando, USA, 18-22 July 2004
- Annette Berriman, Russell Leslie and John Carlson, *Assessing Motivation as a Means of Determining the Risk of Proliferation,* paper presented at the Institute of Nuclear Materials Management, Orlando, USA, 18-22 July 2004
- John Howell, *Chemical Outreach in the West*, DFATNEWS, Vol.11(8), August 2004
- John Carlson, Andrew Leask and Russell Leslie, *Safeguards as a Design Criteria: Guidance for Regulators*, September 2004
- John Howell, *Chemical Control and Counter-Proliferation Outreach in Asia*, DFATNEWS, Vol.11(9), September 2004
- John Howell, *Destruction of Old Chemical Weapons*, DFATNEWS, Vol.11(10), October 2004
- John Howell and Josy Meyer, *The Chemical Weapons Convention: Information for Importers of Chemicals*, Version 2.0, October 2004 (CD-ROM)
- John Howell and Josy Meyer, *The Chemical Weapons Convention: Inspection Information for Producers of Chemicals*, October 2004
- John Howell, Josy Meyer and Brad Howlett, *International Chemical Trade Control: Information for Australian Importers and Exporters of Chemicals*, October 2004
- Annette Berriman, *The Treaty on the Non-Proliferation of Nuclear Weapons and the Upcoming NPT Review Conference*, presentation to the IAEA Seminar for the South Pacific Region on the Conclusion and Implementation of Safeguards Agreements and Additional Protocols, Sydney, 10-11 November 2004
- Josy Meyer, *The Chemical Weapons Convention Convenes*, DFATNEWS Vol.11(11), November 2004
- John Carlson, *Integrated Safeguards: Progress and Issues*, Journal of Nuclear Materials Management, Vol.32(4), Summer 2004
- John Carlson, *Can a Fissile Material Cut-Off Treaty be Effectively Verified*?, Arms Control Today, January/February 2005, pp.25-29
- Josy Meyer, *Regional Workshop on the Biological Weapons Convention*, DFATNEWS, Vol.12(2), February 2005
- Craig Everton, *Lasers, Liberty and Legislation*, pamphlet and poster presented to the Australian Institute of Physics Congress, February 2005

- Annette Berriman, *Proliferation: Threats and Safeguards*, paper presented to the Australian Institute of Energy Symposium on Nuclear Power for Australia, Sydney, 8 June 2005

In addition, the following papers were presented by Mr Andrew Leask at the Meeting of the States Parties to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (biological) and Toxin Weapons and on their Destruction, Meeting of Experts, Geneva, 19-30 July 2004:

- *Emergency Management, an Australian Model: Planning for and Managing a Biological Emergency*
- *An Australian Framework for Responses to Unusual Outbreaks of Animal Disease*
- *Mitigation of Intentional Outbreaks of Human Disease*
- *Disease Surveillance in Australia: Plant Diseases*
- *Improving Regional Surveillance Efforts, Animal Health: Australia's Contribution*
- *Disease Surveillance in Australia : Animal Diseases*
- *The Role of the World Health Organisation in Infectious Disease Surveillance: Australian Perspective*
- *PLANTPLAN: Australian Emergency Plant Pest Response Plan*
- *Australian Disease Surveillance and Response Systems: Humans*

Presentations and Lectures

- Stephan Bayer, Nicholas Doulgeris and Andrew Leask, *A Regulators Systematic Approach to Physical Protection for Nuclear Facilities*, 5th International Seminar on Nuclear Material Technology, Jakarta, September 2004
- Annette Berriman, *A Regulators Systematic Approach to Physical Protection for Nuclear Facilities*, a presentation to the 5th International Seminar on Nuclear Material Technology, Jakarta, September 2004
- John Howell, *Australian Experiences with Declarations under the CWC*, presentation to 2nd Regional Meeting of National Authorities of States Parties in Asia, Beijing, 20-22 September 2004
- John Howell, *Experiences with OPCW Industry Inspections*, presentation to 2nd Regional Meeting of National Authorities of States Parties in Asia, Beijing, 20-22 September 2004
- John Howell, *Customs Role Regarding CWC Import and Export Provisions,* 2nd Regional Meeting of National Authorities of States Parties in Asia, Beijing, 20-22 September 2004
- John Howell, *CWC Implementation Training of Customs Officials*, presentation 2nd Regional Meeting of National Authorities of States Parties in Asia, Beijing, 20-22 September 2004
- Andrew Leask, *Enhancing Biosecurity*, presentation to Biosecure 2004, Canberra, 23 September 2004
- John Carlson, *Safeguards and Non-Proliferation: Experiences, Challenges and Prospects in the Regional Context*, presentation to the International Seminar on Ensuring Safe, Secure and Peaceful Uses of Nuclear Energy in Sustainable Development: Experiences, Challenges and Future Prospects, Bali, Indonesia, 11-13 October 2004
- Nick Doulgeris, *Strengthened Safeguards: Domestic Aspects*, presentation to the IAEA Seminar for the South Pacific Region on the Conclusion and Implementation of Safeguards Agreements and Additional Protocols, Sydney, 10-11 November 2004

- Nick Doulgeris, *SSAC Activities in Australia*, lecture at the 8th Safeguards Training Course of the Japan Atomic Energy Research Institute, Tokai, Japan, 29 November–16 December 2004
- John Howell, Chemical and Commodity Identification Training Seminar, Singapore, 25-27 January 2005
- John Howell, Biological and Commodity Identification Training Seminar, Singapore, 25-27 January 2005
- Josy Meyer, *The Chemical Weapons Convention and Chemical Security in Australia*, presentation to RACI 14th Annual Professors and Heads of Departments of Chemistry Conference, Canberra, 28-29 January 2005
- John Howell, *ASNO and Biological Controls in Australia*, presentation to Queensland University Safety Officers Course, Brisbane, 15 February 2005
- John Howell, *Nuclear, Biological, Chemical and Radiological: Regulation in Australia of Activities and Materials*, presentation to Griffith University Safety Officers Course, Brisbane, 17 February 2005
- Josy Meyer, *Confidence Building Measures under the BWC*, presentation to Joint Australian-Indonesian BWC Regional Workshop, Melbourne, 24 February 2005
- John Howell, *Improving Utility of the Australia Group Website*, presentation to the Australia Group 20th Anniversary Meeting, Sydney, 21 April 2005
- John Howell, *Australian Chemical Import and Export Controls*, presentation to the Australia Group 20th Anniversary Meeting, Sydney, 22 April 2005
- John Howell, *Outreach to Universities*, presentation to the Australia Group 20th Anniversary Meeting, Sydney, 22 April 2005
- Andrew Leask, *Nuclear, Biological, Chemical and Radiological: Regulation in Australia of Activities and Materials,* a presentation to Australian Defence Force Medical Officer Nuclear Biological Chemical Defence Course, Wodonga, 25 April to 6 May 2005
- Nick Doulgeris, *Implementation of Strengthened Safeguards in Australia*, lecture at the IAEA/United States International Training Course on Implementation of State Systems of Accounting for and Control of Nuclear Materials, Santa Fe, New Mexico and Knoxville, Tennessee, May 2005
- John Howell, *ASNO Activity and Trade Regulatory Role*, presentation to the Defence Trade Control and Compliance Seminar, Canberra, 16 May 2005
- John Howell, *A Challenge Inspection in Australia*, presentation to the Chemical Weapons Convention Challenge Inspection Table-Top Exercise, Canberra, 7 June 2005
- John Howell, *CWC Chemicals in Industry and Trade*, presentation to the Chemical Weapons Convention Outreach Seminar, Port Moresby, 20 June 2005
- John Howell, *CWC Experience and Support*, presentation to the Chemical Weapons Convention Outreach Seminar, Port Moresby, 20 June 2005

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	p.iii
Table of contents	Mandatory	p.iv
Index	Mandatory	p.105
Glossary	Mandatory	p.99
Contact officer(s)	Mandatory	p.ii
Internet home page address and Internet address for report	Mandatory	p.ii
Review by Secretary		
Review by statutory office holder	Mandatory	p.1
Summary of significant issues and developments	Suggested	p.1
Overview of department's performance and financial results	Suggested	N/A
Outlook for following year	Suggested	p.6
Significant issues and developments—portfolio	Portfolio departments—suggested	p.1
Departmental Overview		
Overview description of Office	Mandatory	p.27
Role and functions	Mandatory	p.27
Organisational structure	Mandatory	p.76
Outcome and output structure	Mandatory	p.33
Where outcome and output structures differ from PBS format, details of variation and reasons for change	Mandatory	vii
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	p.34
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	p.34
Trend information	Suggested	p.79
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	p.77
Discussion of any significant changes from the prior year or from budget.	Suggested	p.77
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	p.75
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	p.*75*
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	p.75
Impact and features of certified agreements and AWAs	Suggested	DFAT AR
Training and development undertaken and its impact	Suggested	p.77
Occupational health and safety performance	Suggested	DFAT AR
Productivity gains	Suggested	DFAT AR
Statistics on staffing	Mandatory	p.77
Certified agreements and AWAs	Mandatory	DFAT AR
Performance pay	Mandatory	DFAT AR
Contracts exempt from Purchasing and Disposal Gazette	Mandatory	DFAT AR
Assets management		
Assessment of effectiveness of assets management	If applicable, mandatory	DFAT AR
Purchasing		
Assessment of purchasing against core policies and principles	Mandatory	DFAT AR

Consultants		
The annual report must include a summary statement detailing the number of new consultancy services contracts let during the year; the total actual expenditure on all new consultancy contracts let during the year (inclusive of GST); the number of ongoing consultancy contracts that were active in the reporting year; and the total actual expenditure in the reporting year on the ongoing consultancy contracts (inclusive of GST). (Additional information as in Attachment D to be available on the Internet or published as an appendix to the report. Information must be presented in accordance with the proforma as set out in Attachment D.)	Mandatory	DFAT AR
Competitive Tendering and Contracting		
Competitive tendering and contracting contracts let and outcomes	Mandatory	DFAT AR
Absence of contractual provisions allowing access by the Auditor-General	Mandatory	DFAT AR
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Financial Statements	Mandatory	DFAT AR
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Freedom of Information (subsection 8(1) of the *Freedom of Information Act 1982)*	Mandatory	p.92
Report on performance in implementing the Commonwealth Disability Strategy	Mandatory	DFAT AR
Advertising and Market Research (Section 311A of the *Commonwealth Electoral Act 1918)*	Mandatory	DFAT AR
Ecologically sustainable development and environmental performance (Section 516A of the *Environment Protection and Biodiversity Conservation Act 1999*)	Mandatory	DFAT AR
Discretionary Grants	Mandatory	DFAT AR
Correction of material errors in previous annual report	If applicable, mandatory	N/A

Glossary

Additional Protocol	An agreement designed to complement a state's Safeguards Agreement with the IAEA in order to strengthen the effectiveness and improve the efficiency of the safeguards system. The model text of the Additional Protocol is set out in IAEA document INFCIRC/540.
Agency Inspector	Person nominated by the IAEA and declared under section 57 of the Safeguards Act to undertake IAEA inspections.
AMS	Accelerator Mass Spectroscopy.
ANSTO	Australian Nuclear Science and Technology Organisation.
AONM	Australian Obligated Nuclear Material. Australian uranium and nuclear material derived therefrom which is subject to obligations pursuant to Australia's bilateral safeguards agreements.
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency.
ASIO	Australian Security and Intelligence Organisation.
ASSP	Australian Safeguards Support Program.
Australia Group	The Australian-chaired, multilateral arrangement for coordinating national export controls on materials and equipment of potential relevance to chemical and biological weapons.
BAPETEN	Indonesian Nuclear Energy Control Board.
BATAN	Indonesian National Nuclear Energy Agency.
BWC	Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction. Also known as the Biological Weapons Convention.
Challenge Inspection	(for CWC purposes) An inspection, requested by a CWC State Party, of any facility or location in the territory or in any other place under the jurisdiction or control of another State Party.
Complementary Access	The right of the IAEA pursuant the Additional Protocol for access to a site or location to carry out verification activities.
Comprehensive Safeguards Agreement	Agreement between a state and the IAEA for the application of safeguards to all of the state's current and future nuclear activities (equivalent to 'full scope' safeguards) based on INFCIRC/153.
Concise Note	Supplementary explanatory notes on formal reports from a national safeguards authority to the IAEA.
Conversion	Purification of uranium ore concentrates or recycled nuclear material and conversion to a chemical form suitable for isotopic enrichment or fuel fabrication.
CPPNM	Convention on the Physical Protection of Nuclear Material.
CTBT	Comprehensive Nuclear-Test-Ban Treaty.
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization. The Vienna-based international organisation established to give effect to the CTBT.
Customs	Australian Customs Service.

CWC	Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction. Also known as the Chemical Weapons Convention.
CWC Scheduled Chemicals	Chemicals listed in the three Schedules to the Chemical Weapons Convention. Some are chemical warfare agents and others are dual-use chemicals (that can be used in industry or in the manufacture of chemical warfare agents).
Defence	Australian Department of Defence.
Depleted Uranium (DU)	Uranium with a ^{235}U content less than that found in nature (e.g. as a result of uranium enrichment processes).
DFAT	Department of Foreign Affairs and Trade.
Direct-Use Material	Nuclear material defined for safeguards purposes as being usable for nuclear explosives without transmutation or further enrichment, e.g. plutonium, HEU and ^{233}U.
Discrete Organic Chemical	Any chemical belonging to the class of chemical compounds consisting of all compounds of carbon, except for its oxides, sulphides and metal carbonates, identifiable by chemical name, by structural formula, if known, and by Chemical Abstracts Service registry number, if assigned. Long chain polymers are not included in this definition.
DOE	United States Department of Energy.
DPRK	Democratic People's Republic of Korea.
Enrichment	A physical or chemical process for increasing the proportion of a particular isotope. Uranium enrichment involves increasing the proportion of ^{235}U from its level in natural uranium, 0.711%: for LEU fuel the proportion of ^{235}U (the enrichment level) is typically increased to between 3% and 5%.
Environmental analysis	A technique for detecting residual traces of nuclear material on building surfaces, in plants and soil, in water and in the air. A very powerful safeguards tool, the value of which was first demonstrated in Iraq.
Euratom	Atomic Energy Agency of the European Union. Euratom's safeguards office, called the Directorate General of Transport and Energy H (DG), is responsible for the application of safeguards to all nuclear material in Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, 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	(for safeguards purposes) A document agreed between the IAEA and the relevant Member State that specifies the nuclear materials accountancy system for a specific facility and defines the format and scope of inspection activities.
Fissile	Referring to a nuclide capable of undergoing fission by neutrons of any energy, including 'thermal' neutrons (e.g. ^{233}U, ^{235}U, ^{239}Pu and ^{241}Pu).

Fission	The splitting of an atomic nucleus into roughly equal parts, often by a neutron. In a fission reaction, a neutron collides with a fissile nuclide (e.g. ^{235}U) that then splits, releasing energy and further neutrons. Some of these neutrons may go on to collide with other fissile nuclei, setting up a nuclear chain reaction.
Fissionable	Referring to a nuclide capable of undergoing fission by 'fast' neutrons (e.g. ^{233}U, ^{235}U, ^{238}U, ^{239}Pu, ^{240}Pu, ^{241}Pu and ^{242}Pu).
FMCT	Fissile Material Cut-off Treaty. A proposed international treaty to prohibit production of fissile material for nuclear weapons.
Full Scope Safeguards	The application of IAEA safeguards to all of a state's present and future nuclear activities. Now more commonly referred to as comprehensive safeguards.
G8	Group of Eight. Comprises Canada, France, Germany, Italy, Japan, Russia, the United Kingdom and the United States.
GA	Geoscience Australia (formerly the Australian Geological Survey Organisation).
GW	Gigawatt (Giga = billion, 10^9).
GWe	Gigawatts of electrical power.
GWt	Gigawatts of thermal power.
Heavy Water (D_2O)	Water enriched in the 'heavy' hydrogen isotope deuterium (hydrogen 2) which consists of a proton and a neutron. D_2O occurs naturally as about one part in 6000 of ordinary water. D_2O is a very efficient moderator, enabling the use of natural uranium in a nuclear reactor.
HEU	High enriched uranium. Uranium enriched to 20% or more in ^{235}U. Weapons-grade HEU is enriched to over 90% ^{235}U.
HIFAR	High Flux Australian Reactor. The 10MWt research reactor located at ANSTO, Lucas Heights.
Hydro-acoustic	Term referring to underwater propagation of pressure waves (sounds).
IAEA	International Atomic Energy Agency.
IDC	International Data Centre. Data gathered by monitoring stations in the CTBT IMS network is compiled, analysed and archived by the Vienna-based IDC. IDC products giving the results of analyses are made available to CTBT signatories.
IMS	International Monitoring System. A network of 337 monitoring stations and analytical laboratories established pursuant to the CTBT which, together with the IDC, gather and analyse data with the aim of detecting any explosive nuclear testing.
Indirect-Use Material	Nuclear material that cannot be used for a nuclear explosive without transmutation or further enrichment (e.g. depleted uranium, natural uranium, LEU and thorium).
INFCIRC	IAEA Information Circular. A series of documents published by the IAEA setting out, inter alia, safeguards, physical protection and export control arrangements.
INFCIRC/66 Rev.2	The model safeguards agreement used by the IAEA since 1965. Essentially this agreement is facility-specific. For NNWS party to the NPT It has been replaced by INFCIRC/153.
INFCIRC/153 (Corrected)	The model agreement used by the IAEA as a basis for safeguards agreements with non-nuclear-weapon states party to the NPT.

INFCIRC/225 Rev.4 (Corrected)	IAEA document entitled 'The Physical Protection of Nuclear Material and Nuclear Facilities'. Its recommendations reflect a consensus of views among IAEA Member States on desirable requirements for physical protection measures on nuclear material and facilities, that is, measures taken for their physical security.
INFCIRC/540	The model text of the Additional Protocol.
Infrasound	Sound in the frequency range of about 0.02 to 4 Hertz. One category of CTBT IMS stations will monitor sound at these frequencies with the aim of detecting explosive events such as a nuclear test explosion at a range up to 5000 km.
Integrated safeguards	The optimum combination of all safeguards measures under comprehensive safeguards agreements and the Additional Protocol to achieve maximum effectiveness and efficiency.
Inventory Change Report	A formal report from a national safeguards authority to the IAEA on changes to nuclear materials inventories in a given period.
Isotopes	Nuclides with the same number of protons, but different numbers of neutrons, e.g. ^{235}U (92 protons and 143 neutrons) and ^{238}U (92 protons and 146 neutrons). The number of neutrons in an atomic nucleus, while not significantly altering its chemistry, does alter its properties in nuclear reactions. As the number of protons is the same, isotopes are the same chemical element.
LEU	Low Enriched Uranium. Uranium enriched to less than 20% ^{235}U. Commonly, LEU used as fuel in light water reactors is enriched to between 3% and 5% ^{235}U.
Light water	H_2O. Standard water.
Light water reactor	An off-load refuelled 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 accountancy to mean the difference between operator records and the verified physical inventory. A large MUF may indicate diversion of material or loss of control, however, a certain level of MUF is expected due to measurement processes.
MWe	Megawatts of electrical power.
MWt	Megawatts of thermal power.
Natural uranium	In nature uranium consists predominantly of the isotope ^{238}U (approx. 99.3%), with the fissile isotope ^{235}U comprising only 0.711%.

NNWS	Non-nuclear-weapon state(s). States recognised by the NPT as having no 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).
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.
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.
^{239}Pu	An isotope of plutonium with atomic mass 239 (94 protons and 235 neutrons). The fissile isotope of plutonium most suitable for nuclear weapons.
R&D	Research and Development.
Reprocessing	Processing of spent fuel to separate uranium and plutonium from highly radioactive fission products.
ROK	Republic of Korea.
Safeguards Act	Nuclear Non-Proliferation (Safeguards) Act 1987.
Safeguards Inspector	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.
^{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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