This paper examines the legal framework within which implementing arrangements are made for controlling and accounting for nuclear material in Australia; arrangements which are matched in countries eligible to receive and use Australian uranium. It also explains Australia’s uranium export policy and how that material is accounted for in the international nuclear fuel cycle.

1. THE NUCLEAR NON-PROLIFERATION REGIME

Beginning in the early 1950s the international community has systematically established a set of measures to deter the spread of nuclear weapons. More commonly these measures are now known as the nuclear non-proliferation regime, which is global in reach. This regime comprises an integrated network of bilateral, regional and multilateral treaties and other standard-setting arrangements. Taken together, these measures provide a framework which sets out how governments should act to prevent nuclear proliferation. The nuclear non-proliferation regime continues to evolve, for it must: meet new threats, keep pace with emerging technologies and adapt to changing circumstances in the world, such as a renewed interest in nuclear energy as a counter to global warming.

The primary elements of the nuclear non-proliferation regime, developed over the last 50 years or so, are principally treaties and conventions that are legally binding on ratifying states in international law. The pre-eminent instrument is the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). Even though this treaty is not quite universal – out of 192 member states of the UN, only India, Israel and Pakistan are not NPT parties, and the DPRK purported to withdraw\(^1\) from the NPT in 2003 – it undoubtedly sets a norm for international behaviour.

Nonetheless, despite this almost universal adherence to the NPT, the NPT alone cannot prevent the spread of sensitive nuclear technology (SNT), know-how, or nuclear weapons.

In addition to the treaties and conventions (explained below), which are binding in international law, the nuclear non-proliferation regime includes other multilateral arrangements; for example, the Nuclear Suppliers Group (NSG), through which like-minded states have agreed to co-operate with the aim of ensuring civil nuclear trade does not contribute to nuclear weapons proliferation.

Other complementary measures are bilateral, such as Australia’s network of safeguards agreements which enable, inter alia, the sale of uranium for peaceful, non-military purposes.

Finally, since 2001, further supplementary measures have been added to the nuclear non-proliferation regime “toolkit”. These include UN Security Council resolutions – which specifically seek to prevent the proliferation of weapons of mass destruction, including nuclear weapons – and voluntary arrangements and co-operative mechanisms such as the Proliferation Security Initiative (PSI) where states agree to coordinate action, laws and controls within existing international legal frameworks.

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\(^1\) The NPT’s membership has not taken a position on the validity of the DPRK’s announced withdrawal.
2. THE “TREATY ARCHITECTURE” OF THE NUCLEAR NON-PROLIFERATION REGIME

2.1 Treaty on the Non-Proliferation of Nuclear Weapons

The NPT is the centrepiece of the non-proliferation regime. Under that treaty, non-nuclear weapon states, such as Australia, have foresworn nuclear weapons and have accepted comprehensive nuclear safeguards to verify compliance with this commitment in exchange for undertakings on facilitating access to nuclear energy for peaceful purposes. The fundamental objective of all safeguards measures is to ensure that nuclear energy is not diverted for use in the production of nuclear weapons or other nuclear explosive devices.

Under Art II of the NPT, non-nuclear weapon states take on the following commitments. They are obliged:

“not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices directly or indirectly; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices.”

Further, under Art III, they are obliged to:

“accept safeguards, as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statute of the International Atomic Energy Agency and the Agency’s safeguards system, for the exclusive purpose of verification of the fulfilment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices.”

Australia, as a non-nuclear weapon State Party to the NPT, has undertaken pursuant to Art III(1) to accept safeguards. These are set out in the Agreement between Australia and the International Atomic Energy Agency for the Application of Safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons, enshrined in Australian law through the Nuclear Non-Proliferation (Safeguards) Act 1987. Australia has agreed to accept safeguards on "all source or special fissionable material’ in all peaceful nuclear activities within its territory, under its jurisdiction or carried out under its control anywhere, for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices.

Article III(2) of the NPT provides:

“Each State Party to the Treaty undertakes not to provide: (a) source or special fissionable material, or (b) equipment or material especially designed or prepared for the processing, use or production of special fissionable material, to any non-nuclear weapon State for

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2 The NPT designates the following states to be Nuclear Weapon States (NWS): China, France, the UK, the USA and the Russian Federation.

3 As set out in the IAEA Statute Arts XX.1 and 3, [1] “The term 'special fissionable material’ means plutonium-239; uranium-233; uranium enriched in the isotopes 235 or 233; any material containing one or more of the foregoing; and such other fissionable material as the Board of Governors shall from time to time determine; but the term 'special fissionable material’ does not include source material. [3] The term ‘source material’ means uranium containing the mixture of isotopes occurring in nature; uranium depleted in the isotope 235; thorium; any of the foregoing in the form of metal; alloy, chemical compound, or concentrate; any other material containing one or more of the foregoing in such concentrations as the Board of Governors shall from time to time determine; and such other material as the Board fo Governors shall from time to time determine.”
peaceful purposes, unless the source or special fissionable material shall be subject to the safeguards required by this Article.”

Under its Safeguards Agreement with the International Atomic Energy Agency (IAEA), Australia is required inter alia to report what nuclear materials it holds and its location; and to accept visits by IAEA auditors and inspectors to independently verify Australia’s material reports and physically inspect the nuclear materials concerned to confirm physical inventories of them.

In order to strengthen the safeguards system, the IAEA Board of Governors approved, in 1997, a Model Additional Protocol (AP) with a view to strengthening measures for use by the IAEA when verifying states’ compliance with their commitment not to produce nuclear weapons. Australia was the first state to conclude an AP with the IAEA, in December 1997. The new measures provide increased access for inspectors, both to information about current and planned nuclear programs and to more locations on the ground. Australia has also concluded a number of bilateral agreements on peaceful nuclear co-operation with other States for the purpose of facilitating the transfer of nuclear material and technology. These agreements provide for the application of IAEA safeguards to any transferred nuclear material.

2.2 Physical Protection of Nuclear Material

It is essential that States follow international best practice in trying to limit threats directed at nuclear material and/or facilities. Australia is a party to the Convention on the Physical Protection of Nuclear Material (CPPNM). While the CPPNM focuses primarily on nuclear material being shipped in international commerce, it also contains other important requirements related to domestic security measures. As a party to the CPPNM, Australia is obliged to make the following legal provisions:

- to make certain physical protection arrangements and ensure specific defined levels of physical protection for international shipments of nuclear material;
- to co-operate in the recovery and subsequent protection of stolen nuclear material;
- to make specific acts (for example, theft of nuclear materials and threats or attempts to use nuclear material to harm the public) punishable offences under Australian law; and
- to prosecute or extradite those accused of committing such acts.

Australia must give consideration, also, to non-binding but authoritative recommendations developed by the IAEA on the Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC 225, now at Revision 4) which provide much greater technical detail than the general requirements set out in the CPPNM.

In July 2005, a Diplomatic Conference agreed amendments to strengthen the Physical Protection Convention. Key amongst these were to: explicitly include domestic use, storage and transport;

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4 Australia’s Bilateral Safeguards Agreements: Republic of Korea (1979); United Kingdom (1979); Finland (1980); United States (1981); Canada (1981); Sweden (1981); France (1981); Euratom (1982) (covering all member states of the European Union); Philippines (1982); Japan (1982); Switzerland (1988); Egypt (1989); Russia (1990); Mexico (1992); New Zealand (2000); United States (covering co-operation on Silex technology) (2000); Czech Republic (2002); United States (covering supply to Taiwan, China) (2002); Hungary (2002); Argentina (2005); China (2007). This list is updated and recorded in ASNO’s Annual Report (www.asno.dfat.gov.au/annual_reports).
introduce an offence of sabotage; and to require States Parties to establish robust and comprehensive domestic security regimes for nuclear material and nuclear facilities.\(^5\)

### 2.3 Transport of Nuclear Material

In addition to the CPPNM provisions providing for physical protection for international shipments of nuclear material referred to above, the transport of radioactive material is regulated by various more specific international instruments, which give legal force to the IAEA Regulations for the Safe Transport of Radioactive Material (the IAEA Transport Regulations).

- For air transport, legal force is given to the IAEA transport Regulations through their inclusion in a Technical Annex to the *Convention on International Civil Aviation (Chicago Convention)*.
- For maritime transport, the *International Maritime Dangerous Goods Code*, which implements the provisions of the IAEA Transport Regulations, has been made mandatory through incorporation into the text of Ch VII of the *International Convention for the Safety of Life at Sea* (the SOLAS Convention).

The IAEA Transport Regulations address all categories of radioactive material, ranging from very low activity material, such as ores and ore concentrates, to very high activity material, such as spent fuel and high level waste. They establish requirements with regard to the marking, labelling and placarding of conveyances, documentation, external radiation limits, operational controls, quality assurance, notification and the approval of certain shipments and package types.

In addition to the CPPNM – under which Australia has an obligation not to undertake, or authorise undertaking, such international nuclear transport unless assurances are provided that nuclear material will be protected at the levels required by the Convention – a number of other international instruments also address the transport of nuclear material.

Articles 22 and 23 of the *United Nations Convention on the Law of the Sea* prescribe certain conditions for the carriage of “nuclear substances” through sea lanes or territorial seas.

The *Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation* (SUA Convention), as amended by the 2005 SUA Protocol, allows for the transfer of nuclear material where the transfer is consistent with a state’s obligations under the NPT. The 2005 SUA Protocol introduced two new offences which relate specifically to the transfer of nuclear material in a manner inconsistent with the NPT:

- the transportation offence – Art 3bis(1)(b)(iii) – makes it an offence unlawfully and intentionally to transport on board a ship any source material, special fissionable material, or equipment or material especially designed or prepared for the processing, use or production of special fissionable material, knowing that it is intended to be used in a nuclear explosive activity or in any other nuclear activity not under safeguards;\(^6\)
- the dual use offence – under Art 3bis(1)(iv) – makes it an offence unlawfully and intentionally to transport on board a ship any equipment, materials or software or related technology that significantly contributes to the design, manufacture or delivery of a biological, chemical or nuclear (BCN) weapon, with the intention that it will be used for such purpose.

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\(^5\) The amendments to the CPPNM were done at Vienna on 8 July 2005. For Australia they have been brought into force through the *Non-Proliferation Legislation Amendment Act 2007*.

\(^6\) Article 3b is also contains exceptions to these general offences – see Art 2(a) and 2(b).
2.4 Regional Instruments

The South Pacific Nuclear Free Zone (Rarotonga Treaty) prohibits the manufacture, production, acquisition, stationing and testing of nuclear explosive devices, and R & D relating to manufacture or production of nuclear explosive devices in the area covered by the treaty7.

2.5 Radioactive Waste Management and the Transboundary Movement of Radioactive Waste

Transboundary movement and the import or export of hazardous wastes in general, and radioactive waste in particular, has received great attention from the international community in recent years, giving rise to several legal instruments.

One such agreement which is relevant to Australia is the 2001 Waigani Convention (Convention to Ban the Importation into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes within the South Pacific Region). The Waigani convention prohibits the importation of all radioactive wastes into Pacific Island Developing Parties. Under the Waigani Convention, Australia is obliged to ban the export of radioactive wastes to all Forum Island Countries. That obligation has been implemented in Australian domestic law by way of reg 13G of the Customs (Prohibited Exports) Regulations 1958.

Also relevant in consideration of the transboundary movement of radioactive waste is the IAEA Code of practice on the International Transboundary Movement of Radioactive Waste, which was adopted by consensus at the IAEA General Conference in 1990. The code recognises the sovereign right of every state to prohibit the movement of radioactive waste into, from or through its territory. The code calls on states to ensure that transboundary movements are undertaken in a manner consistent with international safety standards, and only take place with the prior notification and consent of the sending, receiving and transit states in accordance with their respective laws and regulations.

The first binding legal instrument to address directly radioactive waste management on a global scale was the 1997 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (the ‘Joint Convention’, which entered into force in June 2001). The Joint Convention establishes an international legal framework for the harmonisation of national waste management practices and standards. The obligations imposed by the Joint Convention with respect to spent fuel and radioactive waste management include an obligation to establish and maintain a legislative and regulatory framework to govern the safety of spent fuel and radioactive waste management. Further, the Joint Convention creates an obligation to ensure that individuals, society and the environment are adequately protected against radiological and other hazards, inter alia, by appropriate siting, design and construction of facilities and by making provisions for ensuring the safety of facilities both during their operation and after their closure.

The Joint Convention also imposes obligations on Contracting Parties in relation to the transboundary movement of spent fuel and radioactive waste, mainly based on the concepts contained in the IAEA Code of Practice. As a party to the Joint Convention, Australia has the right to ban the import of foreign radioactive waste into its territory, but retains the right to export radioactive waste which it may generate. It follows that with respect to any transboundary movement of spent fuel and radioactive waste, Australia would be obliged to ensure that individuals, society and the environment are adequately protected from the potential hazards.

7 The treaty entered into force generally on 8 February 1987 and for Australia on 22 October 1987.
associated with such movement. Further, Australia would be under an obligation to obtain prior notification and consent from the receiving state for all radioactive waste shipments. The transboundary movement of such material through States of transit is subject to the international obligations relevant for the particular mode of transport utilised.

2.6 Emergency Preparedness/Response

The Convention on Nuclear Safety imposes certain obligations with regard to transboundary emergency planning. As a party to the Convention, Australia is obliged to take appropriate steps to ensure that it has in place on-site and off-site emergency plans that cover the actions to be taken in the event of an emergency. The plans need to be tested before the nuclear installation goes into operation and subsequently be subjected to tests on a routine basis. However, the Convention only applies to the operation of nuclear power reactors and therefore imposes no practical obligations on Australia at present.

The Convention on Early Notification of a Nuclear Accident (the Early Notification Convention) and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (the Assistance Convention) cover situations in which an accident involving activities or facilities in one State has resulted or may result in a transboundary release that could be of radiological safety significance for other States.

The Early Notification Convention requires State Parties, in the event of, inter alia, an accident at a nuclear reactor, nuclear fuel cycle facility, or radioactive waste management facility, to notify those States which may be physically affected by the accident. Parties are obliged to provide exact information in order to facilitate the organisation of countermeasures.

The Assistance Convention is a framework agreement designed to establish a general basis for mutual assistance in the event of a nuclear accident or radiological emergency. Under the Convention, States Parties are required to co-operate among themselves and with the IAEA to facilitate prompt assistance in the event of a nuclear accident or radiological emergency to minimise its consequences and to protect life, property and the environment from the effects of radiological release.

2.7 Combating Nuclear Terrorism

Australia is also a signatory to the International Convention for the Suppression of Acts of Nuclear Terrorism (the Nuclear Terrorism Convention), and is working towards becoming a party. The Nuclear Terrorism Convention is aimed at strengthening the international legal framework to combat terrorism. Under the Convention, Australia will be obliged to criminalise the unlawful possession or use of radioactive material, or the possession, making or use of a nuclear device, to cause death or serious bodily injury, or substantial damage to property or the environment. This Convention will provide a legal basis for international co-operation in the prevention, investigation, prosecution, and extradition of those who commit terrorist acts involving radioactive material or a nuclear device. Once it has ratified this Convention, Australia will be required to take control of radioactive material, devices or nuclear facilities, following commission of an offence, to take steps to render harmless the radioactive material, device or nuclear facility, and to ensure that any nuclear material is held in accordance with applicable IAEA safeguards and physical protection standards.
3. IMPLEMENTING LEGISLATION IN AUSTRALIA

3.1 Nuclear Non-Proliferation (Safeguards) Act 1987

The Nuclear Non-Proliferation (Safeguards) Act 1987 (Safeguards Act) forms the legislative basis for nuclear safeguards activities by the Australian Safeguards and Non-Proliferation Office (ASNO) and came into force on 31 March 1987. The Safeguards Act gives effect to Australia’s safeguards obligations under:

- the NPT;
- Australia’s NPT safeguards agreement and AP with the IAEA;
- agreements between Australia and various countries (and Euratom) concerning transfers of nuclear items, and co-operation in peaceful uses of nuclear energy; and
- the Convention on the Physical Protection of Nuclear Material (CPPNM).

Control over nuclear material and associated items in Australia is exercised under the Safeguards Act by a system of permits for their possession and transport. Communication of information contained in sensitive nuclear technology is controlled through the grant of authorities.

The Safeguards Act establishes a statutory office of Director of Safeguards which, since 2004 has been formally known as the Director General, Australian Safeguards and Non-Proliferation Office. The Director General’s functions include ensuring the effective operation of Australia’s safeguards system, and of Australia’s system of bilateral safeguards agreements.

The Safeguards Act empowers the Minister to grant, vary or revoke permits or authorities, to make declarations or orders in relation to material, equipment or technology covered by the Act, and to appoint inspectors to assess compliance with the Act and with Australia’s NPT safeguards agreement with the IAEA. The Minister has delegated most of these powers (with certain exceptions such as granting of permits to uranium mines and for nuclear activities) to the Director General ASNO.

3.2 Non-Proliferation Legislation Amendment Act 2003

The Non-Proliferation Legislation Amendment Act 2003 (NPLA Act 2003) received Royal Assent on 12 December 2003. It amended the Safeguards Act to strengthen arrangements for the protection of, and application of non-proliferation safeguards to, nuclear material, facilities and associated information. Specifically, the Act:

- broadened the class of material which may be declared as associated material, to ensure effective controls on the full range of materials which are specially suited for use in nuclear fuel cycle activities or prohibited activities such as the production of nuclear weapons;
- introduced a permit requirement for the establishment of any new nuclear or related facility in Australia. This will ensure that non-proliferation safeguards measures can be fully integrated into the design of any new facility;
- introduced offences for conduct which breaches procedures set as a permit condition and intended to protect proliferation sensitive information, and for unauthorised communication of information which could prejudice the physical security of nuclear material;
- provided that a permit under the Safeguards Act may prescribe an area to which the permit holder must restrict access. A new offence is introduced for unauthorised entry to such an area; and
updated penalty provisions in the Safeguards Act to bring the level of fines into line with current legislative practice.

### 3.3 Non-Proliferation Legislation Amendment Act 2007

The purpose of this Act, which passed through the Australian Parliament in March 2007, is to amend the Safeguards Act, the *Comprehensive Nuclear Test-Ban Treaty Act 1998* (CTBT Act), and the *Chemical Weapons (Prohibition) Act 1994* (CWP Act) to:

- implement amendments to the Convention on the Physical Protection of Nuclear Material (CPPNM, otherwise known as the Physical Protection Convention);
- provide a framework for the application of non-proliferation safeguards to a nuclear facility that has been shut down;
- review penalties for serious offences in the Safeguards Act; and
- extend the geographical jurisdiction for non-proliferation offences in the abovementioned legislation.

In implementing the Physical Protection Convention, Australia has always taken a broad view of its obligation under the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) to protect nuclear material and nuclear facilities from proliferation, theft or sabotage. As such, many of the provisions of the amended Convention apply already in Australia – through the Safeguards Act.

This Act implements the 2005 amended CPPNM and, for Australia, brings them into force ahead of their general entry-into-force although, at the time of writing, Australia is yet to submit its instrument of ratification to the IAEA.

### 3.4 South Pacific Nuclear Free Zone Treaty Act 1986

The *South Pacific Nuclear Free Zone Treaty Act 1986* (the SPNFZ Act) implements the provisions of the South Pacific Nuclear Free Zone (Rarotonga Treaty) to which Australia is a party.

The SPNFZ Act establishes the framework for inspections in Australia by Treaty inspectors, and provides for appointment by the Minister for Foreign Affairs of authorised officers to accompany and observe international inspectors while they are in Australia. Inspectors appointed for the purposes of the Safeguards Act are also inspectors under the SPNFZ Act. These inspectors are to assist Treaty inspectors and authorised officers in carrying out Treaty inspections, and investigating possible breaches of the SPNFZ legislation in Australia.

### 3.5 Australian Nuclear Science and Technology Organisation (ANSTO) Act 1987

Section 5(2) of the ANSTO Act prohibits ANSTO from undertaking research or development into the design or production of nuclear weapons or other nuclear explosive devices.

### 4. EXPORT/IMPORT CONTROLS: COMPLEMENTARY MEASURES

The international arms control and non-proliferation conventions have provisions that commit members to guard against transfers of materials that could be diverted to WMD programs. But these provisions are not always backed up by well-defined mechanisms for controlling transfers of relevant goods, technology and knowledge. For example, the BWC does not provide guidance on what materials and technologies pose a proliferation risk and should therefore be subject to scrutiny.

The need to develop a common understanding of convention requirements, coupled with sophisticated procurement efforts by proliferationists, has prompted Australia and other like-minded
countries to seek to harmonise their national-level controls to reduce the opportunities for proliferation.

4.1 International Arrangements

There are five export control regimes – the Zangger Committee, the Nuclear Suppliers Group (NSG), the Australia Group (AG), the Missile Technology Control Regime (MTCR), and the Wassenaar Arrangement (WA) – though only the first two are immediately relevant to this paper. Membership of these regimes has increased significantly in recent years; also, NSG participating governments have become generally more transparent about their export arrangements and engaged in outreach with non-members. Other countries have harmonised their export control systems with these regimes. At the time of writing, the US is seeking an exception by NSG participating governments to allow nuclear trade with India for its peaceful nuclear program under IAEA safeguards.

4.1.1 Zangger

The Zangger Committee comprises major nuclear suppliers that have developed a common approach to implementing the NPT and supplying nuclear material to states outside of the NPT based on certain safeguards and assurances. The Committee was formed in 1971 and comprises 35 member states.

4.1.2 Nuclear Suppliers Group

The NSG, formed in 1974 and now comprising 45 states, aims to prevent civilian nuclear trade from contributing to nuclear weapons programs in non-nuclear weapons states. NSG guidelines deal with the transfer of nuclear-related items to all non-nuclear weapons states regardless of their NPT status. The NSG includes all the major suppliers of nuclear technology.

NSG guidelines, first published in 1978, require recipient governments to provide assurances that transferred items will not be diverted to unsafeguarded nuclear facilities or nuclear explosive activities. The guidelines set out re-transfer provisions and requirements for the physical protection of nuclear material and facilities. They require particular restraint with respect to trade in facilities, technology or equipment that may be used for uranium enrichment or plutonium reprocessing.

In 1992, the NSG established additional guidelines for transfers of nuclear equipment, material and technology with both civil and military applications. This was prompted by concern about Iraq's clandestine nuclear weapons program, which involved the acquisition of dual-use items not covered by export controls then in place. The NSG also amended its guidelines to require non-nuclear weapons states to accept the application of IAEA safeguards on all their current and future nuclear activities as a condition of nuclear supply.

Australia is an active participant in international dialogue on sensitive nuclear technology issues. In the NSG, Australia is working for adoption of agreed criteria, including strict non-proliferation measures which recipient states would need to meet before any supplier would transfer sensitive nuclear technology. Australia supports NSG endorsement of the IAEA AP as a condition of nuclear supply.
4.2 Implementing Legislation in Australia

4.2.1 Customs Act 1901

Australia’s national export control system extends to items applicable for use in a military program, including WMD, or that may be used to further the ambitions of terrorist groups. The legal instrument for controlling the export of such items is through reg 13E of the Customs (Prohibited Exports) Regulations of the Customs Act 1901. Regulation 13E states that any item contained within Australia’s control list, the Defence and Strategic Goods List (DSGL) requires authorisation prior to export. The DSGL includes a range of defence and dual-use goods applicable for use in a military or WMD program, such as: materials, equipment, assemblies, software, technologies and associated test, inspection and production equipment. Specifically, reg 13E and the DSGL apply to Zangger and NSG control lists.

4.2.2 Weapons of Mass Destruction (Prevention of Proliferation) Act 1995

It is not possible to identify and describe for regulatory purposes all goods and services which could contribute to a WMD program. To address this situation, the Government has passed the Weapons of Mass Destruction (Prevention of Proliferation) Act 1995 (WMD Act). With its associated Regulations, the WMD Act enables the Government to control the export or transfer of any goods and services that could assist a WMD program. The WMD Act covers items not listed in the DSGL. The final decision as to whether an export or “other service” would assist a WMD program rests with the Minister for Defence.

The WMD Act defines a WMD program as a “plan or program for the development, production, acquisition or stockpiling of nuclear, biological, or chemical weapons or missiles capable of delivering such weapons”. The WMD Act applies to:

- the supply of goods or services both within and outside Australia for a WMD program;
- the export of goods and technologies which are not controlled under other legislation and where it is known or suspected that the goods may be used in a WMD program;
- the provision of goods and services within and external to Australia, where it is known or suspected that they will or may potentially assist a WMD program.

5. NON-PROLIFERATION MEASURES

5.1 UN Security Council

Australia holds the view that the UN Security Council should take a strong and active role on WMD issues. In discussion on Security Council reform, a consideration for Australia in assessing the credentials of prospective new Security Council members is their willingness to support a strong Security Council stance on non-proliferation.

UN Security Council Resolution (UNSCR) 1540 (April 2004) adopted under Ch 7 of the UN Charter requires all members to criminalise the proliferation of WMD, enact strict export controls and secure sensitive materials. The resolution was designed to address a gap in the global non-proliferation architecture and shortcomings in national legislation, especially in relation to the proliferation of WMD to non-state actors.

The resolution identified the key elements of effective export controls and provided a legal basis to address brokering, transit, transhipment and re-export. It required, as a matter of international law, states to put in place relevant domestic laws to develop enforcement capacity at the state level to police exports and transfers of sensitive items. It underlined that states should work with and
inform industry about its obligations under such laws. Prompted by Resolution 1540, many
governments have been working together closely to strengthen WMD-related export control
degrees.

In response to North Korea's missile test in July 2006, UNSCR 1695 (July 2006) banned states
from selling material or technology for missiles or WMD to North Korea, and from receiving
missiles, banned weapons or technology from North Korea. UNSCR 1718 (October 2006)
unified targeted sanctions on North Korea following that country's nuclear test on 9 October,
including preventing the transfer of nuclear technology, military equipment, and luxury goods to
North Korea.

UNSCR 1696 (July 2006) demanded that Iran stop its uranium enrichment program. UNSCRs
1737 (December 2006) and 1747 (March 2007) targeted sanctions on Iran for failing to stop its
uranium enrichment program, including banning the supply of nuclear-related technology and
materials and freezing the assets of key individuals and companies related to the enrichment
program. Within these resolutions there is a carve-out to allow Russia to complete the supply of
Bushehr nuclear power plant to Iran.

5.2 Proliferation Security Initiative

The Proliferation Security Initiative (PSI) is a practical measure to close gaps in multilateral non-
proliferation regimes. The initiative operates as an informal arrangement between countries
sharing non-proliferation goals to co-operate with each other, as necessary, to disrupt WMD-
related trade. It aims to capture WMD-related transfers between states of proliferation concern, or
to non-state actors, that breach international non-proliferation norms or are beyond the reach of
export control regimes.

Over 80 countries participate in the PSI. They have agreed to take steps, either alone or with
others, to impede the transfer or transport of WMD, their delivery systems, and related material.
Participating states operate within the rule of international law and within participants' domestic
laws.

The PSI is consistent with international and national law. The PSI Statement of Interdiction
Principles makes it clear in Principle 4 that PSI supporters will:

“Take actions in support of interdiction efforts regarding cargoes of WMD, their delivery
systems, or related materials, to the extent that their national legal authorities permit and
consistent with their obligations under international law frameworks.”

So, any interdiction, whether on the high seas or within a national jurisdiction, is required only to
take place where there is a legal basis to do so.

The PSI is consistent with the United Nations Convention on the Law of the Sea (UNCLOS).
Under that Convention each country exercises sovereignty over its territorial sea and has the right,
subject to the right of vessels to innocent passage, to undertake interdiction activity in that
territorial sea (Art 25). Also, a country has the right to undertake interdiction activity in relation to
vessels flying its flag on the high seas (Arts 92 and 94). Other states may only be involved with the
consent of the flag-state.

It is clear from UNCLOS provisions that while freedom of navigation exists on the high seas and
within the exclusive economic zones (EEZ) of states, this is not without limits. International law
provides for a number of circumstances where a coastal state may intercept a vessel within its
contiguous zone (from 12 to 24 nautical miles) or EEZ (from 12 to 200 nautical miles) for
infringements of its regulations in those zones. A state is entitled, also, to provide for the regulation and protection of facilities (such as oil installations) on its seabed (for example, the creation of 500 metres exclusion zone around such installations).

International law permits states to carry out a range of regulatory and enforcement actions in relation to the movement of illegal cargoes through their maritime jurisdiction zones. There are a number of circumstances where a vessel may be intercepted on the high seas. This includes the “right of visit” where a vessel is stateless or where it is engaged in flag-state deception (Art 110 of UNCLOS). States can seek, also, flag state consent to board a vessel on the high seas which they suspect may be engaged in shipping WMD-related materials.

Moreover, there already exists a large body of authority for undertaking interdictions, such as those involving coastal states in their territorial waters, contiguous zone, or exclusive economic zone. For example, the PSI interdiction of the BBC China was conducted (2005) entirely within existing international law. There is authority under international law for states to take actions with respect to their land and air space.

Finally, it is worth noting that expressions of support for the PSI do not create any obligations to act. The Statement of Interdiction Principles is not a treaty. Rather, it is a guideline on how to conduct the types of action envisaged under the PSI. Any decision to act is purely a voluntary national decision. The PSI does not of itself create any authority to conduct operations. The PSI operates according to law; it does not make law.

6. AUSTRALIAN URANIUM EXPORTS

6.1 Policy

After Australia ratified the NPT in 1973, the Government conducted an inquiry into uranium mining and milling. This was the Ranger Uranium Environmental Inquiry (RUEI), also known as the Fox report, 1975-1977. While primarily focussing on environmental issues, these reports also covered regulatory aspects of safeguards.

In 19778 Australia determined it would only supply uranium to non-nuclear weapon states (NNWS) which were party to the NPT. While this policy did not state that nuclear weapon states (NWS) had to be parties to the NPT, it did specify that exports to NWS would require assurance of peaceful use and Australian uranium would be covered by IAEA safeguards. Australia supplied uranium to France (a NWS) for use in its civil nuclear fuel cycle prior to France signing the NPT because France was willing to act as if it were a party to the NPT.

This Australian approach has been reviewed since 1977. ASTEC reported in May 1984 it was satisfied "overall that [Australia’s bilateral] agreements meet the policy requirements and that those requirements are sufficiently comprehensive to provide as much control as can be realistically expected. Australian uranium and nuclear material derived from it are therefore adequately accounted for and that Australia has the best possible guarantees that such material is being used solely within the civil nuclear programs of Australian customer countries".

On safeguards, ASNO has four main areas of responsibility:

- application of safeguards within Australia;
- ensuring the physical protection and security of nuclear items in Australia;

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• operation of Australia’s bilateral safeguards agreements; and
• contribution to the operation and development of international (IAEA) safeguards and the strengthening of the international nuclear non-proliferation regime.

IAEA safeguards are a key element in international action against the spread of nuclear weapons. Effective IAEA safeguards are of vital interest to Australia because of their contribution to global and regional peace and security. They are important, also, because they underpin Australia’s stringent uranium export policies.

6.2 Australian Obligated Nuclear Material (AONM)

A characteristic of the civil nuclear fuel cycle is the international interdependence of facility operators and power utilities. Apart from states possessing nuclear weapons, it is unusual for a country to be entirely self-contained in the processing of uranium for civil use—and even in the case of the nuclear-weapon states, power utilities will seek the most favourable financial terms, often going to processors in other countries. Thus it is not 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 UK. The international flow of nuclear material enhances safeguards accountability, through ‘transit matching’ of transfers at the different stages of the fuel cycle.

The international nature of nuclear material flows means that uranium from many sources is routinely mixed during processes such as conversion and enrichment. Uranium is termed a “fungible” commodity, that is, at these processing stages uranium from any source is identical to uranium from any other – it is not possible physically to differentiate the origin of the uranium. This characteristic is not unique to uranium, but is also the case with a number of other commodities. The fungibility of uranium has led to the establishment of conventions used universally in the industry and in the application of safeguards, namely equivalence and proportionality. These are discussed below.

Because of the impossibility of physically identifying “Australian atoms”, and also because Australian obligations apply not just to uranium as it moves through the different stages of the nuclear fuel cycle, but also to material generated through the use of that uranium, eg, plutonium produced through the irradiation of uranium fuel in a reactor, the obligations under Australia’s various bilateral safeguards agreements are applied to Australian Obligated Nuclear Material (AONM). “AONM” is a shorthand way of describing the nuclear material which is subject to the provisions of the bilateral agreements.

This approach is also used by those other countries applying bilateral safeguards comparable to Australia’s, principally the US and Canada. These countries attach a safeguards “obligation” to nuclear material which they upgrade (process, enrich, fabricate), hence giving rise to the situation of “multi-labelling”. For example, AONM enriched in the US will also become US obligated nuclear material (USONM), and its subsequent use will have to meet the requirements of both Australian and US agreements. This is a common situation, that is, a significant proportion of AONM is also characterised as USONM and is accounted for both to ASNO and its US counterpart (the US Department of Energy – US DOE).

The equivalence and proportionality principle – a longstanding mechanism (since the early 1970s) for managing flows of nuclear material in the international fuel cycle – provides that where AONM loses its separate identity because of process characteristics (eg mixing), an equivalent quantity is designated AONM, based on the fact that atoms or molecules of the same substance are indistinguishable, any one atom or molecule being identical to any other of the same substance. In
such circumstances, equivalent quantities of the products of such nuclear material may be derived by calculation or from operating plant parameters. It should be noted that the principle of equivalence does not permit substitution by a lower quality material, eg enriched uranium cannot be replaced by natural or depleted uranium.

The proportionality principle provides that where AONM is mixed with other nuclear material, and is processed or irradiated, a proportion of the resulting material will be regarded as AONM corresponding to the same proportion as was AONM initially.

Some people are concerned that the operation of the equivalence principle means there cannot be assurance that “Australian atoms” do not enter military programs. This overlooks the realities of the situation, that uranium atoms are indistinguishable from one another and there is no practical way of attaching “flags” to atoms. The objective of Australia’s bilateral agreements is to ensure that AONM in no way materially contributes to or enhances any military purpose. Even if AONM were to be in a processing stream with nuclear material subsequently withdrawn for military use, the presence of the AONM would add nothing to the quantity or quality of the military material.

6.3 Safeguards on Australian Uranium Exports

Since 1977, a fundamental tenet of the Government’s uranium policy is that exports are permitted only under stringent safeguards. Uranium exports are made only to selected countries and are covered by a bilateral safeguards agreement. Bilateral safeguards are concluded between the supplier and the recipient of nuclear items, and serve as a mechanism for applying conditions additional to IAEA safeguards: for example, restrictions on retransfers, high enrichment and reprocessing. The safeguards requirements Australia applies to uranium exports are bilateral; they are elaborated in a series of treaty-level agreements with each country involved. These requirements are outlined below.

The key point is that Australia’s safeguards requirements are superimposed on IAEA safeguards. IAEA safeguards provide the basic assurance that nuclear material is not being diverted from peaceful to non-peaceful purposes.

It should be noted that IAEA safeguards are generally not concerned with origin attribution, that is, the “flag” and conditions attached by suppliers (for the IAEA there are limited exceptions, eg under certain non-NPT safeguards agreements). This is the purpose of bilateral safeguards agreements.

6.4 Australia’s Safeguards Conditions

The application of Australia’s requirements starts with a careful selection of those countries eligible to receive AONM. It is generally a minimum requirement that, in the case of NNWS, countries must meet the NPT full scope safeguards standard, that is, IAEA safeguards must apply to all existing and future nuclear activities. Since 2005, for supply to NNWS, the IAEA safeguards AP has been added as a pre-requisite. In August 2007, the Government announced its intention to make an exception in the special case of India, which has not signed the NPT. The Government has announced it would be prepared to allow the export of Australian uranium to

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9 Most of those NWS eligible for the supply of Australian uranium have announced a moratorium on production of fissile material for nuclear weapons. While China has not announced a moratorium on production of fissile material for nuclear weapons it is widely believed not to be producing fissile material for this purpose.
India subject to a number of strict conditions being met. These conditions include conclusion of a safeguards agreement between India and the IAEA covering all India’s designated civil nuclear facilities, and conclusion of an Australia-India bilateral safeguards agreements providing assurances that Australian uranium would remain in peaceful uses at all times. India has not proliferated nuclear materials or technology to others. Further, India has agreed to separate its civil and military nuclear fuel cycles and place the civil cycle under IAEA safeguards in perpetuity. At the time of writing India is negotiating a safeguards agreement with the IAEA.

In the case of nuclear-weapon states, there must be a treaty level assurance that AONM will be used only for peaceful purposes, and arrangements must be in place under which AONM is covered by IAEA safeguards.

A basic requirement is the conclusion of a bilateral safeguards agreement between Australia and the country concerned, setting out the various conditions which apply to AONM. The primary requirement or condition is that AONM is used only for peaceful purposes in accordance with the applicable agreements; or, put another way, that AONM in no way enhances or contributes to any military process.

The principal conditions for the use of AONM set out in Australia’s bilateral safeguards agreements are summarised as follows:

- an undertaking that AONM will be used only for peaceful purposes and will not be diverted to military or explosive purposes, and that IAEA safeguards will apply;
- none of the following actions can take place without Australia’s prior consent:
  - transfers to third parties;
  - enrichment to 20% or more in the isotope uranium-235;
  - reprocessing;\(^{11}\)
- provision for fallback safeguards or contingency arrangements in case NPT or IAEA safeguards cease to apply in the country concerned;
- an assurance that internationally agreed standards of physical security will be applied to nuclear material in the country concerned;
- detailed ‘administrative arrangements’ between ASNO and its counterpart organisation, setting out the procedures to apply in accounting for AONM;
- regular consultations on the operation of the agreement; and
- provision for the removal of AONM in the event of a breach of the agreement.

### 6.5 Nuclear Material Accountancy Regime

#### 6.5.1 Establishment of State System of Accounting and Control of Nuclear Material

Australia has a safeguards agreement with the IAEA in accordance with IAEA document INFCIRC/153 (Corrected) which requires Australia to “…establish and maintain a system of accounting for and control of all nuclear material subject to safeguards under the Agreement…”\(^{12}\). This system is known as the SSAC, State System of Accounting and Control of Nuclear Material.

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11 Consent has been given in advance to reprocessing on a programmatic basis in the case of five Agreements: Euratom, France, Japan, Sweden and Switzerland.
12 INFCIRC/153 (Corrected), para 7.
In Australia, the *Nuclear Non-Proliferation (Safeguards) Act 1987* implements this specific obligation (SSAC) through the Australian Safeguards and Non-Proliferation Office (ASNO).

Since Australia exports uranium (AONM) only to NPT parties which have in force a safeguards agreement with the IAEA – and in the case of NNWS, also, an AP – each recipient of AONM will have equivalent state arrangements operating.

The SSAC has two primary objectives, covering domestic and international obligations:

**Domestic objectives**

To account for and control nuclear material in the State and to contribute to the detection of possible losses, or unauthorised use or removal of nuclear material, and

**International objectives**

To provide the essential basis for the application of IAEA safeguards pursuant to the provisions of an Agreement between the State and the IAEA.

Each State decides if it wishes to combine these functions into a single organisation, as has been done in Australia.

### 6.5.2 Operation of SSAC

First of all the State must give legal authority to and establish the SSAC for: accounting and control; compliance; enforcement; reporting national data to the IAEA and other State authorities as necessary; and approving international transfers.

Specifically, the SSAC must have authority for:

1. establishing provisions governing the possession, transfer and use of nuclear material;
2. ensuring that the State’s nuclear material accounting and control objectives are met;
3. serving as the point of contact in implementing Safeguards Agreements concluded with the IAEA; and
4. developing, approving and implementing nuclear material accounting and control procedures as necessary to enable the State to discharge its obligations under IAEA Safeguards Agreements.

Further, the SSAC or another designated authority must ensure that physical protection measures appropriate for protection against theft, unauthorised use at facilities or in transit and against the sabotage of nuclear facilities are implemented.

The SSAC must be legally empowered to inspect facilities to ensure that they are operated in compliance with authorised conditions.

To underpin this activity the SSAC will, inter alia, establish a national information system which:

1. lists nuclear facilities and all locations holding nuclear material, with information on material accounting and control procedures;
2. records inventories of nuclear material;
3. records and manages transfers; and

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13 IAEA/SG/INF/2, para 2.1(b)
records inspection data and all operational information required for the evaluation
and review of accounting mechanism dealing with losses and “material unaccounted
for” (MUF).  

In conjunction with facility operators and other permittees, the SSAC will:

(a) receive reports of inventories and inventory changes of nuclear material, including
domestic and international receipts and shipments;
(b) maintain a record of all nuclear material (types, amounts, locations) and of
responsible individuals;
(c) process and evaluate information acquired during inspections and information
submitted by the facility operator(s);
(d) audit and evaluate facility records and reports, as necessary; and
(e) review loss mechanisms, shipper-receiver differences, MUF and measurement
uncertainties associates with MUF, as required.

The AP (1997) complements and extends comprehensive safeguards – in force since 1974. The
AP gives the IAEA wider inspection powers and greater access to information about a State’s
nuclear programs.

Adoption of the AP, or strengthened safeguards measures, in 1997 introduced additional
obligations, in particular for the SSAC. Once the AP has been implemented fully and the IAEA
has been able to make a satisfactory whole-of-state safeguards evaluation – a process that can take
several years – the IAEA is able to implement integrated safeguards in the State, which are

14 Material Unaccounted For, or MUF, is the difference between the records maintained by the operator
and the physical inventory verified by the IAEA. Since MUF is the difference between two measured
quantities, it may be equal to zero, or it may be either a positive or negative value. If MUF is positive it
does not necessarily indicate that material has been lost, nor does a negative figure mean that material
has somehow been created. In many cases MUF can be attributed to unavoidable measurement
differences; but where the size of the MUF is outside the expected range of variance further
investigations are undertaken to establish the cause of difference and, if necessary, identify and recover
material.

15 The IAEA Glossary defines the AP as follows:
1.15. Model Protocol Additional to the Agreement(s) between State(s) and the International Atomic
Energy Agency for the Application of Safeguards – the document [540], also known as the Model
Additional Protocol, providing for those measures for strengthening the effectiveness and improving
the efficiency of IAEA safeguards which could not be implemented under the legal authority of
safeguards agreements. It was approved by the IAEA Board of Governors in 1997. The IAEA uses
the Model Additional Protocol for negotiation and conclusion of additional protocols and other
legally binding agreements as follows:
(a) With States and other parties to comprehensive safeguards agreements, containing all of the
measures provided for in this document as the standard;
(b) With nuclear weapon States, incorporating those measures from this document that each such
State has identified as capable of contributing to the non-proliferation and efficiency aims of
the Model Additional Protocol when implemented with regard to that State, and as consistent
with that State’s obligations under Article I of the NPT;
(c) With other States that are prepared to accept measures provided for in this document in
pursuance of safeguards effectiveness and efficiency objectives.

The full text of the Model Protocol may be found at
designed as the optimal combination of comprehensive safeguards and AP measures. Integrated safeguards commenced in Australia in 2001.

In order to fully benefit from the new measures available to the IAEA in the strengthened and integrated safeguards system (under the AP) the SSAC must co-operate proactively with the IAEA. This means the SSAC must provide information in a timely fashion and enable access to resolve questions or inconsistencies that may arise from declarations, inspections, or analysis by the IAEA. Further, the SSAC must try to anticipate the types of information that may assist the IAEA in the application of safeguards, and supply that information to the Agency as soon as it becomes available. Enhanced co-operation with the IAEA is particularly important to ensure optimal operation of the safeguards system.

Strengthened safeguards bring new requirements for states in terms of information, access and co-operation. This includes showing full transparency to the Agency, particularly where there are issues of compliance or confidence building to be resolved.

One of the key measures available to the IAEA under the AP is “complementary access” (CA). CA covers access beyond what is normally allowed for inspection or design information verification purposes. When conducted in conjunction with an inspection at a nuclear site CA can be requested with as little as two hours notice or at other locations on 24 hours notice. Due to the short time frames envisaged for a CA, SSACs must have in place all of the necessary legal and technical arrangements to respond to any request by the IAEA for a CA.

6.5.3 Checking the records

In each country which uses, processes or stores AONM, ASNO is charged to ensure that the peaceful use commitments and other treaty commitments are met. The results of this work are presented in the ASNO annual report tabled in Parliament each year.

Australia’s bilateral partners holding AONM are required to maintain detailed records of transactions involving AONM, and ASNO’s counterpart organisations are required to submit regular reports, consent requests, transfer and receipt documentation to ASNO. The IAEA also receives reports covering the use and shipment of uranium in the international fuel cycle. ASNO accounts for AONM on the basis of information and knowledge from multiple sources (including the IAEA). This information covers, inter alia:

- reports from each bilateral partner;
- shipping and transfer documentation;
- calculations of process losses and nuclear consumption, and nuclear production;
- knowledge of the fuel cycle in each country;
- regular liaison with counterpart organisations and with industry; and
- reconciliation of any discrepancies with counterparts.

7. CONCLUSION

NPT obligations and requirements are implemented through the IAEA and its safeguards regime, supplemented by a series of complementary measures, some binding in law while other measures are voluntarily subscribed to by like-minded nations.

In support of its NPT obligations to prevent the proliferation of nuclear weapons Australia has developed a robust uranium export policy. Through a network of bilateral safeguards agreements and export controls, Australia has implemented a comprehensive regime to ensure its uranium is
used solely for peaceful purposes. Many other states with significant nuclear fuel cycle activities have implemented similar arrangements.

Nonetheless, many such states remain concerned about the spread internationally of sensitive nuclear technology (SNT) – for uranium enrichment and reprocessing – which could enable a state to develop a nuclear weapons break out capability or nuclear weapons themselves. Consequently, a number of arrangements (for example the US Global Nuclear Energy Partnership) for limiting the spread of SNT, while respecting rights to peaceful nuclear energy have been advanced. Regardless of which or any of such arrangements come to fruition, the international legal framework described in this paper is unlikely to change significantly, though it could be strengthened.

**LIST OF MULTILATERAL TREATIES BEARING ON AUSTRALIAN IMPLEMENTATION OF CONTROLS ON THE PRODUCTION AND EXPORT OF URANIUM CONCENTRATES**

(A) To which Australia is a Party

NPT
Australia-IAEA Safeguards Agreement
Additional Protocol to IAEA Safeguards Agreement
South Pacific Nuclear Free Zone (Rarotonga Treaty)
CPPNM
Convention on Nuclear Safety
Convention on Early Notification of a Nuclear Accident
Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency
SUA Convention/SOLAS Convention

(B) To which Australia is not a Party

The 1963 Vienna Convention on Civil Liability for Nuclear Damage and the 1987 amendment thereto
The 1960 (Paris) Convention on Third Party Liability in the Field of Nuclear Energy
The 1988 Joint Protocol relating to the Application of the Vienna Convention and the Paris Convention
The 1997 Convention on Supplementary Compensation for Nuclear Damage
Amended CPPNM