Who's Watching the Nuclear Watchdog? A Critique of the Australian Safeguards and Non-Proliferation Office

A Joint Submission on the Agreement between Australia and Russia on Cooperation in the Use of Nuclear Energy for Peaceful Purposes

by
Prof. Richard Broinowski
Dr Alan Roberts
& Dr Jim Green

SUBMISSION No 18
TT on 14 May 2008

Contact: Jim Green <jim.green@foe.org.au>, 0417 318 368.
PO Box 222, Fitzroy, Victoria, 3065

Contents

Acronyms

ANSTO – Australian Nuclear Science and Technology Organisation
AONM – Australian-obligated nuclear materials – e.g. Australian-origin uranium and its by-products such as depleted uranium and plutonium
ASNO – Australian Safeguards and Non-Proliferation Office
CTBT – Comprehensive Test Ban Treaty
DFAT – Department of Foreign Affairs and Trade
DOE – (US) Department of Energy
DPRK – Democratic People's Republic of Korea a.k.a. North Korea
FMCT – Fissile Material Cut-off Treaty
HEU – Highly-enriched uranium
IAEA – International Atomic Energy Agency
LEU – Low-enriched uranium
LWR – Light water reactor
MUF – Material Unaccounted For

NPT – Nuclear Non-Proliferation Treaty
WMD – Weapons of Mass Destruction

1. Executive Summary

This submissions raises serious concerns regarding the competence and professionalism of the Australian Safeguards and Non-Proliferation Office (ASNO). ASNO's mission, to prevent nuclear proliferation dangers associated with Australia's uranium exports, is a task vital to the long-term security of Australians and all people. This paper details a large number of statements made by ASNO which are false or misleading. The evidence compiled raises critical questions of good governance, and leads inescapably to the conclusion that the safeguards on Australian uranium which ASNO is responsible for implementing are deeply flawed both in their design and in their execution.

This situation requires redress.

The authors of this paper believe there is a compelling case for major reform of ASNO as a matter of urgency. An alternative course of action would be for the Australian government to establish an independent public inquiry. Such an inquiry should have a broad mandate to review all aspects of ASNO's structure and function, should be adequately resourced, and should have powers similar to those of a Royal Commission to access witnesses, documents and other evidence.

Such an inquiry should be carried out independently of ASNO. It should also be carried out independently of the Department of Foreign Affairs and Trade (DFAT), given that the current relationship between ASNO and DFAT is arguably one of the areas in need of review. DFAT has declined a request to review a paper detailing numerous inaccurate statements made by ASNO (letter to NGOs, 28 May 2007, available on request).

Such an inquiry should address the competence and performance of ASNO; its scientific and technical expertise; whether its current management, organisation, structure and relationships best serve its mandate; any conflicts of interest; the implications of ASNO's structural connection to DFAT (whether it has sufficient independence or operates as a 'captured bureaucracy'); and options for reform including consideration of organisational models in other countries.

ASNO's previous responses to criticism have included angry and dismissive attacks on its critics, assertions that an entire document can be dismissed on the basis of questionable challenges to just one or two points (see for example ASNO, 'Reactor Grade Plutonium', <www.asno.dfat.gov.au/infosheets/rgp_dec06.pdf>), and a conspicuous failure to address the substance of a large majority of the criticisms. We sincerely hope that the multiple serious concerns raised in this paper will prompt serious consideration by government and parliamentarians, and responses which are substantive and constructive.

The authors of this paper intend to continue to monitor ASNO's activities and its statements. The matters raised here go to the heart of Australia's obligations as a major uranium exporting nation. We hope that it will not be long before the Australian government addresses the unacceptable and untenable situation which currently prevails regarding a matter of such critical importance to the security of Australians and the world as preventing further nuclear proliferation.

2. Introduction

In his latest book, the Australian academic, Gavan McCormack (2007), makes some stark observations about Japan's nuclear capabilities. At the industrial complex at Rokkasho in Aomori prefecture lies a vast nuclear industry including enrichment and reprocessing works, and some of Japan's 45 tonnes of separated plutonium – about one-sixth of the global civilian stock. By 2020, the Japanese stock will reach 145 tonnes, more than in the entire US nuclear arsenal. Japanese bureaucrats and scientists continue to chase the dangerous and illusory goal of turning much of this into mixed oxide fuel (MOX) for perpetual use in breeders and adapted conventional nuclear reactors, turning Japan into a 'nuclear state' (*genshiryoku rikkoku)* dependent on no outside source for its electricity.

But there is another motive for the plutonium accumulation: nuclear weapons. In 1957, Prime Minister Kishi said he favoured Japan acquiring them. So did Prime Minister Ikeda in 1961, Prime Minister Eisaku Sato in 1964, Prime Minister Ohira in 1984, and Prime Minister Nakasone in 1984. In the 1990s, and with North Korea clearly in mind, chief of the Defence Agency, Norota Hosei, said that in certain circumstances Japan had the right to a pre-emptive attack. In 2002, Abe Shinzo, deputy chief cabinet secretary, said the constitution would not block Japan's possession of nuclear weapons 'provided they were small' (Tsukasa, 2006). In 2005 and 2007, Prime Ministers Koizumi and Abe echoed the same line.

Much of this plutonium, which could be turned into nuclear weapons in a very short time, originates from Australian uranium. Having conceded to Japan almost since Australian bilateral safeguards were negotiated with that country the right to enrich and reprocess our uranium without case-by-case permission, successive Australian governments have contributed to fuelling a potentially enormous Japanese nuclear weapons industry. And if Japan went down that path, no doubt the Republic of Korea, and probably Taiwan – also customers for Australian uranium – would throw off their inhibitions and go nuclear also.

It is against such a background of dangers and possibilities that the assurances of Mr John Carlson and his Safeguards and Non-Proliferation Office that Australian uranium is safe from diversion into nuclear weapons must be seen. This paper pulls together some of his more fanciful claims. These include that we only select client states with impeccable credentials, that nuclear power as such is not a proliferation problem – only the spread of enrichment and reprocessing technologies, and the old chestnut about the use of reactor-grade plutonium in nuclear explosions.

Unfortunately, the Australian Safeguards and Non-Proliferation Office, like so much of the federal bureaucracy under Mr Howard, is simply giving an unrealistic sugar-coating of false assurance to an increasingly sceptical Australian public. The fact is that Australian uranium is increasingly contributing to a likely nuclear-armed Asian region. We cannot accurately trace its path through the intricacies of an increasingly complex and dangerous international nuclear fuel chain. Nor indeed can we track its equivalence in fissionable nuclear material. Australian nuclear material has gone missing, and has no doubt ended up in nuclear weapons programs, or at least allowed the substitution of other atoms to do so.

Meanwhile, the Howard government is becoming increasingly irresponsible about the client states to which it is prepared to sell Australian uranium, including most recently India and Russia. Recent customers include China (with shipments expected to begin in 2009) and Taiwan. One is a member of the NPT, the other is not. The bilateral safeguards agreement with China provides absolutely no assurance that Australian uranium won't be diverted into its weapons program, or allow uranium otherwise set aside for power reactors so to be used. Chinese authorities, not known for their transparency, won't commit themselves to cease the production of fissile material, or to ratify the Comprehensive Test Ban Treaty. And with only three nuclear plants out of dozens subject to regular IAEA safeguards inspections in recent years, they can divert our uranium with impunity. As for Taiwan, technically a province of China, and without the legal capacity to sign the NPT, Australian uranium sales, even through the US, are reckless and, as the Hawke government determined in October 1986, illegal (see Broinowski, 2003, pp 181-2).

India, also a non-member of the NPT, looks like becoming yet another customer for Australian uranium. If anything, its nuclear secrecy and unwillingness to abide by basic non proliferation principles, are worse than those of China. Its officials claim that they will make available to international inspection all its nuclear facilities engaged in peaceful nuclear activities. But given the complexity of its nuclear machinery, and that most if not all its reactors have been engaged in some or other aspect of nuclear weaponry, this assurance simply cannot be believed or relied upon.

In the expansion of Australian uranium sales to these countries, Howard is showing a contempt for the Nuclear Non-Proliferation Treaty, and for a set of international constraints on the spread of nuclear weaponry to which the majority of the world's community of states continue to subscribe. Astonishingly, the web site of the Department of Foreign Affairs and Trade continues to proclaim that Australia is one of the NPT's strongest supporters. The activities of the Howard government show this claim to be untrue. By focusing on the current recklessness with which we choose customers for Australian uranium, and the ineffectiveness of the bilateral safeguards we negotiate with them, this paper will hopefully help to raise the consciousness and concern of thinking Australians about the lies that are perpetrated in Canberra.

References

Gavan McCormack, 2007, "Client State – Japan in the American Embrace", Verso, Research School of Pacific and Asian Studies, Australian National University.

Yoshida Tsukasa in the Japanese periodical *Gendai*, September 2006, pp.116-29.

Richard Broinowski, 2003, "Fact or Fission – the truth about Australia's nuclear ambitions", Scribe.

---------- Return to Table of Contents ----------

3. Australian Uranium Exports to China

On 25 October 2006 in Melbourne, on the last day of public hearings by the Joint Standing Committee on Treaties on two treaties paving the way for nuclear cooperation and sales of Australian uranium to China, with not one journalist in the room, the Director-General of the Australian Safeguards and Non-Proliferation Office, Mr John Carlson, said some extraordinary things.

The head of Australia's nuclear watchdog, appearing before the Committee for at least the second time as well as having provided a written submission and answers to questions, and accompanied by three other departmental officials, was unable to state the number of nuclear facilities in China: "I must admit that I do not know the total number of facilities." With prompting he agreed there were more than 30.

The Carnegie Endowment for International Peace in Washington DC lists 44 facilities in China which are of proliferation concern (Cirincione et al., 2005):
* 10 nuclear weapons design and production facilities
* 15 operational plutonium production reactors, and an additional 2 shutdown, 1 under construction and 1 planned
* 3 operational enrichment plants and 2 no longer operational
* 2 fuel fabrication plants and a further one shutdown
* 2 operating plutonium reprocessing plants, 1 under construction and 1 shutdown
* 2 operational and 1 non-operational facilities to produce tritium, deuterium and beryllium.

Mr Carlson said that: "For a nuclear weapons state, it is really up to the nuclear weapons state what it wishes to submit to safeguards ..." and "So China has at the moment, I think, 10 facilities that it has placed under safeguards." He said that of the 10 facilities "at the moment that are eligible for safeguards", three facilities are currently actually safeguarded (Joint Standing Committee on Treaties, 2006).

Of these three facilities – a power reactor, a research reactor and an enrichment plant – only the power reactor (named QSNPP, located in Hai Yan) has a detailed facility-specific working document called a Facility Attachment in place (as stated in IAEA (2005) and confirmed in writing to be correct by Elizabeth Dobie-Sarsam, IAEA Division of Public Information, after consultation with IAEA Safeguards expert Malik Derrough, 2 June 2006).

Although in Mr Carlson's words "roughly 10" facilities in China are eligible for inspections, "China is obliged to act as if safeguards were in place, because it does not know from one year to the next which facilities the agency will come and do safeguards at." This suggests that the IAEA varies the actual facilities safeguarded from year to year. In fact, IAEA Annual Reports make it clear that rather than the selected facilities varying from year to year, the same three facilities have been monitored over several years.

Although Mr Carlson told the Committee that he had for the last 5½ years chaired the IAEA Standing Advisory Group on Safeguards Implementation, with regard to the Chinese nuclear facilities selected for inspection he admitted: "As to whether it ends up that they work their way through the list, I am not sure of exactly what system the agency would follow."

Mr Carlson stated in regard to use of AONM in facilities not subject to IAEA inspections: "This is an acceptable situation to us because we believe the commitment by a nuclear weapons state to accept safeguards indicates a serious intent."

Mr Carlson also stated that in relation to light water reactors, "we do not consider them a proliferation risk, particularly in a nuclear weapons state." This is misleading and dangerous. A 1000 MW Light Water Reactor inevitably produces plutonium – typically 200-250 kg per year. There is no technical barrier to using plutonium of almost any types, including so-called reactor- grade, to make nuclear weapons. (For an authoritative assessment by a former US Nuclear Regulatory Commission commissioner, see Gilinsky, 2006; see also Beljac et al., 2006, and Roberts, 2007.)

Mr Carlson contradicted and undermined IAEA Director-General Dr Mohamed El Baradei by suggesting that the IAEA safeguards budget was not in need of major increase, and expressing no concern for the current needs and deficiencies in the Agency's verification capacity which the Director-General has repeatedly and clearly drawn attention to (see Annex 1).

Mr Carlson (2006) claimed in written responses to questions that "there has been no finding by NPT parties at NPT review conferences that China is not complying with its nuclear disarmament commitments". This is misleading. Like the other nuclear weapon states, China has made no firm commitment to disarm, despite its legal obligation to do so under the NPT, affirmed by the International Court of Justice in 1996, and reaffirmed at the 2000 NPT Review Conference. China is modernising its nuclear arsenal, refuses to ratify the Comprehensive Test Ban Treaty, has a large stockpile of both highly enriched uranium (5-15 tons) and plutonium (3-7 tons) (Cirincione et al., 2005), and according to the Stockholm International Peace Research Institute 2006 report (Born, 2006: 225-242), China has *never engaged* in international disarmament talks.

In relation to China's appalling history of exporting sensitive nuclear material, equipment and know-how – including materials for weapons – to a number of countries, including Pakistan, North Korea, Iran and Libya (Cirincione et al., 2005:163-74), Mr Carlson was equally sanguine. In written testimony, Mr Carlson (2006) stated: "There have been concerns about China's non-proliferation record in the past, but since joining the NPT in 1992, China has moved steadily to improve its practices." Yet he goes on to say "… it was not until China joined the Nuclear Suppliers Group in 2004 that it was obligated by NSG guidelines to engage in new nuclear supply to NNWS [Non Nuclear Weapon States] only when the receiving state has in place IAEA full scope safeguards." This was the same year that a US Central Intelligence Agency report concluded "… the proliferation behaviour of Chinese companies remains of great concern." (Cirincione et al., 2005: 163-4.)

On an earlier occasion, before the Senate Estimates (2006) hearings, Mr Carlson had admitted that during the negotiations on the Australia-China bilateral nuclear agreements, China refused to answer Australia's question about whether it had ceased production of fissile material (which can be directly used for nuclear weapons). The Weapons of Mass Destruction Commission (2006) in its recent report calls on China to make a clear commitment to ceasing production of fissile material. China remains the only NPT-defined nuclear weapons state which has not done so. The Australian government, unable to verify that China has ceased

such production, relied on an open source published report from a non-governmental organisation (Cirincione et al., 2005).

How will Australia monitor its "stringent" bilateral safeguards, with secret Administrative Agreements not subject to parliamentary – or public – scrutiny? According to ASNO's (2006) Regulation Impact Statement "… ASNO officials visit bilateral counterparts annually to reconcile nuclear material transfer reports in detail." That is, Australia's bilateral safeguards are merely a retrospective book-keeping exercise based on reports provided by the recipient country. They add precious little to flawed IAEA safeguards, and are not even implemented in most of the facilities which may use AONM.

Australia's bilateral nuclear agreements are implemented through secret Administrative Arrangements between the respective agencies in both countries. Only an outline of the nuclear administrative agreement was provided by Mr Carlson to the Committee. Under the pretext of confidentiality, such agreements are not provided to or reviewed by elected members of Parliament.

And what if China's breached safeguards? Most likely we would never know; if we did, Australia is entitled to suspend or cancel further transfers of nuclear material, and "has the right to require return of nuclear material subject to this agreement if corrective steps are not taken by the recipient party within a reasonable time". That is, after the damage is done, all Australia could practically do is suspend further supply – closing a door after the horse has bolted.

What about the radioactive waste that will inevitably be produced from Australian uranium? In fine bureaucratic form, Mr Carlson told the Joint Standing Committee on Treaties (2006): "Nuclear waste is outside our area. I suggest you talk to ANSTO."

Summary and comment

In summary, in testimony to the Joint Standing Committee on Treaties, Mr John Carlson, the head of Australia's nuclear watchdog agency:

1. Did not know the number of nuclear facilities in China, a nuclear weapons state with which Australia was then finalising nuclear agreements, nor how many or which facilities would process AONM.
2. Despite being chair for over five years of the IAEA Standing Advisory Group on Safeguards Implementation, did not know how the agency selected nuclear facilities for inspection.
3. Found it acceptable that though there are 44 proliferation-sensitive nuclear facilities in China, only 10 facilities are eligible for IAEA safeguards, three are actually inspected, and only one (not the most proliferation sensitive of the 3) has a full suite of arrangements covering IAEA safeguards (including a Facility Attachment) in place. He therefore supported AONM being processed at facilities not subject to IAEA inspections.
4. Believed that such a situation is acceptable not because safeguards can be relied upon to detect, let alone prevent, diversion of nuclear materials to weapons but because of his belief that "the commitment by a nuclear weapons state to accept safeguards indicates a serious intent". He thus admits safeguards fundamentally rely not on proof but on trust.

5. Did not consider light water reactors a proliferation risk, despite overwhelming evidence to the contrary.
6. Contradicted and undermined the IAEA Director General, Dr Mohamed El Baradei in relation to current deficiencies and needs in the Agency's verification capacity.
7. Was dismissive of China having the worst record of exports of proliferation sensitive and weapons-related materials and know-how to other countries of any of the nuclear weapon states.
8. Was unable to confirm information in the open literature about China having stopped production of fissile material, after China refused to answer the Australian government's questions on this matter.
9. Did not provide the Committee with a copy of the Administrative Arrangements to apply under Australia's nuclear cooperation agreements with China. Such secret agreements are not made available to elected members of the Australian Parliament.

All this occurs in the context of Australia having no any additional on-the-ground verification capacity to augment the incomplete coverage of the IAEA.

This amounts to a systematic pattern of error, misinformation and complacency which is alarming, and which undermines the long-term interests of Australians.

The Australian government has claimed that for years it was ignorant of, and cannot be held accountable for, the world's largest case of illegal and corrupt breaches of UN sanctions, in the case of Australian Wheat Board kickbacks to the Saddam Hussein regime in Iraq. For years it ignored, played down and didn't want to hear questions and what should have been repeated alarm signals from the UN, US and Canada. That was about wheat, which is safe, non-toxic, generates no hazardous long-term waste, and cannot be diverted to the most destructive weapons ever invented. What assurance can be provided – which in relation to uranium should be as cast-iron as humanly possible – that a similar combination of corruption and commercial interest could never occur in relation to nuclear material?

It is over 30 years since the Fox Inquiry characterised nuclear safeguards as providing "an illusion of protection", and since then the frailty of this illusion has been repeatedly demonstrated – in Iraq, Libya, Iran and North Korea. Yet the government wants us to believe that on safeguards on Australian uranium we should trust it and every future government of Australia and China and their instrumentalities, including ASNO, and all the companies involved, and whatever succeeds them, essentially forever, with industrial quantities of the most dangerous and persistent of all substances.

The conclusion is inescapable that at best, ASNO and its Director General are ineffectual, providing an illusion that a competent, independent agency is protecting the interests of the Australia people when it comes to the important matter of nuclear proliferation. At worst, ASNO serves principally the narrow commercial interests of the nuclear industry and the political interests of those promoting it, providing a smokescreen of safeguarding the long-term public interest against nuclear dangers, while actually being more part of the problem of nuclear proliferation than the urgently needed solutions.

References for Section 3: ASNO and Uranium Sales to China

ASNO, 2006, Regulation Impact Statement, <www.aph.gov.au/house/committee/jsct/8august2006/treaties/china_ris.pdf>.

Beljac M et al. An illusion of protection. Australian Conservation Foundation, Medical Association for Prevention of War. October 2006. Available at: <www.acfonline.org.au> and <www.mapw.org.au>.

Born H. National governance of nuclear weapons: opportunities and constraints. In: Stockholm International Peace Research Institute. SIPRI Yearbook 2006. Oxford: Oxford University Press, 2006, pp 225-42.

Carlson J. Letter to Dr Andrew Southcott, Chair, Joint Standing Committee on Treaties, 29 Sep 2006.

Cirincione J, Wolfsthal JB, Rajkumar M. Deadly arsenals. Nuclear, chemical and biological threats. 2nd edition. Washington DC; Carnegie Endowment for International Peace, 2005.

Gilinsky V. A fresh examination of the proliferation dangers of light water reactors. In: Sokolski H (ed). Taming the next set of strategic weapon threats. Carlisle, PA; Strategic Studies Institute, US Army War College, June 2006. Available at: <http://www.StrategicStudiesInstitute.army.mil/>

IAEA 2005 Annual Report, available at: <http://www.iaea.org/Publications/Reports/Anrep2005/index.html>

Joint Standing Committee on Treaties. Reference: China sale of uranium and safeguards treaties. Wednesday, 25 October 2006, Melbourne. <www.aph.gov.au/hansard/joint/commttee/J9814.pdf>

Roberts Alan, August 2007, "Generating electrical power … and atomic bombs. The double role of nuclear power stations". EnergyScience Coalition Briefing Paper #17, <www.energyscience.org.au>.

Senate Estimates: Hearing of the Senate Foreign Affairs, Defence and Trade Legislation Committee 29 May 2006. Transcript at: <www.aph.gov.au/hansard/senate/committee/S9349.pdf>.

Weapons of Mass Destruction Commission, June 1 2006, "Weapons of Terror: Freeing the World of Nuclear, Biological and Chemical Arms", <www.wmdcommission.org>.

---------->

Annex 1: Statements by IAEA Director-General Dr Mohamed El Baradei regarding the limitations of safeguards

"The IAEA's Illicit Trafficking Database has, in the past decade, recorded more than 650 cases that involve efforts to smuggle such [nuclear and radioactive] materials." (1)

"Today, out of the 189 countries that are party to the NPT, 118 still do not have additional protocols in force." (1)

"IAEA verification today operates on an annual budget of about $100 million – a budget comparable to that of a local police department. With these resources, we oversee approximately 900 nuclear facilities in 71 countries. When you consider our growing responsibilities – as well as the need to stay ahead of the game – we are clearly operating on a shoestring budget." (1)

"… we are only as effective as we are allowed to be." (1)

"If a country with a full nuclear fuel cycle decides to break away from its non-proliferation commitments, a nuclear weapon could be only months away." (2)

"… the Agency's legal authority to investigate possible parallel weaponisation activity is limited …" (2)

"… verifying enrichment facilities or reprocessing facilities is quite difficult and the co-called conversion time is very short. So we are dealing with what I call "virtual nuclear weapons states"."(3)

"…the additional protocol is now in force in only 78 countries out of over 180 that are party to the NPT. And that is nearly a decade after the model protocol was agreed."(3)

"Our budget is only 130 million dollars; that's the budget with which we're supposed to verify the nuclear activities of the entire world. Reportedly some $1 billion was spent by the Iraq Survey Group after the war in that country. Our budget … is comparable with the budget of the police department in Vienna. So we don't have the required resources in many ways to be independent, to buy our own satellite monitoring imagery, or crucial instrumentation for our inspections. We still do not have our laboratories here in Vienna equipped for state-of-the-art analysis of environmental samples." (3)

(1) Putting teeth in the nuclear non-proliferation and disarmament regime. 2006 Karlsruhe Lecture, Karlsruhe, Germany, 25 March 2006

(2) Reflections on nuclear challenges today. Alistair Buchan Lecture, International Institute for Strategic Studies, London, UK 6 Dec 2005

(3) Addressing verification challenges. Symposium on International Safeguards, Vienna, 16 October 2006

These and other statements available at <www.iaea.org/NewsCenter/Statements/index.html>.

Other relevant quotes on safeguards

"In the eight years I served in the White House, every weapons proliferation issue we faced was linked with a civilian reactor program."
Al Gore
Guardian Weekly 2006; 174 (25):17-18 (9-15 June 2006)

"The development of atomic energy for peaceful purposes and the development of atomic energy for bombs are in much of their course interchangeable and interdependent. … Fear of such surprise violation of pledged word will surely break down any confidence in the pledged word of rival countries developing atomic energy if the treaty obligations and good faith of the nations are the only assurances upon which to rely."
Dean Acheson & David Lilienthal
A report on the international control of atomic energy. 16 March 1946, p4

"We are convinced that if the production of fissionable materials by national governments (or by private organisations under their control) is permitted, systems of inspection cannot be by themselves made "effective safeguards … to protect complying states against the hazards of violations and evasions."
Dean Acheson & David Lilienthal
A report on the international control of atomic energy. 16 March 1946, p4-5

"… roughly two-thirds of the energy and effort required to produce HEU goes into enriching natural uranium with 0.711 percent U-235 to fuel grade low-enriched uranium with 3.6 percent U-235, while only about one third goes into further enrichment of that LEU to produce highly enriched uranium with 90 percent U-235."
Brice Smith
Insurmountable risks. Institute for Energy and Environmental Research. Takoma Park, Maryland, May 2006:127.

"Reprocessing provides the strongest link between commercial nuclear power and proliferation."
US Congress, Office of Technology Assessment
Nuclear proliferation and safeguards. June 1977, p.12.

"No system of safeguards that can be devised will of itself provide an effective guarantee against production of atomic weapons by a nation bent on aggression."
Harry S Truman, CR Attlee & WL Mackenzie King.
Declaration on atomic bomb by President Truman and Prime Ministers Attlee and King.
15 November 1945.

"…the Nuclear Non-proliferation Treaty disintegrates before our very eyes … the current non-proliferation regime is fundamentally fracturing. The consequences of the collapse of this regime for Australia are acute, including the outbreak of regional nuclear arms races in South Asia, North East Asia and possibly even South East Asia."
Kevin Rudd, Shadow Minister for Foreign Affairs, Trade & International Security.

Leading, not following. The renewal of Australian middle power diplomacy. Sydney Institute, 19 September 2006.

"It would be so easy for us to produce nuclear warheads – we have plutonium at nuclear power plants in Japan, enough to make several thousand such warheads."
Ichiro Ozawa, leader of the Liberal Party in Japan (and former LDP member),
lecture in Fukuoka, April 2002.

"We are approaching a point at which the erosion of the non-proliferation regime could become irreversible and result in a cascade of proliferation."
High-level Panel on Threats, Challenges and Change.
A more secure world: Our shared responsibility. Report to the Secretary-General. 30 November 2004:39.

"In fact, the NPT is the weakest of the treaties on WMD in terms of provisions about implementation."
Weapons of Mass Destruction Commission.
Weapons of Terror. Final Report. WMD Commission, Stockholm, Sweden
1 June 2006: 63.

"It is clear that no international safeguards system can physically prevent diversion or the setting up of an undeclared or clandestine nuclear programme."
IAEA
Against the Spread of Nuclear Weapons: IAEA Safeguards in the 1990s, 1993.

"Again and again, it has been demonstrated here and overseas that when problems over safeguards prove difficult, commercial considerations will come first."
Mike Rann, ALP (SA) Nuclear Hazard Committee
'Uranium: Play It Safe', March 1982.

---------- **Return to Table of Contents** ----------

4. Plutonium and Proliferation

In criticising the Australian Conservation Foundation / Medical Asssociation for the Prevention of War publication 'An Illusion of Protection', ASNO objects in particular to the passage where the writers 'assert that reactor grade plutonium has been used in nuclear tests'; ASNO maintains that they have 'ignored evidence to the contrary ' which ASNO presented to a parliamentary enquiry.

The main source for the assertion criticised is, of course, the declaration to that effect by the United States Department of Energy (DOE), which needs examining in some detail. It is available on the internet at: <www.osti.gov/opennet/document/press/pc29.html>.

The page is headed 'U.S. Department of Energy, Office of the Press Secretary, Washington DC, 20585'. There follows immediately the document's title: 'Additional Information Concerning Underground Nuclear Weapon Test of *Reactor-Grade* Plutonium'. (Italics added for the term

reactor-grade, here and below.)

The phrase can be found throughout the document:

> "The test confirmed that *reactor-grade* plutonium could be used to make a nuclear explosive … weapons can be constructed with *reactor-grade* plutonium … erroneous statements made elsewhere about the potential use of *reactor-grade* fuel for nuclear weapons ..."

And so on. Altogether, in this document of a little over three printed A4 pages, 'reactor grade' occurs no less than 22 times. ASNO apparently sees this as simply an outdated usage of words, and quotes from its own testimony at a parliamentary enquiry:

> "There is some confusion over [this test, because] at that time "reactor-grade" was much closer to weapons-grade than is currently the case. While the US has never revealed the quality of the plutonium used in that test, there are indications that it was of "fuel-grade", an intermediate category between weapons-grade and reactor-grade, which has been recognised as a separate category since the 1970s".

Why this grading? It is because two quantities of plutonium will behave differently as explosive material, if their percentages of plutonium-240 differ. It has thus been convenient to classify or 'grade' plutonium according to this percentage.

But if the material in this particular test was falsely classified, as ASNO is suggesting, this cannot possibly be explained by a 'confusion' about grading systems. For in this same document giving 'additional information' on the reactor-grade test, the DOE also states:

> "Prior to the 1970's, there were only two terms in use to define plutonium grades: weapon-grade (no more than 7 percent Pu-240) and reactor-grade (greater than 7 percent Pu-240). In the early 1970's, the term fuel-grade (approximately 7 percent to 19 percent Pu-240) came into use, which shifted the reactor-grade definition [to] 19 percent or greater Pu-240."

The DOE is thus noting that the new definition had been in force for some three decades. (All these quotations come from the text as downloaded on July 20, 2007.) When it repeats the phrase 'reactor-grade', as it does a score of times, we must assume this means what the DOE gives elsewhere in that same document as the current definition – namely, having 19% or more of plutonium-240.

If in fact the test material had less Pu-240 than this, the DOE was asserting an untruth and continues to do so. Certainly we should consider this possibility, and look carefully at the evidence against the agency's truthfulness – evidence which, we are told, includes what ASNO presented to the enquiry, and now quotes in its critique.

On the test material it quotes itself as saying:

> "[T]here are indications that it was of "fuel-grade", an intermediate category between

> weapons-grade and reactor-grade …' More generally, it stated also that 'ASNO is not aware of any successful test explosion using reactor-grade plutonium, typical of light water reactor fuel."

While ASNO's opinions should receive all due respect, it is hard to see 'indications' and being 'not aware' as falling into the category of *evidence*, which ASNO upbraids us for 'ignoring'. Its reference to De Volpi (1996) could be more germane, since De Volpi raised many queries about the DOE report that deserve study. It should be noted, however, that his queries were mainly concerned with the report's omission of certain details about the circumstances of the test explosion, rather than with the grade of the test material. His final, somewhat ambiguous 'guess' (the word he uses) is that this grade was 'closer to the low end (81%) of the definition ' – that is, to the '19% Pu-240' mark.

No convincing case appears in all this to reject the DOE's report that 'A successful test was conducted in 1962, which used reactor-grade plutonium in the nuclear explosive in place of weapon-grade plutonium.' Yet, by writing that it 'is not aware of any successful test explosion using reactor-grade plutonium …' , ASNO is clearly declaring, with no ifs or buts, that this key statement in the report is untrue.

It is difficult to understand how ASNO can be so certain of the DOE's dishonesty. Perhaps a clue is given in its concluding paragraphs, on the problems arising with such test material, and its earlier remarks on 'technical difficulties' and the need for 'experienced weapon designers'. The emphasis here on the barriers against weapon development is in marked contrast to the estimates from various people experienced in the weapons field, of whom Carson Mark (Director, Theoretical Division, Los Alamos National Laboratory, 1947-1972) is altogether typical:

> "... all of the plutonium isotopes are fissionable. Indeed, a bare critical assembly could be made with plutonium metal no matter what its isotopic composition might be ... Reactor-grade plutonium with any level of irradiation is a potentially explosive material ... .The difficulties of developing an effective design of the most straightforward type are not appreciably greater with reactor-grade plutonium than those that have to be met for the use of weapons-grade plutonium. The hazards of handling reactor-grade plutonium, though somewhat greater than those associated with weapons-grade plutonium, are of the same type and can be met by applying the same precautions."

ASNO comments, in this concluding section, on the fact that, for the purpose of applying its safeguards measures, the International Atomic Energy Agency (IAEA) defines the great bulk of plutonium samples as 'direct-use' material, that is, 'nuclear material that can be used for the manufacture of nuclear explosives components without transmutation or further enrichment'.

The general public may not be as impressed as ASNO seems to be, with the distinction which (as it writes) 'might seem a fine one', between 'nuclear explosives' and 'nuclear weapons'. We doubt whether North Korea could have been dissuaded from its proliferative work, if persuaded that the best it could do was impress the world with only a 'nuclear explosive'. It is not evident, either, that its leadership was greatly concerned with the reliability, storage life and so on of the devices. What they wanted was a big explosion, and they got it. We can be

sure also that Osama bin Laden will not be passing up the chance to seize a 'contaminated' bundle of fuel rods, out of dissatisfaction with the final product's shelf life or exact explosive power.

---------->

There has been so prolonged a discussion about this particular test that we might wonder what on earth the fuss is about. Is there some bigger question hiding behind it all?

Indeed there is, one that the MAPW/ACF publication states quite clearly. Referring to the Non-Proliferation Treaty (NPT) and the role of a Non-Nuclear Weapon State (NNWS), the document's Executive Summary (page 7) asserts:

> "*Article IV enables a NNWS to acquire nuclear materials, technology and infrastructure. However, once such a nuclear capacity is realised the potential for NNWS to acquire nuclear weapons is inescapable, as evidenced by the concern expressed about Iran's nuclear programme. There are clear examples demonstrating that NNWS can become nuclear weapons capable relatively quickly. By legitimising and encouraging the expansion of nuclear fuel cycle capabilities around the world the NPT has the perverse effect of promoting the means for a cascade of proliferation.*"

Why does civilian nuclear power have this dangerous *military* consequence? Because, inside the fuel rods of the most widespread type of nuclear power station, based on a Light Water Reactor (LWR), there are created large quantities of plutonium-239 – the explosive used in the atomic bomb that destroyed Nagasaki. 'Large quantities' here means: enough each year for dozens of Nagasaki bombs.

Two EnergyScience Briefing Papers (numbers 9 and 17) explain how nuclear power stations have been connected, historically and inescapably, with nuclear weapons. Here we indicate why the explosive properties *of their fuel itself* must be of concern.

There is a useful book describing in some detail the ways in which reactor fuel supplies the nuclear material for nuclear bombs. The publication, *Taming the next set of strategic weapons threats*, was published in June 2006 by the Strategic Studies Institute (SSI) of the US Army War College jointly with the Nonproliferation Policy Education Center. It can be downloaded free from the site
<www. StrategicStudiesInstitute.army.mil>.

The most relevant section is Chapter 5, by Victor Gilinsky: 'A Fresh Examination of the Proliferation Dangers Of Light Water Reactors'.

The fuel rods of course need some treatment before the nuclear material for a bomb is obtained. Two major points are:
* First, the plutonium must be separated from the other elements (the rods must be 'reprocessed'); although only chemical methods are needed to effect the separation, the radioactivity of the rods can make special handling apparatus necessary.
* Second, some of the plutonium-239 will have been further converted, after the absorption of a second neutron, into the heavier form ('isotope') of plutonium-240; but it so happens that this

substance reduces the explosive power of the bomb – thus, from a weapons point of view, it must be regarded as a 'contaminant'.

Neither of these presents an insuperable barrier to a government seeking nuclear weapons. If it has a nuclear power station, it automatically acquires plutonium and, to process it, the trained work force the station will need anyway.

As long as the fuel rod remains in the reactor, the two kinds of plutonium – the explosive 239, and the 'contaminant' 240 – will each be continuously added to. To keep down the level of contaminant, the fuel rod should be removed from the reactor early – that is, before its usual replacement time of, say, five years.

Is it possible to choose this withdrawal time so that the explosive plutonium-239 has been created in quantities usable for weapons, while the percentage of contaminant plutonium-240 is still small enough to leave it with plenty of explosive power? Only too possible, unfortunately.

The simple way to get the nuclear material for bombs from a power station emerges clearly from Gilinsky's discussion: don't leave the fuel rods in the reactor for the full five years or so – withdraw them early. There is a range of time in which the plutonium thus obtained will be both plentiful enough for a weapon, and not too severely contaminated.

In one method that he treats in detail, withdrawal is done at the scheduled (and therefore expected) time. But the rods withdrawn (and reprocessed) are not those that have done their appointed service of five years or so, but ones that have spent only about a third of this time, perhaps 20 months, in the reactor.

The plutonium in such rods would contain, according to Gilinsky, about 14% of the contaminant plutonium-240. He asked Harmon W. Hubbard to assess the explosive power of the resulting bombs, using publicly available information only. (Hubbard has performed such work for the US Government. The details of his calculations are given in Hubbard (2003).)

The result: a couple of dozen bombs which, although more contaminated, would each give a bomb yield averaging around a quarter or so of full Nagasaki strength. The appropriate unit for measuring this explosive power is tons-of TNT-equivalent. Even the more contaminated case will yield thousands of these units. As Gilinsky comments, the trouble with the idea that the contaminant will make such bomb material 'fizzle' is that, with nuclear weapons, "the fizzle yield is still pretty large".

It should be further noted that it is Hubbard's lowest estimates which are quoted above. They increase significantly – up to a 12,000-ton-TNT average – if the proliferating country could 'take advantage of the wide availability of declassified nuclear weapons information and the enormous increases in computing and other technological aids since the 1945 Trinity shot' (p.83).

All of this means that the common LWR reactor must be regarded as a potent source of material for nuclear bombs. But, to make a bomb, this material would need to be separated

from the unwanted material in the fuel rods; does this step of 'reprocessing' constitute a formidable – or at least, easily detectable – stage in the progress towards a bomb?

Unfortunately, no. As Gilinsky notes, '[T]he feasibility of small-scale, and possibly "quick and dirty" reprocessing of LWR fuel has been known for 30 years.' He gives no less than four (published) references to designs for the building of 'quick and dirty' reprocessing plants, one of them as small as 65 feet square – just under 20 metres a side.

---------->

The overall conclusion forced on us is a disturbing one: if a country possessing nuclear power stations, of this common type at least, is not manufacturing nuclear weapons, it is only because it has chosen not to do so.

Returning now, in conclusion, to the earlier debate, we see that, ironically enough, the whole argument about whether the 1962 test was reactor-grade or fuel-grade becomes of limited interest anyway. To a significant extent, the grade can be fixed simply by removing the rod from the reactor earlier or later, as Gilinsky's approach makes clear.

This means that the history of a fuel rod inside a nuclear power station can be sketched as follows:

When the reactor starts up, the rod contains no plutonium to speak of. After a short time – it might be a few weeks or a few months – a significant amount of the weapon material Pu-239 has collected in it, and a small percentage of the contaminant Pu-240. This is the weapon-grade stage in its history, and a few kilograms of it are capable of destruction measured in tens of thousands of tons of TNT. After more months, the fraction of the contaminant has grown, and the explosive power will drop to an average of 'only' a thousand tons or so of TNT.

With bad luck or incompetent procedure, it can fall to even less than that. The North Korea test, for example, was reported at around 600 tons of TNT. That was still enough to command 'respect', and vastly improved treatment by the US.

It seems very likely that lessons from the North Korea case have been absorbed by other states, both 'rogue' and not so rogue. They will have learnt that, to get the iron fist threatening them replaced by a velvet glove, even crude nuclear devices will do. And, if nuclear power is spread more widely through the world, the material for those weapons will often be inside their electrical power station, waiting to be extracted.

Technical Note

When the bomb material Pu-239 is accompanied by a 'contaminant' more ready to fission (like the Pu-240), the latter provides a source of neutrons that can 'pre-initiate' the chain reaction at an earlier moment than that designed for maximum release of the Pu-239 fission energy. Thus the yield depends on the precise moment when the initiating neutrons enter. Instead of a fixed yield, the probabilities of the various emission times and their corresponding bomb yields have to be calculated.

If you wish to follow and assess procedures of this detailed type, the references to consult below are Hubbard 2003, Lovins 1980 and Mark 1993.

These studies have found the kind of results mentioned above: bomb yields from various plutonium isotopic mixtures that have a minimum of around a thousand tons-TNT and usually much more. It would be interesting to have similar calculations from workers who have arrived at happier conclusions based on more than a qualitative belief. They seem difficult to find, however, and we would be glad to learn of any that exist in order to peruse them.

References for Section 4: Plutonium and Proliferation

Australian Conservation Foundation and Medical Association for the Prevention of War, October 2006, "An Illusion of Protection", <www.acfonline.org.au/articles/news.asp?news_id=1012&c=254457>

ASNO (Australian Safeguards and Non-Proliferation Office), 2006, Reactor-Grade Plutonium: Use In Nuclear Weapon Tests, <www.asno.dfat.gov.au/infosheets/rgp_dec06.pdf>

De Volpi, Alex, 1996, "A Coverup of Nuclear Test Information?", <http://units.aps.org/units/fps/newsletters/1996/october/aoct96.cfm#a2>

DOE (US Department of Energy), 2007, "Additional Information Concerning Underground Nuclear Weapon Test of Reactor-Grade Plutonium", <www.osti.gov/opennet/document/press/pc29.html>

Gilinsky, V. "A Fresh Examination of the Proliferation Dangers Of Light Water Reactors", Chapter 5 in Sokolski (ed.), <www. StrategicStudiesInstitute.army.mil>.

Hubbard, Harmon W., 2003. "Plutonium from Light Water Reactors as Nuclear Weapon Material", <www.npec-web.org/projects/hubbard.pdf>

Lovins, Amory, 1980, "Nuclear weapons and power-reactor plutonium". Nature, 283, pp. 817-823, (No. 5750, February 28 1980), <www.rmi.org/images/PDFs/Security/S80-01_NucWeaponsAndPluto.pdf>

Mark, J. Carson, "Explosive Properties of Reactor-Grade Plutonium", Science & Global Security, 1993, Volume 4, pp.11l-128, <www.fissilematerials.org/ipfm/site_down/sgs04mark.pdf>

Sokolski, H. (ed.), June 2006, "Taming the next set of strategic weapons threats", Strategic Studies Institute (SSI) of the US Army War College and Nonproliferation Policy Education Center, <www. StrategicStudiesInstitute.army.mil>.

---------- **Return to Table of Contents** ----------

5. Fact or Fission

This section details numerous statements made by ASNO which are false or misleading.

Safeguards are not and could never be 100% effective

ASNO routinely misleads the Australian public and our political representatives when it asserts that international and bilateral safeguards agreements and processes "ensure" or "provide assurances" that Australian uranium and its by-products such as depleted uranium and plutonium, known collectively as Australian-obligated nuclear materials (AONM), will not contribute to weapons proliferation.

Those agreements and processes certainly attempt to prevent diversion of nuclear materials to weapons programs but they are not and could never be 100% effective.

ASNO and the Department of Foreign Affairs and Trade routinely offer these false "assurances". The ASNO website illustrates the point:

1. The risk of diversion of AONM is not acknowledged in a document linked from the front page of ASNO's website, "Australia's Uranium Export Policy", <www.dfat.gov.au/security/aus_uran_exp_policy.html>. That document asserts that "Australia's uranium export policy ... provides assurances that exported uranium and its derivatives cannot benefit the development of nuclear weapons or be used in other military programs." Why no acknowledgement of the risk of diversion of AONM for nuclear weapons research and/or production?
2. That document links to another, "Australia's Network of Nuclear Safeguards Agreements", <www.dfat.gov.au/security/nuclear_safeguards.html>, which asserts that: "All of Australia's uranium is exported for exclusively peaceful purposes, and only to countries and parties with which Australia has a bilateral safeguards Agreement. These Agreements ensure that Australia's nuclear exports remain in exclusively peaceful use ..." Why no acknowledgement of the risk of diversion of AONM?
3. That document links to an excerpt from the 1998-99 Australian Safeguards Office Annual Report which asserts that bilateral safeguards agreements "were established to ensure that nuclear items exported from Australia remain in exclusively peaceful use, and in no way enhance or contribute to any military purpose." Why no acknowledgement of the risk of diversion of AONM? (<www.asno.dfat.gov.au/annual_report_9899/25_years.html>)

Occasionally, ASNO will concede the indisputable point that there is a risk of diversion of AONM – for example, ASNO Director-General John Carlson (2005) states that "... of course it is possible diversion might occur in the future ...". However, it is far more common for ASNO to provide false and misleading "assurances" which strongly imply that there is no risk of diversion.

ASNO should clearly acknowledge on its website that there is a risk of diversion of AONM, and it should remove or modify statements which imply otherwise.

AONM is not fully accounted for

Mr Carlson (2002) says: "All Australian-obligated nuclear material [AONM], including plutonium, is fully accounted for." That is false. There are routine accounting discrepancies –

called 'Material Unaccounted For' (MUF). MUF refers to discrepancies between the 'book stock' (the expected measured amount) and the 'physical stock' (the actual measured amount) of nuclear materials at a location under safeguards. Such discrepancies are frequent due to the difficulty of precisely measuring amounts of nuclear material.

What Mr Carlson means when he says that all AONM is "fully accounted for" is that ASNO has accepted all the various reasons given for MUF over the years, however fanciful those explanations may or may not be. (ASNO refuses to provide specific data on MUF discrepancies or even aggregate information. Nor has ASNO adequately justified this secrecy.)

Mr Carlson (2005) states: "MUF certainly does not imply that AONM is missing. When ASNO concludes that all AONM is accounted for, this means, inter alia, that we are satisfied about the explanation for any MUF."

In other words, when ASNO says all AONM is fully accounted for, it means all AONM is **not** fully accounted for.

It is agreed that MUF does not necessarily mean that diversion has occurred – the problem is that we cannot be certain that diversion of MUF has not occurred on each and every occasion when there is a difference between recorded and measured quantities. The inevitability of accounting discrepancies provides an obvious loophole for would-be proliferators. The problem is most acute with facilities processing large volumes of nuclear material, and in particular those processing large volumes of fissile material such as reprocessing plants.

IAEA safeguards

Mr Carlson (2002) defends the IAEA's safeguards system and says it provides the "foundation" for preventing misuse of Australian-obligated nuclear materials. The safeguards system was exposed as a farce by the Iraqi regime in the 1980s and early '90s – see the voluminous material on this scandal published in the Bulletin of the Atomic Scientists (<www.thebulletin.org>) and by the IAEA (<www.iaea.org>). Since the Iraq debacle, efforts have been made to improve the system, but it still inadequate.

Apart from the nuclear industry and its apologists, including ASNO, there is universal acknowledgement of serious flaws with the safeguards system. Indeed Dr Mohamed El Baradei, the Director General of the IAEA, has stated that the IAEA's basic inspection rights are "fairly limited", that the safeguards system suffers from "vulnerabilities", that efforts to improve the system have been "half-hearted", and that the safeguards system operates on a "shoestring budget". (See statements at <www.iaea.org/NewsCenter/Statements/index.html>.)

Compare those acknowledgements from the IAEA Director General with ASNO's false "assurances" that safeguards prevent diversion of AONM.

The IAEA has two roles – promoting the peaceful uses of atomic energy, and preventing weapons proliferation. Since the materials and facilities required for peaceful nuclear research and power programs can be and have been used for nuclear weapons R&D and in some cases

full-scale weapons production, the IAEA's two roles can be described as: trying to prevent weapons proliferation while actively promoting the expanded use of materials and facilities which can in many cases be used for nuclear weapons research and/or production. The contradiction is obvious notwithstanding Mr Carlson's (2005) comments about the two roles being "complementary" rather than "inconsistent". By Mr Carlson's logic, drug-running operations would neatly complement efforts to stem the trade in illicit drugs.

Membership of the Board of Governors of the IAEA is weighted in favour of countries with significant nuclear programs. Mr Carlson (2005) fails to see the problem arising from that weighting. The problem is that countries with significant nuclear programs may have reasons, e.g. commercial reasons, to downplay the proliferation risks associated with civil nuclear programs. South Australian Premier Mike Rann's observation in a 1982 paper is pertinent: "Again and again, it has been demonstrated here and overseas that when problems over safeguards prove difficult, commercial considerations will come first."

(Numerous articles on the flawed nuclear safeguards system are posted at: <www.foe.org.au/campaigns/anti-nuclear/issues/mining/UraniumSafeguards.doc/view>.)

Declared and undeclared facilities

Mr Carlson (2006) stresses the use of undeclared facilities in Iraq's nuclear weapons program from the 1970s to 1991:

> *"It is well known that discovery of the undeclared Iraq program after the first Gulf War showed inadequacies in "traditional" IAEA safeguards, especially as regards possible undeclared nuclear activities. This is what prompted the program to strengthen safeguards, of which the Additional Protocol is a part.*
>
> *"It is also well known that the IAEA's ability to detect undeclared nuclear activities requires substantial further development, this is the most serious challenge to safeguards – also discussed at length in my annual reports. Australian uranium is exported for declared nuclear programs under IAEA safeguards – the problem of detecting undeclared activities does not show that safeguards on declared activities are inadequate."*

However there is abundant evidence of safeguarded facilities being used in the nuclear weapons program in Iraq (Green, 2002). For example, the safeguarded, highly-enriched uranium (HEU) fuelled IRT research reactor was frequently used in the Iraqi weapons program:
1. A fuel element from the IRT reactor was used for a plutonium extraction experiment.
2. On three other occasions, fuel elements were fabricated from undeclared uranium dioxide in an Experimental Reactor Fuel Fabrication Laboratory, they were secretly irradiated in the IRT reactor and then chemically processed in an unsafeguarded Radiochemical Laboratory containing hot cells.
3. The reactor was used to make polonium-210 for neutron initiator research, using bismuth targets.
4. The reactor was used to produce small quantities of plutonium-238, which could have been used for neutron initiator research instead of short lived polonium-210.

5. The reactor could potentially have produced sufficient plutonium for one weapon over a period of several years using fuel and/or a uranium blanket and/or uranium targets; this risk, albeit small, was increased by the fact that IAEA inspections of the reactor were infrequent because of the low risk status of the reactor.
6. HEU fuel for the IRT reactor, and the 0.5 MW(th) Tammuz-II reactor, was diverted during Iraq's 1990-1991 'crash program'.
7. 'Dirty' radiation bombs were produced and three test bombs were exploded in Iraq in 1987, using materials irradiated in the IRT and/or Tammuz II research reactors (the more powerful IRT reactor was the better suited of the two reactors for the purpose).

Not once did the IAEA detect these proscribed uses of the 'safeguarded' IRT reactor.

The US military clearly believed the IRT and Tammuz II reactors represented a proliferation threat and bombed them in 1991.

The IAEA (1997, p.53) states that the IRT reactor was of "very limited usefulness as a plutonium production reactor" but made a "useful" contribution to the nuclear weapons research and development program.

Iraq's accession to the Non-Proliferation Treaty was a net positive for its nuclear weapons program. Safeguards did little to thwart the program, and NPT accession facilitated technology transfer. IAEA safeguards inspector Roger Richter resigned in 1981, having written to the US State Department the year before stating: 'The most disturbing implication of the Iraqi nuclear program is that the NPT agreement has had the effect of assisting Iraq in acquiring the nuclear technology and nuclear material for its program by absolving the cooperating nations of their moral responsibility by shifting it to the IAEA. These cooperating nations have thwarted concerted international criticism of their actions by pointing to Iraq's signing of NPT, while turning away from the numerous, obvious and compelling evidence which leads to the conclusion that Iraq is embarked on a nuclear weapons program." (Quoted in MacLachlan and Ryan (1991); see also Nucleonics Week, June 25, 1981, p.3.)

Uranium customer countries

Mr Carlson (1998) makes the absurd claim that: "One of the features of Australian policy ... is very careful selection of our treaty partners. We have concluded bilateral arrangements only with countries whose credentials are impeccable in this area."

Mr Carlson's claim is demonstrably false. Australia has uranium export agreements with:
* nuclear weapons states – the US, UK, France, China, and an agreement is reportedly being negotiated with Russia. Most or all of these weapons states are arguably in breach of their NPT disarmament obligations)
* states with a history of covert nuclear weapons research based on their 'civil' nuclear programs (e.g. South Korea)
* states blocking progress on the Comprehensive Test Ban Treaty (e.g. US) and a Fissile Material Cut-Off Treaty (e.g. US).

Japan, a major customer of Australian uranium, has developed a nuclear 'threshold' or 'breakout' capability – it could produce nuclear weapons within months of a decision to do so, relying heavily on facilities, materials and expertise from its civil nuclear program. An obvious source of fissile material for a weapons program in Japan would be its stockpile of plutonium – including Australian-obligated plutonium. In April 2002, the then leader of Japan's Liberal Party, Ichiro Ozawa, said Japan should consider building nuclear weapons to counter China and suggested a source of fissile material: "It would be so easy for us to produce nuclear warheads; we have plutonium at nuclear power plants in Japan, enough to make several thousand such warheads."

Japan's plutonium policy is anything but impeccable. It is irresponsible. Diplomatic cables in 1993 and 1994 from US Ambassadors in Tokyo describe Japan's accumulation of plutonium as "massive" and questioned the rationale for the stockpiling of so much plutonium since it appeared to be economically unjustified. A March 1993 diplomatic cable from US Ambassador Armacost in Tokyo to Secretary of State Warren Christopher, obtained under the US Freedom of Information Act, posed these questions: "Can Japan expect that if it embarks on a massive plutonium recycling program that Korea and other nations would not press ahead with reprocessing programs? Would not the perception of Japan's being awash in plutonium and possessing leading edge rocket technology create anxiety in the region?" (Greenpeace, 1999.)

Yet successive Australian governments have allowed Japan to stockpile Australian-obligated plutonium. Not once has a reprocessing request from Japan been refused.

South Korea

South Korea is another major customer of Australian uranium with less than impeccable credentials. In 2004, South Korea disclosed information about a range of activities which violated its NPT commitments – uranium enrichment from 1979-81, the separation of small quantities of plutonium in 1982, uranium enrichment experiments in 2000, and the production of depleted uranium munitions from 1983-1987.

ASNO (letter, available on request) insists that South Korea did not use AONM in its long-standing secret nuclear weapons research program from 1979-2000. How can ASNO be sure? According to the letter, one reason is that the South Koreans say so!

We still do not know – and will probably never know – whether AONM was used in the South Korean secret nuclear weapons research program:
* We have the assurance of South Korean authorities – but the value of such an assurance is highly questionable in the circumstances.
* There could not possibly have been diversion before 1986 since there was no transfer of AONM to South Korea until 1986.
* Mr Carlson (2005) states in relation to post-1986 unauthorised activities that: "... the IAEA's investigations showed that the nuclear material used was produced from indigenous sources, Accordingly, ASNO is satisfied that no AONM was involved." But the International Atomic Energy Agency (IAEA) appears to base its conclusions in part on "information provided by the ROK", so the argument becomes circular. Moreover, the claim that only indigenous material was used is contested (Kang et al., 2005).

Nuclear power and nuclear weapons

Mr Carlson makes the astonishing assertion that: "Nuclear power does not present a proliferation risk." (Carlson, 2007; see also Carlson 2006.)

In fact, there is a long history of nuclear power (and 'research') programs providing cover for weapons and research. This includes the use of power reactors to produce material for weapons, and the use of a range of other 'civil' nuclear facilities for weapons research and/or production, such as research reactors, enrichment plants, and reprocessing plants.

Mr Carlson (2000) states that "... in some of the countries having nuclear weapons, nuclear power remains insignificant or non-existent." However, of the ten states known to have produced nuclear weapons:
* eight have nuclear power reactors.
* North Korea has no operating power reactors but an 'Experimental Power Reactor' is believed to have been the source of the fissile material (plutonium) used in the November 2006 nuclear bomb test, and North Korea has power reactors partly constructed under the Joint Framework Agreement.
* Israel has no power reactors, though the pretence of an interest in the development of nuclear power helped to justify nuclear transfers to Israel.

Power reactors are certainly used in support of India's nuclear weapons program – this is no longer in dispute since India is refusing to subject eight power reactors to safeguards under the US/India nuclear agreement.

The US itself is using a power reactor to produce tritium for use in nuclear weapons.

Pakistan may be using power reactor/s in support of its nuclear weapons program.

North Korea's October 2006 weapon test used plutonium from an 'Experimental Power Reactor'.

Then Australian Prime Minister John Gorton certainly had military ambitions for the power reactor he pushed to have constructed at Jervis bay in NSW in the late 1960s – he later admitted that the agenda was to produce both plutonium and electricity. In the 1950s and '60s the federal Cabinet was provided with numerous submissions arguing that one advantage of a nuclear power program was the plutonium by-product which could be used in nuclear weapons if the government was so-minded.

Civil and military nuclear programs also overlap to a greater or lesser degree in the five 'declared' weapons states – the US, the UK, Russia, China and France. Specific examples – such as the use of a power reactor to produce tritium for weapons in the US – are of less importance than the broad pattern of civil programs providing a large pool of nuclear expertise from which military programs can draw. The five declared nuclear weapons states all have nuclear power reactors and they account for 57% of global nuclear power output (203/370 gigawatts as at September 2006).

Moreover, nuclear power reactors per sé need not be directly involved in weapons research/production in order for a nuclear power program to provide cover and support for a weapons program. For example, the nuclear weapons programs in South Africa and Pakistan were clearly outgrowths of their power programs although enrichment plants, not power reactors, produced the fissile material for use in weapons. Likewise, nuclear power programs typically involve the construction of research/training reactors which can be and have been used in weapons programs (e.g. India, Israel).

Iraq is another illustration of the potential for nuclear power programs to facilitate nuclear weapons programs even if power reactors are not used to produce fissile material for weapons, or even if power reactors are not built. While Iraq's nuclear research program provided much cover for the weapons program, stated interest in developing nuclear power was also significant. According to Khidhir Hamza (1998), a senior nuclear scientist involved in Iraq's weapons program:

> "Acquiring nuclear technology within the IAEA safeguards system was the first step in establishing the infrastructure necessary to develop nuclear weapons. In 1973, we decided to acquire a 40-megawatt research reactor, a fuel manufacturing plant, and nuclear fuel reprocessing facilities, all under cover of acquiring the expertise needed to eventually build and operate nuclear power plants and produce and recycle nuclear fuel. Our hidden agenda was to clandestinely develop the expertise and infrastructure needed to produce weapon-grade plutonium."

Mr Carlson's view also sits uncomfortably with the concentration of nuclear power in weapons states – almost 60% of global nuclear power output is in the nuclear weapons states and those power programs involve large numbers of nuclear scientists, technicians, engineers etc., with frequent transfer to and from nuclear weapons programs.

In short, the attempt to distance nuclear power programs from weapons proliferation is disingenuous. While currently-serving politicians and bureaucrats are prone to obfuscation on this point, several retired politicians have recently noted the link between power and weapons:
* Former US Vice President Al Gore said in 2006: "For eight years in the White House, every weapons-proliferation problem we dealt with was connected to a civilian reactor program. And if we ever got to the point where we wanted to use nuclear reactors to back out a lot of coal ... then we'd have to put them in so many places we'd run that proliferation risk right off the reasonability scale."
* Former US President Bill Clinton said in 2006: "The push to bring back nuclear power as an antidote to global warming is a big problem. If you build more nuclear power plants we have toxic waste at least, bomb-making at worse."
* Former Australian Prime Minister Paul Keating said in 2006: "Any country with a nuclear power program "ipso facto ends up with a nuclear weapons capability".

Mr Carlson (2000) says: "If we look to the history of nuclear weapons development, we can see that those countries with nuclear weapons developed them before they developed nuclear power programs." However, ostensibly civil nuclear programs clearly preceded and facilitated

the successful development of nuclear weapons in India, Pakistan, and in the former nuclear weapons state South Africa.

Mr Carlson (2006) states: "I have pointed out on numerous occasions that nuclear power as such is not a proliferation problem – rather the problem is with the spread of enrichment and reprocessing technologies ..." The claim is false, no matter how many times Mr Carlson makes it:
* Power reactors have been used directly in weapons programs.
* Power programs have facilitated and provided cover for weapons programs even without direct use of power reactor/s in the weapons program.
* And power reactors produce large volumes of weapons-useable plutonium and can be operated on a short irradiation cycle to produce large volumes of weapon-grade plutonium.

Nuclear weapons states

Mr Carlson (2005) states that it is it is "not plausible" that a non nuclear weapons state would seek nuclear weapons because the nuclear weapons states are not meeting their NPT commitments. Why not?

According to IAEA Director General Dr. Mohamed El Baradei (2005): "[W]e must show the world that our commitment to nuclear disarmament is firm. As long as some countries place strategic reliance on nuclear weapons as a deterrent, other countries will emulate them. We cannot delude ourselves into thinking otherwise."

Likewise, El Baradei (2004) noted that: ''There are some who have continued to dangle a cigarette from their mouth and tell everybody else not to smoke.''

So by the logic of no less an authority than Dr. Mohamed El Baradei – Nobel Peace Prize winner and IAEA Director General – Mr Carlson is deluding himself.

Mr Carlson's illogical and incomprehensible statement is out of step not only with the IAEA Director General but also with the expert Board of the Bulletin of the Atomic Scientists, Nobel Laureats, Cold War warriors such as Henry Kissinger and countless experts in non-proliferation.

References for Section 5: Fact or Fission

Anon., November 12, 1990, "Blix Says IAEA Does Not Dispute Utility of Reactor-Grade Pu for Weapons," Nuclear Fuel, p.8.

Blix, H., November 1, 1990, Letter to the Nuclear Control Institute, Washington DC.

Carlson, John, December 21, 1998, Evidence before Joint Committee on Treaties, <www.aph.gov.au/hansard/joint/commttee/j2022.pdf>.

Carlson, John, 2000, "Nuclear Energy and Non-proliferation – Issues and Challenges: An Australian Perspective", Paper prepared for JAIF Symposium on Peaceful Uses of Nuclear Energy and Non-Proliferation, Tokyo, 9-10 March 2000.

Carlson, John, November 15, 2002, Australian Financial Review, Letter to the Editor. <www.geocities.com/jimgreen3/uraniumbombs.html>

Carlson, John, 2005, supplementary submission 33.1 to
House Standing Committee on Industry and Resources, Inquiry into developing Australia's non-fossil fuel energy industry,
<www.aph.gov.au/house/committee/isr/uranium/subs.htm>
or direct download: <www.aph.gov.au/house/committee/isr/uranium/subs/sub33_1.pdf>.

Carlson, John, November 27, 2006, supplementary submission 30.2 to the Joint Standing Committee on Treaties, Inquiry into Uranium Sales To China,
<www.aph.gov.au/house/committee/ jsct/8august2006/subs2/sub30_2.pdf>.

Carlson, John, August 10, 2007, "Campaigner's claims alarmist", Courier Mail,
<www.news.com.au/couriermail/story/0,23739,22216748-27197,00.html>.

El Baradei, Mohamed, 2004, Quoted in James Traub, "The Netherworld of Nonproliferation", New York Times, June 13.

El Baradei, Mohamed, 2005,
<www.iaea.org/NewsCenter/Statements/2005/ebsp2005n006.html>.

Green, Jim, 2002, Myth of the Peaceful Atom: Research Reactors and Nuclear Weapons,
<www.foe.org.au/campaigns/anti-nuclear/issues/myth-of-the-peaceful-atom/PeacefulAtom.doc/view□>

Greenpeace, September 1, 1999, "Confidential diplomatic documents reveal US proliferation concerns over Japan's plutonium program", media release,
<archive.greenpeace.org/pressreleases/nuctrans/1999sep1.html>.

Hamza, Khidhir, 1998, "Inside Saddam's secret nuclear program", Bulletin of the Atomic Scientists, September/October, Vol.54, No.5.

International Atomic Energy Agency, 1997, "Fourth consolidated report of the Director General of the International Atomic Energy Agency under paragraph 16 of Security Council resolution 1051 (1996)", IAEA Document S/1997/779, Vienna, Austria: IAEA, October,
<www.iaea.org/worldatom/Programmes/ActionTeam/reports/s_1997_779.pdf>

Kang, Jungmin, Peter Hayes, Li Bin, Tatsujiro Suzuki and Richard Tanter, 2005, "South Korea's nuclear surprise", Bulletin of the Atomic Scientists, January/February, Vol.61, No.01, pp.40-49,
<www.thebulletin.org/article.php?art_ofn=jf05kang>.

Koutsoukis, Jason, November 9, 2002, "Has anybody seen Australia's uranium?", Australian Financial Review, pg. 21.

MacLachlan, Ann and Margaret Ryan, 1991, "Allied bombing of Iraqi reactors provokes no safeguards debate", Nucleonics Week, January 31.

---------- **Return to Table of Contents** ----------