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Australia as a supplier of uranium to the  
Asian region: Implications

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## Abstract

Significant interest in Australia's uranium export industry has re-emerged in the face of increased energy demand, fears of eventual reduced supplies of traditional energy sources, further evidence of global climate change and prospective higher electricity prices. This paper examines how Australia will respond to that renewed interest and how it seeks to balance its economic and environmental interests with its traditional nuclear non-proliferation activism.

Australia's uranium is most likely to continue to be exported in the form of yellowcake and the immediate economic benefits are potentially substantial. The development of the nuclear cycle in the region has long-term implications, however, because of the dilemma that Australia faces from the added use and production of fissile material in the region. Given Australia's dependence on the International Atomic Energy Agency and its safeguards regime, the implications of a failed 2010 NPT Review Conference would be especially serious. Changing US attitudes will help as would some regional consensus in support of the nonproliferation regime.

# Australia as a supplier of uranium to the Asian region: Implications

STUART HARRIS\*

## INTRODUCTION

Significant interest in Australia's uranium export industry has re-emerged recently. This interest reflects an expected demand for uranium in the face of increased energy requirements, fears of eventual reduced supplies of traditional energy sources, further evidence of global climate change and prospective higher electricity prices which would make nuclear energy more economic. This paper examines how Australia is responding to that renewed interest and how it seeks to balance its economic and environmental interests with its traditional nuclear nonproliferation activism.

Australia has been exporting uranium oxide, or yellowcake, for some time to nuclear power-producing countries including, in the Asian region, Japan, South Korea and Taiwan; it recently made its first shipments to China. Interest in Australian uranium has also emerged in India, Indonesia, and the Philippines as these countries expand further, or develop, nuclear power-generation. There have also been signs that other regional states, including Vietnam, Malaysia and Thailand, each of which has research reactors, have some interest in developing nuclear power for electricity generation. The international interest in nuclear energy extends beyond questions of commercial access to fuels, to the security of that access. As demand grows and energy supply tightens, security of uranium supply has become an important factor in policy decisions.<sup>1</sup>

As a supplier of uranium to the region, the implications for Australia, beyond the immediate economic benefits, are substantial. In part, this significance will depend upon the form that the uranium takes when

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<sup>1</sup> For example, both China and Japan have sought to include energy security in the bilateral trade treaties with Australia currently under negotiation.

exported, and the conditions under which exports take place. Although uranium will most likely continue to be exported in the form of yellowcake, the export of uranium in association with copper ore or other mineral ores adds a minor complexity. More important is the development of the nuclear cycle in the region and the related question of supply of enriched uranium. For Australia, therefore, the implications will depend significantly upon the continuing effective operation of the international nuclear nonproliferation regime. That this may be in some doubt is discussed below.

### **BACKGROUND**

Australia first mined uranium commercially in the early 1950s for the American and British nuclear weapons programs. The uranium export industry developed based on uranium discoveries in the 1970s in South Australia, Queensland and the Northern Territory. The industry is now said to have 25 per cent of the world's reserves, but close to 40 per cent of the world's low cost reserves.

Control of uranium exports falls within the federal government's jurisdiction. Policies have varied considerably over the years, not just as political control has changed, but also as attitudes have evolved. Policies of the Australian Labor Party (ALP) and the Coalition parties (the Liberal Party and the National Party) have been rethought and adjusted since the Second World War. In the context of the aftermath of the Second World War, Australian–British nuclear collaboration, and the emerging global nuclear threat posed by the Cold War, the ALP under Ben Chifley toyed with the idea of nuclear weapons development and the subsequent Coalition government moved toward such a development in the name of Imperial Defence, later reinforced by China's testing of a nuclear weapon in 1964. The impetus fell away as bilateral relations with the US developed.<sup>2</sup> It was finally swept away by Gough Whitlam when he became prime minister in 1972.

The ALP had originally supported uranium mining and the development of a domestic enrichment and nuclear power industry. The idea of uranium exports, however, faced growing public opposition to nuclear energy, and concern for preservation of Aboriginal lands and broader environmental

<sup>2</sup> Wayne Reynolds, 'Rethinking the Joint Project: Australia's Bid for Nuclear Weapons, 1945–1960', *Historical Journal*, 41(3) 1998, pp. 853–73.

issues. The ALP government had initiated the Ranger Uranium Environmental Inquiry to look at the environmental issues associated with uranium mining in the Northern Territory. Subsequently, ALP policy changed after the ALP lost office in 1975—uranium mining and development of a nuclear industry was to be opposed by the ALP when returned to office.

The Ranger Inquiry report, which was presented to the incoming Coalition government, supported the export of uranium but only under rigorous international and domestic conditions.<sup>3</sup> The Coalition government, arguing the contribution of exports in strengthening the global nonproliferation regime, accepted the Ranger Inquiry's recommendations and agreed to uranium exports from the Ranger mine in the Northern Territory, provided that strict safeguard agreements were in place.<sup>4</sup> Exports began again in 1977. Malcolm Fraser's Coalition government followed the Inquiry's recommendations and adopted systems of bilateral safeguards with International Atomic Energy Agency (IAEA) verification.

By 1982 when the ALP returned to office, uranium mining was underway and the Party revised its policy. Mining was now to be restricted to the two established mines—Narbarlek and Ranger, both in the Northern Territory—but exports of uranium were also permitted where uranium was mined incidentally to the mining of other minerals. The 'Roxby Downs' amendment to the policy allowed Olympic Dam in South Australia—a major copper and uranium development—to proceed. The so-called 'three mines' policy—Ranger, Narbarlek and Olympic Dam—eventually became the 'no new mines' policy to accommodate the closure of Narbarlek in 1988 and the start up of Beverley in South Australia that took place under the Coalition government in 2000.

The expected substantial returns from uranium exports failed to materialise for most of the 1980s and 1990s because of the static market and low uranium prices. The low prices were partly a consequence of Australian output expansion and partly a result of the end of the Cold War, which saw major powers disposing of secondary uranium from military stocks

<sup>3</sup> Ranger Uranium Environmental Inquiry, *First Report* (Canberra: AGPS, 1976).

<sup>4</sup> Martin Indyk, 'Safeguarding Nuclear Energy in the Pacific', in Stuart Harris and Keichi Oshima (eds), *Australia and Japan: Nuclear Energy Issues in the Pacific* (Canberra and Tokyo: Australia-Japan Research Centre, 1980), p. 128.

reduction, which added substantially to the available worldwide supply of uranium. Consequently, uranium mining did not become profitable until the energy prices upturn in the early years of the twenty-first century, and as global climate change emerged as a political issue.

Sizeable public opposition to mining remained, and although, until recent years, there was bipartisanship on safeguards and nonproliferation issues, the ideological differences of the political parties were important. The different attitudes to uranium mining continued as a bone of contention between the ALP and the Coalition until 2007 when the ALP abandoned its policy of blocking the establishment of new uranium mines.

Under the Australian Constitution, state governments have the effective powers to license mining. Until recently, state Labor governments have been able to block the expansion of the number of uranium mines. However, opposition was gradually eroding in some states, and this helped change the ALP's policy. Now the responsible Labor federal minister believes Australia should increase uranium mining and exports to meet increased demand in China and presumably elsewhere.<sup>5</sup>

There are now three mines producing uranium: Ranger, Olympic Dam and Beverley.<sup>6</sup> These mines supply between 20 to 25 per cent of the world market. BHP Billiton wants to open a new mine, Yeelirrie, in Western Australia and Honeymoon will soon begin producing in South Australia. Within a few years, these two additional mines alone will provide an increase of some 50 per cent of the current annual production of around 10,000 tonnes. Further commercial deposits of uranium have been found in the Northern Territory, South Australia, Western Australia and Queensland; the Queensland state Labor government, however, has not yet agreed to license uranium mining.

Among the factors leading to the ALP's policy change have been recognition of the greater international interest in the development of nuclear power with its consequent economic benefits and positive effects on limiting greenhouse gas emissions. That recognition, however, goes hand in hand with a concern to influence how that development takes place in order

<sup>5</sup> Paul Hayes, 'Increase Uranium Mining, Ferguson', *Australian Mining*, 3 April 2009, <[www.miningaustralia.com.au/Article/Increase-uranium-mining-Ferguson/475775.aspx](http://www.miningaustralia.com.au/Article/Increase-uranium-mining-Ferguson/475775.aspx)>.

<sup>6</sup> Another South Australian mine—Four Mile—has been approved for development.



to minimise global nuclear proliferation, and more particularly in the region where weapons proliferation may be a less likely problem than nuclear safety and the safeguarding of nuclear materials.

When in government, the ALP's efforts to reduce the risks of nuclear proliferation and conflict have been long-standing as illustrated by its efforts in developing the Comprehensive Test Ban Treaty (CTBT), pursuing a South Pacific Nuclear Free Zone Treaty (Treaty of Rarotonga, 1986), setting up the Canberra Commission on the Elimination of Nuclear Weapons (Canberra Commission) which reported in 1996, initiating the International Commission on Nuclear Non-Proliferation and Disarmament (International Commission) co-chaired by Australia and Japan, and now the Inquiry into Nuclear Non-Proliferation and Disarmament, by the Joint Standing Committee on Treaties (JSCOT) of the Australian Parliament.

### **SAFEGUARDS**

Australia has a clear economic interest in being a major exporter of uranium oxide, but it is fully cognizant of the strategic and environmental significance of the commodity. Consequently, special measures have to be put in place to deal with uranium internationally, notably to distinguish military from non-military applications and to ensure Australian uranium is used only for peaceful purposes.

Since the adoption of the Ranger Inquiry's recommendations on safeguards, there has been a bipartisan approach to safeguards by both Coalition and Labor Party governments. Australia, described by Jeffrey Lantis as 'a global champion of nonproliferation',<sup>7</sup> has been very conscious of the need to sign bilateral safeguard agreements with countries to which it sells uranium and to sell uranium to countries that are signatories to the Nuclear Non-Proliferation Treaty (NPT), have a bilateral safeguards arrangement under it and, since its adoption, have subscribed to the IAEA's 1997 Additional Protocol to Nuclear Safeguards Agreements which provides for strengthened safeguards.

Those Asian states with significant nuclear activities have signed the Additional Protocol to Nuclear Safeguards Agreements and Australia has been assisting those states with its practical implication to facilitate early

<sup>7</sup> Jeffrey S. Lantis, 'Elections and Enduring Realities: Australia's Nuclear Debate', *Arms Control Today*, 38(3) 2008, pp. 22-9, at p. 22.

ratification. Australia now has twenty-two nuclear safeguard agreements in force covering thirty-nine countries plus Taiwan. Six of those agreements—with China, Japan, Korea, New Zealand, the Philippines and Taiwan (via an agreement with the US)—relate to importers in the region. These agreements place obligations on the bilateral partner regarding Australian Obligated Nuclear Material that apply to uranium as it moves through the different stages of the nuclear fuel cycle.<sup>8</sup>

For the credibility of Australia's safeguards, IAEA verification is an essential component. Although Australia is one of the few developed countries without a nuclear power industry, as a major uranium supplier, it has been an active participant in IAEA executive board discussions of the development of safeguards. In the face of widespread criticism, echoed in Australia, that the 'full scope' safeguards were not adequate to detect the clandestine acquisition or weaponisation of nuclear material, Australia played a constructive role in developing and encouraging the adoption of the IAEA's Additional Protocol to Nuclear Safeguards Agreements. As already noted, this has now become a further precondition for Australia's exports of uranium to non-nuclear weapons states (NNWS).

The international safeguards regime and the Australian bilateral safeguards pursued under it are controversial in Australia. Critics doubt their overall adequacy and reliability. Public attention has focused particularly on sales to nuclear weapons states (NWS). Australia has been a substantial exporter of uranium to the NWS, notably the US, the UK and France. When the safeguards agreement with China was signed, it elicited some domestic controversy, as did the agreement with Russia, which has been put on hold.

Nevertheless, the problem with uranium exports to NWS is that these states are regarded by the IAEA as 'horses that have already bolted', and it is not interested in using its scarce resources for safeguards or verification of those states' civil nuclear activities.<sup>9</sup> NWS are not obligated to accept safeguards arrangements, although now all have done so on a voluntary basis in which they offer a list of civilian plants open to the IAEA to inspect.

<sup>8</sup> Australian Government, Department of Foreign Affairs and Trade, 'Australia's Uranium Exports Policy', <[www.dfat.gov.au/security/aus\\_uran\\_exp\\_policy.html](http://www.dfat.gov.au/security/aus_uran_exp_policy.html)>.

<sup>9</sup> Richard Leaver, 'Nuclear Safeguards: Some Canadian Questions about Australian Policy', Austral Policy Forum 09-5A, 23 February 2009, <[www.globalcollab.org/Nautilus/australia/apsnet/policy-forum/2009/Leaver.pdf](http://www.globalcollab.org/Nautilus/australia/apsnet/policy-forum/2009/Leaver.pdf)>.

The Additional Protocol to Nuclear Safeguards Agreements, which China and a number of Asian countries have signed, gives the IAEA scope for challenge inspections for those countries that have signed it, although how much of an assurance that provides in practice is unclear.

The basic principle underlying the safeguards has itself been criticised despite claims that Australian uranium will not be used for weapons production. It is seen to make little difference if it provides a substitute for uranium sourced elsewhere that is then released for weapons production. There is also a more general concern that the move by the IAEA to Integrated Safeguards as an economy measure, under tight financial constraints (imposed by the US, Australia and others) on the IAEA budget and the increased costs of the Additional Protocol, has weakened the safeguards process. This is not necessarily the case as a Canadian study, although on a small and not particularly representative sample, has argued.<sup>10</sup>

Moreover, the bilateral agreement with China is currently being renegotiated to facilitate a major mine expansion at Roxby Downs for exports to China of uranium infused copper concentrate to ensure that any uranium extracted would be satisfactorily accounted for and become subject to the monitoring of the safeguards agreement. Richard Leaver questions whether the Chinese safeguards are not more ones of form rather than substance.<sup>11</sup> Whether the practical or the symbolic aspects are the more material is another question.

For NNWS, in particular, the criticisms question the adequacy of the monitoring process and the problem that insufficient account is taken, in the safeguarding process, of the ability for reactor grade uranium to be made into weapons. A further argument relates to the 'back end' of the cycle. Given the expansion of nuclear power, the production of large amounts of reactor grade plutonium that will result could be reprocessed for weapons production. These are contested issues, but while debate continues over the ability to make weapons from reactor grade uranium and from reactor grade plutonium, some strong voices suggest it is possible and may already have

<sup>10</sup> Jack Boureston and Yana Feldman, 'Integrated Nuclear Safeguards: Development, Implementation, Future Challenges', *Compliance Chronicles*, No. 4 (Ottawa: Canadian Centre for Treaty Compliance, Carleton University, January 2007), <[www.carleton.ca/cctc/docs/CC4.pdf](http://www.carleton.ca/cctc/docs/CC4.pdf)>.

<sup>11</sup> Leaver, 'Nuclear Safeguards'.

happened.<sup>12</sup> There is also a view that existing safeguards do not take sufficient account of the concerns that terrorists might be able to gain access to fissile material, although since 1970, the IAEA has taken a number of steps towards the protection of nuclear materials. This included the 2002 Action Plan for Protection Against Nuclear Terrorism.

Australia will no doubt be putting forward constructive ideas on improved safeguards in the 2010 NPT Review Conference.

#### **AUSTRALIA'S DILEMMA**

The foregoing discussion needs to be seen in the context in which Australia now faces a dilemma in its uranium export and nuclear nonproliferation policies. How it will resolve this dilemma is yet to be spelled out by the government. A primary objective of the International Commission is to reinvigorate the global debate on nuclear issues and on how to strengthen the NPT; but it will no doubt also give advice to the Australian government on its approach to the 2010 NPT Review Conference. In addition, the JSCOT will presumably make a contribution to policy thinking about the NPT Review Conference.

Australia's dilemma is that in expanding its uranium exports in order to gain economic and global climate change benefits, it is adding to the possibility of nuclear weapons proliferation. Increased reliance on nuclear power in the region will increase the number of plants using and producing fissile materials and a greater spread of nuclear expertise and technology. Despite the acknowledged failures in the safeguards and verification processes, notably in Iraq in 1991, management of the nuclear processes can be argued to have been reasonably successful as far as the first of the three pillars of that mechanism—proliferation—is concerned, although, as discussed below, not all agree with that proposition.

Australia's position has been that both NWS and NNWS have obligations under the NPT regime and that the reduction of nuclear weapons was a critical component of maintaining the nonproliferation regime.

<sup>12</sup> Richard Garwin, Submission to the Joint Standing Committee on Treaties: Inquiry into Nuclear Non-Proliferation and Disarmament, March 2009, <[www.aph.gov.au/House/committee/jsct/nuclearnon\\_proliferation/subs/sub85.pdf](http://www.aph.gov.au/House/committee/jsct/nuclearnon_proliferation/subs/sub85.pdf)>; Marko Beljac, 'Putting Nuclear Non-Proliferation First', Submission to the Joint Standing Committee on Treaties: Inquiry into Nuclear Non-Proliferation and Disarmament, March 2009, <[www.aph.gov.au/House/committee/jsct/nuclearnon\\_proliferation/subs/sub18.pdf](http://www.aph.gov.au/House/committee/jsct/nuclearnon_proliferation/subs/sub18.pdf)>.

Consequently, Australia has been conscious of the bargain represented by the two other pillars—the commitment of NWS to move towards disarmament on the one hand, and the rights of the NNWS to have access to them the benefits of peaceful nuclear energy while forgoing the nuclear weapons option on the other.

Australia has long interpreted this bargain as involving an active role in meeting the obligations implied in the rights of the NNWS. The Ranger Inquiry had said that ‘a total refusal to supply [uranium] would place Australia in clear breach of Article IV of the NPT’.<sup>13</sup> As noted earlier, Australia has been an active participant in the international debate over the nuclear cycle at all levels. The Fraser and Hawke governments both stressed the critical management issues of the nuclear cycle and there was substantial bipartisanship over the need to set examples and emphasise discipline in the safeguarding of material in the civilian nuclear fuel cycle while seeking more effective ways of limiting nuclear weapons proliferation.

Australia has been vigorous in its participation in the international community’s proceedings and thinking about nuclear issues in response to its concerns about nuclear proliferation. It thus sought to take a lead in contributing to the international debate and was active in supporting the continuing renewal of the NPT and gaining support, including through pressing for a CTBT, for the 1995 indefinite extension of the NPT. Under the leadership of the Hawke government-appointed Ambassador for Disarmament, and as part of continuing activism in the field of non-proliferation and nuclear disarmament, Australia’s efforts to achieve a ban on nuclear weapons testing, although opposed by the US, contributed ultimately to the passage of the CTBT.

Although the CTBT was passed by the United Nations in the early days of John Howard’s government, that government’s objective of strengthening US ties and its acceptance of the lead of the George W. Bush administration meant that little diplomatic effort was put into seeking support for its ratification. Nor did the Coalition government show any enthusiasm in seeking follow-up to the 1996 Report of the Canberra Commission.

<sup>13</sup> Ranger Uranium Environmental Inquiry, *First Report*, pp. 179–80.

At the 2000 NPT Review Conference, the NWS agreed to a 13-point program of action towards nuclear disarmament. On taking office, the Bush administration did not support this program.<sup>14</sup> In practice, some elements were implemented, such as the moratorium on nuclear weapons testing. Few others were, hence the lack of agreement at the 2005 NPT Review Conference.

Australia's previous high level of activity has resumed under Kevin Rudd's government. It is very sensitive to the fact that the expected substantial expansion of peaceful nuclear energy in the region will need increased regional cooperation to avoid proliferation risks and to ensure that safety and environmental concerns do not increase. For this, an invigorated NPT and IAEA are necessary.

As Michael Clarke notes, the logic of restraint that prevailed during the Cold War and underpinned support for the NPT, and which saw a diminished need for nuclear weapons, was undermined by the gradual US revitalised attitude to nuclear weapons in the post-Cold War period, especially as questions of 'rogue states' and terrorism arose.<sup>15</sup> Nuclear weapons remained central in the US as a counter-proliferation tool and, together with its other actions, led to a view that, after 11 September 2001, the US was seen by others as a country to be deterred rather than a country practicing deterrence to discourage aggression by others;<sup>16</sup> the Anti-Ballistic Missile Treaty was revoked, the CTBT fell off the agenda, the Proliferation Security Initiative was unilaterally established rather than negotiated through the UN, and there was a lack of support for a Fissile Material Cut-Off Treaty (FMCT) to limit the production of fissile material.

These factors have affected the nonproliferation regime to the point where the US Institute for Peace states 'we may be close to a tipping point

<sup>14</sup> The changes in the US position are discussed in more detail in Ron Huisken, 'Keeping our Yellowcake Peaceful: A Policy Framework for Uranium Exports', SDSC Working Paper 412 (Canberra: Strategic and Defence Studies Centre, Australian National University, March 2009).

<sup>15</sup> Michael Clarke, 'Refashioning Australia's Nuclear Bargain? The Challenges of Changing Strategic Regime and Market Environments', *Nonproliferation Review*, 15(2) 2008, pp. 311–34, at pp. 317–19.

<sup>16</sup> Nuclear Age Peace Foundation, 'Statement: The Challenge of Nuclear Weapons in the Twenty-First Century: A Path Forward', 15 June 2003, <[www.wagingpeace.org/articles/2003/06/15\\_21st-century.htm](http://www.wagingpeace.org/articles/2003/06/15_21st-century.htm)>.

on nuclear proliferation'.<sup>17</sup> The logic of restraint is now much more in question and the problems facing the NPT and NNWS's adherence to the NPT have increased considerably. As Marianne Hanson has argued, a paradigm shift in the NWS and particularly in US policy is needed.<sup>18</sup>

The new US administration has indicated a need to ensure the 2010 NPT Review Conference does not fail. It has indicated its wish to renew arms control with Russia through negotiating a successor to the Strategic Arms Reduction Treaty (START) I. President Barack Obama has also indicated that Russian help on Iran's nuclear weapon program would reduce the need for a missile defence system.<sup>19</sup> Although US Secretary of Defense Robert Gates has said that he sees further testing as necessary, Obama has called for the US Senate to reconsider its opposition to ratification of the CTBT. Given the recent agreement in the Conference on Disarmament to negotiate an FMCT, which has been welcomed by Australia,<sup>20</sup> it would be a significant step if the US were to pursue an effective FMCT.

The current Australian government is committed to supporting the NPT process and to reducing the acknowledged weaknesses of the treaty at the 2010 NPT Review Conference. The debate in Australia mostly reflects views supporting this approach, but there are alternative views suggesting that flaws in the NPT regime are sufficiently damaging to the treaty's legitimacy and effectiveness, and that there is a need to move away from the NPT and seek alternative ways to deal with nuclear proliferation.<sup>21</sup>

The domestic debate is continuing, but there are no signs that the Australian government will depart from its continuing support for the NPT. With a new administration in the US, the Australian government will be

<sup>17</sup> United States Institute for Peace, *America's Strategic Posture: The Final Report of the Congressional Commission on the Strategic Posture of the United States* (Washington, DC: United States Institute for Peace, May 2009), p. xv.

<sup>18</sup> Marianne Hanson, 'The Future of the NPT', *Australian Journal of International Affairs*, 59(3) 2005, pp. 301–16, at p. 313.

<sup>19</sup> Peter Crail, 'Obama seeks Russian Cooperation on Iran', *Arms Control Today*, 39(3) 2009, pp. 41–3.

<sup>20</sup> Stephen Smith, Minister for Foreign Affairs, 'Australia Welcomes Agreement to Negotiate a Fissile Materials Cut-off Treaty', Media Release, 1 June 2009.

<sup>21</sup> Andrew O'Neil, 'Nuclear Proliferation and Global Security: Laying the Groundwork for a New Policy Agenda', *Comparative Strategy*, 24(4) 2005, pp. 343–59; Michael Wesley, 'It's Time to Scrap the NPT', *Australian Journal of International Affairs*, 59(3) 2005, pp. 283–300; for a counterinterview, see Hanson, 'The Future of the NPT'.

hoping that some of the Bush administration's negative effects on the NPT, which led to an acrimonious outcome at the 2005 NPT Review Conference and the growing decline of the legitimacy of the NPT, may be ameliorated.

### **THE NUCLEAR FUEL CYCLE AND GNEP**

Australia shares wider concerns that the greater the number of states that move towards a complete nuclear fuel cycle, the greater the possibility of horizontal proliferation of nuclear weapons. Australia's existing policy is consistent with a view that there is adequate enrichment capacity, existing or being developed, in the world, and that Australian uranium should be enriched in existing facilities and then exported to states that are parties to the NPT and adhere to the Additional Protocol to Nuclear Safeguards Agreements.

Moreover, developing a nuclear fuel cycle with existing enrichment technology is costly for, and beyond the capacity of, many smaller developing countries or those with limited resources. On the other hand, for countries developing civilian nuclear energy plants, security of supply of enriched uranium is a critical consideration. So too is the question of reprocessing, disposal and storage of spent fuel.

To limit the incentives for states to seek fuel supply security with enrichment capabilities, calls have been made over several decades for the development of multilateral enrichment facilities or fuel banks, desirably under international supervision.

Under the Howard government, in 2007 Australia became a member of the Global Nuclear Energy Partnership (GNEP), a group under US leadership of nearly thirty countries, including China, Japan and South Korea. Its stated aim is to promote nuclear energy while reducing nuclear proliferation. As well as cooperating in the transfer of technology, its aim originally was to provide enriched uranium on a 'lease and take back' basis, with a fuel services program package consisting of fuel supply and spent fuel treatment services. It would provide nuclear fuel economically and safely to developing nations in return for their forgoing enrichment and reprocessing activities, thus reducing proliferation concerns. Part of the original aim of GNEP was to encourage the establishment of advanced



reactors that would reuse spent fuels and so reduce the incidence of wastes, although this has since been dropped as part of the GNEP program.<sup>22</sup>

The initial judgement of the Australian Safeguards and Non-Proliferation Office (ASNO) was that, rather than take back wastes, Australia would be a user of the GNEP services and send any wastes produced in Australia to a country with advanced fuel cycle technologies able to recycle the spent fuel and treat the eventual high level wastes.<sup>23</sup> When Australia joined GNEP, however, it reserved its right to enrich uranium but also said it would not take back the world's wastes. The Rudd government, although critical of GNEP when in Opposition, and although it attended the most recent GNEP meeting, has not yet decided its position on membership. It has said, however, that Australia will not take back the world's spent nuclear fuel.

Lease and take-back arrangements for nuclear fuel are not new; it was a practice followed by the Soviet Union and now offered again by Russia in respect of its nuclear power plant exports, including the one it is building in Iran. A number of proposals for multilateral fuel banks have been made, some under the management of the IAEA; overall, by 2007, some twelve proposals had been catalogued.<sup>24</sup> There is also a proposal by a US non-governmental organisation, the Nuclear Threat Initiative, in association with the IAEA. None seems to include take-back provisions.

A problem with the various proposals for limiting enrichment largely to NWS and their allies (which would include Australia and Canada were they to take the enrichment track), is that it would perpetuate the existing resentment of the two-tiered system established under the NPT which many NNWS see or claim to see as discriminatory. From that perspective, GNEP in particular could be seen less as an internationalist program than one protecting the enrichment monopoly of the NWS.

Another problem with GNEP and multilateral arrangements more generally is that they would make it difficult to sustain Australia's policy of limiting the countries to which Australia's uranium would be sold or

<sup>22</sup> Daniel Horner, 'Part of GNEP Officially Cancelled', Arms Control Association, May 2009, <[www.armscontrol.org/act/2009\\_5/Part\\_GNEP\\_canceled](http://www.armscontrol.org/act/2009_5/Part_GNEP_canceled)>.

<sup>23</sup> Australian Safeguards and Non-Proliferation Office, *Annual Report 2006-2007* (Barton: ASNO, 2007).

<sup>24</sup> Tariq Rauf and Zoryana Vovchok, 'Fuel for Thought', *IAEA Bulletin*, 49(2) 2008, pp. 59-63.

transferred to third parties.<sup>25</sup> For arrangements under the control of individual governments, a further problem is that they will not meet the supply security criterion for NNWS. The ability of a country or group of countries to block exports of nuclear material for reasons unconnected with the trade itself puts that security at risk—Australian deferral of the commitment to uranium exports to Russia (along with the US) because of its conflict with Georgia in 2009 is a case in point.

There has been considerable criticism of the GNEP idea by arms control groups in the US, the US National Academy of Sciences, and environment groups in the US and in Australia on a range of grounds.<sup>26</sup> The arms control groups argue that it will encourage rather than discourage proliferation; the environment groups see it as necessarily involving nuclear waste returning to the enriched uranium supplier and, in Australia's case, a nuclear waste depository in Australia. Given that the reprocessing part of the GNEP program has been dropped, some of the criticism is now not valid. The argument that there will still be considerable fissile material in individual countries is still valid, calling for safe and secure management.

Australia's participation in GNEP was a consequence of a series of influences. The question of nuclear enrichment and reprocessing in Australia had been off the agenda since the 1970s and only reemerged when global climate change and energy shortages arose after 2003, showing up first in the global market for uranium after a long period of low prices. Secondary supplies were diminishing while prospects for nuclear power expansion were looking brighter. Prime Minister Howard wanted to expand uranium sales and have some counter to criticism of the Coalition government's inaction on climate change. He also saw possibilities for greater economic benefits from an enrichment industry in Australia by selling a value-added product rather than simply the basic raw material.<sup>27</sup> In 2006, he raised the issue of nuclear power in Australia, calling for a full-

<sup>25</sup> Beljac, 'Putting Nuclear Non-Proliferation First', p. 6.

<sup>26</sup> Joint Letter to Congress from Nuclear Arms Control Organisations, Union of Concerned Scientists, 31 October 2007, <[www.anuclear.org/Portals/0/documents/08%20Community%20Letter%20Opposing%20GNEP.pdf](http://www.anuclear.org/Portals/0/documents/08%20Community%20Letter%20Opposing%20GNEP.pdf)>; 'National Academy of Sciences says No-Go on GNEP', *Energy Daily*, 6 December 2006.

<sup>27</sup> John Howard, 'Australia's National Challenges: Energy and Water', transcript of speech to CEDA (Committee for Economic Development of Australia), 17 July 2006, <[http://ceda.com.au/public/package/howard\\_200607/howard\\_200607\\_speech.html](http://ceda.com.au/public/package/howard_200607/howard_200607_speech.html)>.

blooded debate on the issue which led to the establishment of a taskforce under a supporter of civilian nuclear power for Australia, Dr Zygmunt (Ziggy) Switkowski.

The taskforce report supported the expansion of nuclear mining and export, saw nuclear power as a practical option for part of Australia's electricity production and economically competitive provided greenhouse costs were included in the costs of competing fuels, and concluded that there was an opportunity for Australia to be a participant in the wider nuclear fuel cycle.<sup>28</sup> The report noted that an Australian development of a laser enrichment process, the Silex process, now being commercially tested by an American company, would lower enrichment costs. It was developed at the Lucas Heights nuclear establishment over some twenty or so years and sold to a private company, Silex Systems Ltd, in 1994.

The problem with lower enrichment costs, if they materialise, is that in reducing the cost barriers to an enrichment process for smaller countries, it makes it easier for countries interested in setting up clandestine programs for weapons production to acquire enrichment capabilities, and hence increases the possibilities of proliferation. The taskforce chair subsequently said that the priority should be for nuclear power in Australia rather than uranium enrichment.

Were nuclear power plants to be built in Australia, more pressure would exist to establish a uranium enrichment plant in Australia, although the economics could well militate against it. Thus only if it became a supplier, rather than a user, of the nuclear services provided by GNEP or a supplier in a multilateral fuel bank would it be likely to be economic and that, as observed earlier, would pose problems for its selective export policy.

The current Labor government has said that it does not support moving to uranium enrichment or the development of nuclear power. At the present time, moreover, the Coalition parties appear to have shifted away from nuclear power. Former opposition leader, Brendan Nelson, indicated no

<sup>28</sup> Australian Department of the Prime Minister and Cabinet, *Uranium Mining, Processing and Nuclear Energy: Opportunities for Australia?* (Barton: Department of the Prime Minister and Cabinet, 2006).

support for nuclear power, although the present leader, Malcolm Turnbull, may be less inclined to reject it outright.<sup>29</sup>

A further consideration is that were a uranium enrichment plant to be established, given its nuclear expertise—even if now less than in the past—Australia could be seen as having the resources and the technology to give it, like Japan, a break-out capability, whether that was its intention or not. That point is unlikely to be lost on other countries, including those in the region.<sup>30</sup>

### **THE AUSTRALIAN DEBATE ABOUT MINING AND EXPORTING URANIUM**

We need to separate the interests and opinions behind uranium export in the form of uranium oxide (yellowcake) and those behind the export of low enriched uranium linked to nuclear power generation. No propositions have come forward for the production of highly enriched uranium. The main debates on uranium mining and exports of uranium are between the miners and the environmental groups. Aboriginal groups do not have a uniform position on mining and it often depends upon how the location of mining and the linked environmental impacts might affect their religious sites.

Miners and investors in the mining industry are clearly supporters of the development of uranium exports and this extends beyond simply uranium miners since uranium is often found in association with other minerals, notably copper and gold. The companies already producing yellowcake are keen to see their expansion programs approved which, subject to meeting environmental requirements, the current Labor government and several state governments have done. Exploration has led to further discoveries and the companies involved will seek approvals to develop and export. New mines have been approved in Western Australia and South Australia, but are not yet producing.

Environmental groups are mostly strongly opposed to mining and exports of uranium. There is some questioning at the margins of the

<sup>29</sup> Malcolm Turnbull, Doorstop Interview, Tasmania, 1 April 2009, <[www.liberal.org.au/news.php?Id=2864](http://www.liberal.org.au/news.php?Id=2864)>.

<sup>30</sup> Andrew Davies, 'Australian Uranium Exports and Security: Preventing Proliferation', Strategic Insights 28 (Barton: Australian Strategic Policy Institute, August 2006), p. 15.

movement about the relative danger of nuclear power and of climate change and global warming. This is illustrated best by the changed view of Tim Flannery, a noted scientist, environmentalist and author, who has softened his view on nuclear energy. He believes the dangers of climate change are such that nuclear power should be accepted provided sufficient care is taken to minimise its harmful effects. He has also criticised Australia's unwillingness to sell uranium to India.<sup>31</sup> This has not been reflected yet in the basic policies of the main groups, but the World Wildlife Fund appears to have moved from active campaigning against mining, acknowledging that mining will take place, but arguing that nuclear power will not solve the climate change problem. Friends of the Earth, the Australian Conservation Foundation and Greenpeace can be expected to continue to campaign against mining and more strongly still against any expansion of the nuclear cycle in Australia.

A slight majority of Australians would seem to have accepted mining and exporting uranium—one opinion poll in 2006 showed a small majority in favour, but down from support levels in the 1980s and 1990s. A slightly larger majority supports exports to China, seemingly reflecting climate change concerns about China's coal-fired power generation.<sup>32</sup>

When the issue of nuclear power is polled, the question of siting is critical. When the idea of developing nuclear power in Australia reemerged at the instigation of Howard in 2006, the Australia Institute listed the various sites in Australia that could be suitable for nuclear power plants. Needing water, population centres and a substantial electricity supply, these tended to be in the coastal areas which are the more favoured residential areas.<sup>33</sup> So although public opinion polls suggest the population is not greatly divided over the merits of nuclear power in the abstract, even those who favour it tend to be against such plants in their own areas.

Various polls conducted since the issue was raised for public consideration in 2006 show that support for nuclear power has not changed

<sup>31</sup> 'Refusing to Sell Uranium to India Morally Questionable: Flannery', ABC News Transcript, 4 February 2009, <[www.abc.net.au/news/stories/2009/02/04/2482427.htm](http://www.abc.net.au/news/stories/2009/02/04/2482427.htm)>.

<sup>32</sup> 'Majority of Australians Support Uranium Exports to China', Roy Morgan Finding No. 4009, 13 April 2006, <[www.roymorgan.com/news/polls/2006/4009/](http://www.roymorgan.com/news/polls/2006/4009/)>.

<sup>33</sup> Andrew Macintosh, 'Siting Nuclear Power Plants in Australia: Where Would They Go?', Research Paper 40, Australia Institute, January 2007, <[www.tai.org.au/documents/downloads/WP96.pdf](http://www.tai.org.au/documents/downloads/WP96.pdf)>.

significantly—usually around 40 per cent in support and rather more opposed, but with a sizeable undecided group.<sup>34</sup> Support for the introduction of nuclear power in the respondent's neighbourhood, however, was much lower with about two-thirds opposed and one-quarter supporting local siting of a nuclear plant.<sup>35</sup>

The issue of the nuclear power cycle raised considerable media interest at the time of Howard's speeches in 2006. The issue then brought in a small scientific support group that provided some balance to the scientists behind the environmental opposition. None of the major mining or energy companies, however, has indicated, at least in recent decades, any desire to expand the nuclear fuel cycle, including uranium enrichment, beyond the mining and export of uranium oxide. Some companies linked to nuclear technology, including the one concerned with the Silex technology, would benefit from an expansion of the industry, but so far they do not include any of the big players. The laser enrichment technology, in particular, has attracted adverse attention from environmentalists.<sup>36</sup>

As discussed earlier, defence interests in a nuclear industry were clear post-1945 when the move to a nuclear power industry was seen as a way towards the development of nuclear weapons if needed. Little if any such interest has been shown since the establishment of the US alliance and the nuclear umbrella it is assumed to provide to Australia.

Whatever the federal attitude to nuclear power, the siting issue is also a matter for state and local government politics. When some local businessmen established a company to investigate developing nuclear power plants in South Australia and Victoria, the two states indicated that they had legislation in place to prevent this, as do some local governments. The federal government then proposed overriding legislation to make such decisions possible.

<sup>34</sup> 'Is Opinion on Nuclear Power Changing?', Crikey Conversations, 28 January 2009, <<http://blogs.crikey.com.au/pollytics/2009/01/28/is-opinion-on-nuclear-power-changing/>>.

<sup>35</sup> Andrew Macintosh, 'Who Wants a Nuclear Power Plant? Support for Nuclear Power in Australia', Research Paper 39, Australia Institute, January 2007, <[www.tai.org.au/documents/downloads/WP95.pdf](http://www.tai.org.au/documents/downloads/WP95.pdf)>.

<sup>36</sup> See, for example, Greenpeace, 'Secrets, Lies and Uranium Enrichment: The Classified Silex Project at Lucas Heights', November 2004, <[www.greenpeace.de/fileadmin/gpd/user\\_upload/themen/frieden/silex\\_report.pdf](http://www.greenpeace.de/fileadmin/gpd/user_upload/themen/frieden/silex_report.pdf)>

### **The international and regional uranium market**

Australia is clearly able and willing to contribute substantially to meeting global and regional uranium demand as it grows with the expansion of nuclear power. International Energy Agency projections suggest that while global nuclear power generation in the next decade or two will not progress as fast as global electricity demand, it will still grow significantly;<sup>37</sup> growth in Asia will be a major area of increased demand for some time, notably in China and India, but also with some expansion in South Korea and Japan. According to the World Nuclear Association (WNA), in 2008, over and above China's eleven nuclear power reactors in commercial operation, twelve more were under construction and at least twelve more were about to start construction. With China fast-tracking its nuclear power plans, construction of some of the latter has already begun in early 2009.<sup>38</sup>

China has its own deposits of uranium but, according to the WNA, they are low-grade and inefficiently mined. Reliance on uranium imports will therefore remain important. Other planned expansions in the Asian region, apart from India, are limited and likely to be slow.

Indian plans for additional nuclear power reactors are substantial with six reactors under construction and up to twenty-five planned and proposed. History suggests that Indian nuclear plans have been slow to materialise; among other things, fuel shortages have at times delayed commercial operations. The Nuclear Suppliers Group (which included Australia) agreement to an exemption for India provided safeguard arrangements were made with the IAEA, removed some of the previous constraints on the transfer of nuclear materials and technology to India. Nevertheless, Australia has declined to sell uranium to India as it is not an NPT country; that policy is unlikely to change soon, although counter arguments in Australia are likely to grow.<sup>39</sup> To a large degree, however, the uranium oxide market is global, and India's demand will add to global demand.

<sup>37</sup> International Energy Agency, *World Energy Outlook 2008* (Paris: International Energy Agency), pp. 147, 456.

<sup>38</sup> Xin Dingding, 'China to Start Building 5 Nuclear Power Plants', *China Daily*, 21 April 2009.

<sup>39</sup> See, for example, Rory Medcalf, 'Restraining Nuclear Arms in the Asian Century: An Agenda for Australia', Lowy Institute Analysis (Sydney: Lowy Institute for International Policy, September 2008), p. 11; Hamish McDonald, 'India: Beyond the Sea Wall: Chronic Neglect and Australia-India

Domestic and overseas investment in Australian uranium companies has increased as a consequence of the prospects for growing uranium demand. Overseas investors include Indian and Canadian companies seeking interests in Australian uranium development. Japan already has interests in Australian uranium and China too has looked to invest in Australian uranium companies; Sinosteel has joined with an Australian company PepinNini in a joint venture to develop a uranium deposit in South Australia and other Chinese companies seem likely to follow.

#### **AUSTRALIA AND REGIONAL AND INTERNATIONAL SCIENTIFIC AND TECHNICAL COOPERATION FRAMEWORKS**

Consistent with its obligations under the NPT, Australia has a long history of involvement and cooperation in nuclear matters with Asian countries, notably through the Australian Nuclear Science and Technology Organisation. This cooperation covers a range of nuclear issues including nuclear health and safety, security, research, environment and education. Australia also participates actively in such groups as the Forum for Nuclear Cooperation in Asia, the Asian Senior-level Talks on Non-Proliferation and the IAEA's Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology (RCA). Australia has a 'strong record' in contributing financially to the IAEA's Technical Cooperation Fund and in supporting cooperative IAEA research projects.<sup>40</sup>

Australia was a party to the 1987 RCA. It ratified each of the three subsequent extensions, with ratification of the fourth extension expected shortly. In 2007–08, Australia provided training in the areas of nuclear safeguards, nuclear security and export controls to over 180 professionals from fifteen regional countries.

Since 2007, in collaboration with Indonesia and South Korea, and in the Asia-Pacific Economic Cooperation (APEC) context, Australia has been active, through ASNO, in seeking to develop an Asia-Pacific association on regional safeguards. The third informal meeting in Seoul in 2009 agreed to establish an Asia Pacific Safeguards Network. Its aim includes regional

Relations', *The Asialink Essays*, 4, June 2009, <[www.asialink.unimelb.edu.au/\\_data/assets/pdf\\_file/0019/21673/Hamish\\_McDonald\\_India\\_essay.pdf](http://www.asialink.unimelb.edu.au/_data/assets/pdf_file/0019/21673/Hamish_McDonald_India_essay.pdf)>.

<sup>40</sup> Australian Safeguards and Non-Proliferation Office, Submission to the Joint Standing Committee on Treaties: Inquiry into Nuclear Non-Proliferation and Disarmament, Canberra, April 2009.



operational capacity-building in relation to NPT obligations and related conventions. Training programs are also an important element of such networks. There has also been effective cooperation between the Australian Radiation Protection and Nuclear Safety Agency and the related agencies of governments in the region.

In sum, Australia participates actively in what Andrew Simon concluded are 'good multilateral and bilateral frameworks for addressing many of the scientific, technical and management concerns associated with nuclear development',<sup>41</sup> these include capacity-building, training and management, and safeguards design and implementation.

#### **NUCLEAR WASTE STORAGE IN AUSTRALIA**

Australia currently stores its limited nuclear waste at its Lucas Heights nuclear reactor site. Some of this would have been processed overseas to convert it into stable waste for long-term storage.

Were Australia to develop a nuclear enrichment capacity as part of a fuel supply mechanism, there would be a security issue in taking back the spent fuel for secure storage in Australia. A treatment process of highly radioactive waste for disposal underground, SYNROC, was developed in Australia, and would be a possible medium should government policies change (the process is currently being evaluated in the US).<sup>42</sup> Political and environmental sensitivity makes this highly unlikely, however.

While various geologically acceptable sites for safe depositories of its own nuclear wastes have been identified, efforts since 1978 to gain public acceptance have not been successful. The Howard government legislated for a site in the Northern Territory which remains within the federal jurisdiction, and one had been proposed by representatives of the traditional (Aboriginal) owners. However, a recent Senate Committee report, prepared under the Rudd government, said that the existing legislation dealing with nuclear waste was deeply flawed and should be repealed. It looked for a

<sup>41</sup> Andrew Simon, 'Nuclear Power in Southeast Asia: Implications for Australia and Non-Proliferation', Lowy Institute Analysis (Sydney: Lowy Institute for International Policy, April 2008), p. 17.

<sup>42</sup> Selena Ng, 'An Industry Update on Global Power and the Opportunities for Australia', presentation to the Annual Meeting of the Four Societies, Sydney, 25 February 2009, <[www.nuclearaustralia.org.au/Four%20Societies%20Talk%20Dr%20Ng%20250209.pdf](http://www.nuclearaustralia.org.au/Four%20Societies%20Talk%20Dr%20Ng%20250209.pdf)>.

new policy framework involving a more consultative approach, although did not specify any particular solution.<sup>43</sup>

Arguments that Australia should be responsible for wastes that come from the uranium it exports are raised from time to time, but these are seldom supported.<sup>44</sup> One notable exception was former Prime Minister Hawke. Arguing that it was an act of environmental responsibility, he said that Australia had the ‘geologically safest places in the world for the storage of waste’, that Australia should promote itself as a safe place for the world’s nuclear waste and that the money raised could go towards domestic environment problems and to support the Aborigines.<sup>45</sup> Some scientists are cautiously supporting the view that the issue is about public perceptions rather than a question of safety or risk. This was also the position of the *Uranium Mining, Processing and Nuclear Energy* report, chaired by Switkowski.

We noted earlier the refusal of the Howard government to accept importing the world’s nuclear wastes within the GNEP program. Similarly, the Rudd government has rejected the idea of accepting the world’s nuclear wastes. This leaves the issue of handling spent fuel to the international community, which seems unlikely to provide a solution or, as Richard Garwin suggests, storing the wastes safely next to the nuclear reactors as is generally the case at present.<sup>46</sup>

## CONCLUSION

Given the prospective growth in nuclear power in the Asian region, the short-term implications for Australia are that it is well-placed to increase its uranium exports and, despite competitors, to capture more of the world and regional market.

The longer-term implications, however, arise because of the dilemma that Australia faces from the added use and production of fissile material in

<sup>43</sup> Senate Standing Committee on Environment, Communication and the Arts, *Commonwealth Radioactive Waste Management (Repeal and Consequent Amendment) Bill 2008* (Canberra: Parliament of Australia, 2008), <[www.aph.gov.au/senate/committee/eca\\_ctte/radioactive\\_waste/report/c03.htm](http://www.aph.gov.au/senate/committee/eca_ctte/radioactive_waste/report/c03.htm)>.

<sup>44</sup> A similar argument was made earlier that Australia should take back the ash waste from the coal it exports.

<sup>45</sup> ‘Hawke Nominates Australia as World’s Nuclear Waste Dump’, ABC AM Transcript, 27 September 2005, <[www.abc.net.au/am/content/2005/s1469140.htm](http://www.abc.net.au/am/content/2005/s1469140.htm)>.

<sup>46</sup> Garwin, Submission.

the region. Against the economic and climate change benefits that growth in nuclear power and in Australia's uranium trade bring, are the risks to Australia's nuclear nonproliferation objectives. The IAEA and the NPT have provided the framework under which Australia avoided this dilemma in the past through the safeguards regime and its bilateral safeguards agreements. For this framework to remain effective, a shoring up and reinvigoration of the NPT is required, along with some strengthening of the safeguards monitoring and verification processes, particularly as they apply in the region. This is so even if, as seems likely, Australia remains simply an exporter of yellowcake. It will be in Australia's interests, therefore, to encourage and support regional implementation of procedures for safe and secure handling of nuclear materials. The existing institutional arrangements provide useful mechanisms for these purposes, but greater effort may be needed.

The question of the complete nuclear fuel cycle has challenging implications for Australia. It is unlikely that Australia will develop its own enrichment capability while the political mood of politicians and the public remains as it is at present. Admittedly, both political parties have changed their views substantially, but this has occurred over a long period of time. Progress on resolving the problem of multilateralising enrichment capabilities to minimise proliferation risks will be slow and events could well take over. For Australia, GNEP may not be the best path to follow. The question of safe storage of spent fuels, perhaps more important in the region than weapons development, is likely to depend for some time on the management and skills in the countries utilising nuclear power. Australia already has effective frameworks for cooperation and exchanges in the region that may need further development to assist in enhancing the skills needed.

The NPT framework is seen as fundamental to Australia's nonproliferation approach; the implications of a failure coming out of the 2010 Review Conference would be especially serious. The action taken with respect to the International Commission will be a valuable starting point for Australia at the 2010 NPT Review Conference. However a significant shift in US policy is essential for a better outcome. The first steps appear favourable, but Australia should do what it can to reinforce those first steps. Some degree of regional consensus, or at least some common ground on nuclear security issues in the region, whether in the APEC forum, the ASEAN Regional Forum or the East Asia Summit context, would make a significant contribution.

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