Submission No. 52

Inquiry into the Strategic Importance of Australia's Uranium Resources

The House of Representatives Standing Committee on Industry and Resources

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Friends of the Earth

Australia

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Introduction

This submission has been prepared by the Friends of the Earth Australia Anti Nuclear Campaign. Friends of the Earth is a non-government, non-profit organisation committed to social justice and environmental sustainability. Friends of the Earth is active at local, regional and national levels and is also a member of the Friends of the Earth International network of 71 member groups, one of the worlds largest non-government environmental groupings. Friends of the Earth has been actively engaged on nuclear issues in Australia for over 30 years.

Friends of the Earth is committed to phasing out of the nuclear industry based on the premise that it is an unsafe, unwanted and unnecessary impact on both people and the environment. Over 50 years the nuclear industry has failed to deliver it's promise of safe, clean energy while in reality continued to generate hazardous waste and entrench the threat of nuclear weapons. Friends of the Earth works toward a nuclear free future; opposing major nuclear developments; campaigning for responsible management of waste and presenting clean safe alternatives.

Friends of the Earth is opposed to:

- All aspects of the nuclear fuel cycle
- Uranium exploration, mining, milling, processing and export.
- Nuclear power.
- Nuclear weapons construction and testing.
- The use of nuclear reactors for research and for the production of radioactive isotopes.

Friends of the Earth strongly supports:

- Active phase out of existing uranium mining operations.
- Long term commitment to mine site rehabilitation and monitoring.
- The minimisation of radioactive wastes.
- Minimising handling and transportation of radioactive materials.
- Minimising the use ionising radiation.
- Immediate disarmament of nuclear weapons states.
- Environmentally benign alternatives to nuclear power.

We welcome the opportunity to provide further information and discuss the following submission at any hearings of the Inquiry.

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In what follows we will address the following terms of reference:

a) global demand for Australia's uranium resources and associated supply issues
c) potential implications for global greenhouse gas emission reductions from the further development and export of Australia's uranium resources
d) current structure and regulatory environment of the uranium mining sector

and provide advice on:

1. Whole lifecycle of waste management assessment of the uranium industry, including radioactive waste management at mine sites in Australia, and nuclear waste management overseas consequent to use of Australian exported uranium.
2. The adequacy of social impact assessment, consultation and approval processes with traditional owners and affected aboriginal people in relation to uranium mining resource projects.
5. The effectiveness of safeguards regimes in addressing the proliferation of fissile material, the potential diversion of Australian Obligated fissile materials.

Comments

a) global demand for Australia's uranium resources and associated supply issues

The future of nuclear power is uncertain, as is the potential contribution of Australian uranium to meeting global demand.

A total of 440 reactors operating in 31 countries generate 16% of the world's electricity, 6% of the commercial primary energy and 2-3% of the final energy.

The largest nuclear power generators – the US, France, Japan, Germany, Russia, and South Korea – produce about three quarters of the world's total.

For every country with nuclear power reactors, more than five other countries have no power reactors and no plans to introduce any.

Of the countries with nuclear power programs, some are planning to build new reactors, but a greater number are either deliberately phasing out nuclear power or have no new reactors on order or planned (a *de facto* phase-out policy).

Previous expectations of significant growth of nuclear power have proven to be highly inaccurate. The IAEA estimated in 1974 that in the year 2000, nuclear output would be 4,450 GW. Output in the year 2000 was 352 GW. The IAEA estimate was out by a factor of 12.6.

The average age of operating nuclear power plants is 21 years and has been increasing steadily. In total, 107 reactors have been permanently shut down, and their average age was also about 21 years.

Twenty-two of the last 31 reactors connected to the grid have been built in Asia. Of the reactors under construction, 18 of the 27 are located in Asia, with almost no new construction in Western European or North America. The historical peak of 294 operating reactors in Western Europe and North America was reached in 1989.

Assuming a reactor operating lifetime of 40 years, a total of 280 reactors would have to be built to keep pace with shut downs over the next 20 years. Even if lifetime extensions significantly increase the average reactor lifespan, it is doubtful whether new reactors will keep pace with shut downs.

Of the US$ 87.6 billion spent by 26 OECD member states between 1991 and 2001 on energy R&D, half went to nuclear research. Oil, coal and gas accounted for a total of 10%, and renewable energy 8%.

(Most of the above information is drawn from: Mycle Schneider and Antony Froggatt, December 2004, "World Nuclear Industry Status Report 2004", <www.greens-efa.org/pdf/documents/greensefa_documents_106_en.pdf>.)

Even if power reactors are introduced in Indonesia, Thailand and Vietnam (three countries mentioned in foreign minister Alexander Downer's submission to the current inquiry), they will be small nuclear power programs with very little significance for Australian uranium exports.

Mr Downer says in his submission to the current inquiry: "The IAEA acknowledges that certain forms of subsidy may be necessary in some instances, but believes that the Kyoto Protocol flexible mechanisms give ample opportunity for this. Such arrangements will help to make nuclear energy more affordable." However, nuclear power is not subsidised through Kyoto mechanisms and further attempts to introduce any such subsidies are likely to meet with the same fate as previous attempts - they will be rejected. Furthermore, Mr Downer's statements regarding Kyoto mechanisms are an implicit acknowledgement that nuclear power is not economically viable in the absence of subsidies.

c) potential implications for global greenhouse gas emission reductions from the further development and export of Australia's uranium resources

Few would predict a doubling of nuclear power output by 2050, but even if it were to eventuate it would reduce greenhouse emissions by about 5% – less than one tenth of the reductions required to stabilise atmospheric concentrations of greenhouse gases. Nuclear power is being promoted as *the* solution to climate change, but it is no such thing. As a senior analyst from the IAEA said last year: "Saying that nuclear power can solve global warming by itself is way over the top".

Relatively high-grade, low-cost uranium ores are limited and will be exhausted in about 50 years at the current rate of consumption. The estimated total of all conventional uranium reserves is estimated to be sufficient for about 200 years at the current rate of consumption. These resources will of course be depleted more rapidly in a scenario of nuclear expansion. It is far from certain that uranium contained in 'unconventional sources' such as granite, sedimentary rock or seawater can be recovered economically.

Accepting that low-cost uranium resources are limited, nuclear advocates frequently argue that the use (and production) of plutonium in 'fast breeder' reactors will allow uranium resources to be extended almost indefinitely. However, most plutonium breeder programs have been abandoned because of technical, economic and safety problems. In any case, this option must be firmly ruled out because it poses an unacceptable risk of contributing to the proliferation of plutonium fission weapons.

The finite nature of uranium as an energy resource, and the limited availability of relatively high-grade, low-cost ores, has implications for greenhouse assessments. Claims that nuclear power is 'greenhouse free' are false. Substantial greenhouse gas generation occurs across the nuclear fuel cycle. Fossil fuel derived electricity is generally considerably more greenhouse intensive, but this comparative benefit of nuclear power may be substantially eroded as higher-grade uranium ores are depleted and lower-grade ores are mined. Most of the earth's uranium is found in very poor grade ores, and recovery of uranium from these ores is likely to be considerably more greenhouse intensive compared to high-grade ores.

Likewise, nuclear power emits more greenhouse gases per unit energy than most renewable energy sources (though the difference is small), and that comparative deficit is likely to widen as uranium ore grades decline.

Claims that nuclear power can reduce greenhouse emissions generally apply only if the comparison is with fossil fuel generated power. For example, the European Commission argues that 312 million tonnes of carbon dioxide emissions are avoided annually through the use of nuclear power in European Union countries (compared to natural gas), but the 'savings' drop to:

- roughly half, if the comparison is with a natural gas cogeneration plant;
- zero, if the comparison is with hydroelectricity;
- a negative value, if the comparison is with a range of energy efficiency options of with a number of renewable energy sources such as wind power or various forms of biogas.

Numerous studies have detailed how major reductions in greenhouse gas emissions can be achieved through a combination of energy efficiency measures and renewable energy sources.

Energy efficiency and conservation measures alone will not suffice, nor will renewable energy sources – but combined, they can deliver the major reductions of greenhouse gas emissions required to stabilise atmospheric concentrations of those gases.

Without significantly reducing growth in energy demand through a range of energy efficiency measures, greenhouse emissions are likely to increase even with a large expansion of nuclear power or renewable energy.

Major emissions reductions can be achieved with technologies already in use; technological developments will certainly make the task less onerous, but the necessary reductions can be accomplished even in the absence of technological advances.

Some studies consider the relative cost of reducing greenhouse emissions. Nuclear power does not fare well in these studies. Energy efficiency measures are shown in one study to deliver almost seven times the emissions reductions as nuclear power per dollar invested (and none of the high-level waste or weapons-useable plutonium). Wind power also compares favourably to nuclear power when calculating carbon abatements costs. Various forms of gas cogeneration and biomass cogeneration can reduce emissions at comparable cost to nuclear power.

Studies of the means by which large emission reductions can best be achieved demonstrate the importance of matching solutions to the prevailing circumstances. Solutions that are highly effective in one region may be far less so elsewhere – for example, some countries are far better placed to make greater use of solar or wind power than others.

Two studies have analysed methods to achieve major greenhouse emission reductions in Australia. Last year, the Clean Energy Future Group – which comprises renewable energy companies and the Worldwide Fund for Nature – produced a comprehensive paper that details how major greenhouse gas emissions reductions can be achieved (Saddler et al., 2004). It finds that Australia can meet its energy needs from various commercially proven fuels and technologies while cutting greenhouse emissions by 50% by 2040.

A report by the Australia Institute maps out a plan to achieve an overall 60% reduction in greenhouse gas emissions in Australia by 2050 (Turton et al., 2002). The study covers all sectors of the Australian economy. It envisages widespread energy efficiency measures, a major expansion of wind power, modest growth of hydroelectricity, significant use of biomass, niche applications for solar photovoltaics, and a shift away from large-scale thermal generators isolated from load centres towards distributed cogeneration of electricity and heat.

The following studies analyse methods by which large reductions to greenhouse emissions can be achieved without nuclear power. A number of these studies are summarised by Saddler et al., 2004, ch.13:

Bailie A., S. Bernow, B. Castelli, P. O'Connor, and J. Romm, April 2003, "The Path to Carbon Dioxide-Free Power: Switching to Clean Energy in the Utility Sector", a study by Tellus Institute and Center for Energy and Climate Solutions for World Wildlife Fund, USA, <worldwildlife.org/climate/projects/powerSwitch.cfm>.

Bailie, Alison, Stephen Bernow, William Dougherty, Michael Lazarus and Sivan Kartha, July 2001, "The American Way to the Kyoto Protocol: An Economic Analysis to Reduce Carbon Pollution", report by Tellus Institute and Stockholm Environment Institute – Boston Center, for World Wildlife Fund, <www.panda.org/downloads/climate_change/usreport.doc>.

Department of Trade and Industry (UK), 2003, "Our Energy Future – Creating a Low Carbon Economy", Energy White Paper, Version 11, <www.dti.gov.uk/energy/whitepaper>.

Diesendorf, Mark, 2005, "Towards New South Wales' Clean Energy Future", A Report for the Clean Energy Future Group, <wwf.org.au/News_and_information/Publications/PDF/Report/nswcefreport2005.pdf>.

Friends of the Earth (UK), September 2002, "Tackling climate change without nuclear power: A report detailing how climate targets in the power sector can be met without replacing existing nuclear capacity", <www.foe.co.uk/campaigns/climate/resource/general_readers.html#nuclear_power>

Hansen, J., M. Sato, R. Ruedy, A. Lacis and V. Oinas., 2000, "Global warming in the twenty-first century: An alternative scenario", Proc. Natl. Acad. Sci., 97, pp.9875–9880.

Harmelink, M., W. Graus, K. Blok, and M. Voogt, 2003, "Low Carbon Electricity Systems: Methodology & Results for the EU", report by Ecofys for World Wide Fund for Nature.

Interlaboratory Working Group on Energy-Efficient and Clean-Energy Technologies (USA), November 2000, "Scenarios for a Clean Energy Future", Prepared for Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, <www.ornl.gov/sci/eere/cef>.

Mintzer, Irving, J. Amber Leonard, Peter Schwartz, July 2003, "U.S. Energy Scenarios for the 21st Century", prepared for the Pew Center on Global Climate Change, <www.pewclimate.org/global-warming-in-depth/all_reports/energy_scenarios/index.cfm>

Naughten B., P. Pakravan , J. Dlugosz J., and A. Dickson, 1994, "Reductions in greenhouse gas emissions from the Australian energy system: a report on modelling experiments using ABARE's MENSA model", Canberra: ABARE.

Saddler, Hugh, Richard Denniss and Mark Diesendorf, 2004, "A Clean Energy Future for Australia", Report for the Clean Energy Future Group, <www.wwf.org.au/News_and_information/Features/feature10.php>.

Turton Hal, Jinlong Ma, Hugh Saddler and Clive Hamilton, October 2002, "Long-Term Greenhouse Gas Scenarios: A pilot study of how Australia can achieve deep cuts in emissions", Discussion Paper No. 48, The Australia Institute, Canberra. Summary at: <www.tai.org.au/WhatsNew_Files/WhatsNew/DP48sum.pdf>.

Royal Commission on Environmental Pollution (UK), 2000, "Energy – The Changing Climate", <www.rcep.org.uk/energy.htm>.

Torrie, Ralph, Richard Parfett and Paul Steenhof, October 2002, "Kyoto and Beyond: The low-emission path to innovation and efficiency", prepared by Torrie Smith

Associates for the David Suzuki Foundation and the Canadian Climate Action Network Canada, <www.davidsuzuki.org/files/Kyoto_72.pdf>.

d) current structure and regulatory environment of the uranium mining sector (noting the work that has been undertaken by other inquiries and reviews on these issues)

The current regulatory framework for uranium mining can only be described as patently inadequate. The failure to realistically engage with the potential hazards in the assessment and approval phase continues on into operations of uranium mines. It is clear from the regular incidents at mines in different parts of the country that regulations are failing to adequately address operational problems that are inherent in the type of extraction process in use. Further the methods used in monitoring the environmental and health impact of uranium mining are lacking, and the reliability of reporting mechanisms is becoming increasingly questionable. Finally, the penalties for failing to comply with regulations are not in line with the significant hazards that breaches present. A lack of willingness to impose penalties, especially for repeat offences, indicates a level of complacency that is unacceptable considering the serious risks to the environment and the health of the community.

Assessment and Approval

Assessment of uranium projects is conducted under established Environment Impact Assessment (EIA) practices under the Environment Protection and Biodiversity Conservation (EPBC) Act, 1999 and previous Environment Protection (Impact of Proposals) (EPIP) Act 1974. While the EPBC legislation establishes a framework for environmental protection, in practice it mitigates certain impacts while facilitating intrinsically hazardous developments.

Jabiluka Uranium Project
The approval of the Jabiluka project situated within World Heritage listed Kakadu National Park clearly demonstrates a failure to represent public interest and environment protection ahead of private interest. Mining, milling and tailings waste disposal within a sensitive ecosystem subject to monsoon rainfall will inevitably have environmental impacts.

Beverley Uranium Project
The Beverley uranium mine was the first mine using the controversial in-situ leach technique in Australia and remains the only uranium mine using a sulfuric acid leachate in this process in the OECD. Approval of the project was made despite significant uncertainties remaining about potential groundwater contamination and liquid waste disposal. Significant scientific debate remains unresolved about how 'contained' the aquifer being mined is. Reports of groundwater 'excursions' were revealed to the public only after approval had been granted. These impacts will accumulate over the period of operation and remain when the project is decommissioned.

Honeymoon Uranium Project
The Honeymoon project, involving a similar mining technique to the Beverley mine was given approval again within a cloud of controversy. In the case of the

Honeymoon mine there is clear evidence that the aquifer mined is connected to surrounding groundwater. An excursion during trial operations was again recorded.

Approvals have consistently ignored environmental impacts or assume this is a reasonable consequence given the perceived 'benefits' of mining. However environmental protection is not just a matter of principle, impacts of the processes have consequences for communities in these regions and may prevent utilisation of resources, notably water supply in the future. The EIA process provides the key point in mitigating environmental impact from industrial actions. Given the nature of uranium mining and long-term waste management it can be impossible to reverse impacts when in operation.

*It must also be noted that in approval process there is an overwhelming body of anecdotal evidence that suggests that the practices involved in gaining consent from traditional owner groups for uranium mining have been far from satisfactory. Stories of harassment, divisive interventions into communities and hollow promises of employment and community development opportunities are common.

Regulation

While uranium is given unique status under Federal EIA and export controls, practical regulation of mining operations remains more ineffectual than other hazardous industries. Repeated incidents at mines both in South Australia and Kakadu demonstrate a clear failure of existing regulatory regimes to improve mining practices once in operation.

Monitoring

Adequate effective monitoring of radioactive release into the environment remains an issue of debate. The physical nature of radiation and the mechanisms of release make monitoring a difficult task. However steps can be made to expand present monitoring allowing for assessment independent of the mine operator.

Monitoring in general remains periodic rather than continuous and does not cover the spectrum of potential radiological exposures / release. The location of monitoring stations in most case is not sufficient to assess intermittent and accumulative impacts.

Aside from long-term accumulation of radiation, potential worker exposure is a significant issue. Current practice in assessment of human exposure continues to use 'risk' analysis with 'acceptable' worker and accident doses above general population. There remains no government collection of records to assess long-term health impacts to workers. Given the health impacts now associated with asbestos mining, long-term health assessment should be a public duty of care.

Reporting

In many cases incidents at uranium operations have failed to be promptly reported to authorities or the public. A concerning example of this conduct in recent times was demonstrated by ERA when in their annual report it was stated that the company operates in accordance with applicable environmental legislation. However the directors' report fails to mention a number of severe uranium contamination events that occurred last year at ERA's Ranger mine. One notorious incident in March 2004 resulted in 28 workers falling ill after drinking water contaminated with uranium levels 400 times greater than the maximum Australian safety standard.

Enforcement and Penalty Mechanisms

There is a clear double standard when it comes to enforcement and penalties for breaches of regulations. Comparable incidents involving the discharge of pollutants occurring in other industrial operations would face significant penalties or be shut down. Impacts on artesian water in an arid region, or World Heritage wetlands should attract the same penalties associated with discharge of industrial pollutants to an urban sewer. The fact that there have been repeated incidents at Olympic Dam, Beverly and Ranger over the course of their operation shows a clear failure by both mine operators and regulators to improve operational practices onsite. Given repeated and at times chronic incidents the present regulatory structure fails to enforce environmental protection. Regulation requires independence and potency to deliver effective control over mining operations. Further to have measurable impact on operators practice, regulators must have active powers of enforcement. Given the nature and repetition of incidents, there needs to be stronger use of financial penalties combined with the suspension or revocation of operating licences.

Summary

Increasing environment protection against the impacts of uranium mining requires an understanding of the systemic issues created by inadequate EIA approval. Regulatory structures require increased independence and stronger power to suspend or revoke operating licenses. Long term impact assessment and mitigation requires expanded and continuous monitoring combined with effective public reporting. Further, health records should be maintained independently to assess cumulative effects on workers.

1.Whole lifecycle of waste management assessment of the uranium industry, including radioactive waste management at mine sites in Australia, and nuclear waste management overseas consequent to use of Australian exported uranium.

Radioactive wastes arise across the nuclear fuel cycle:

* Uranium mines typically generate large volumes of low-level waste which is kept on site. For example the Roxby Downs copper/uranium mine in South Australia has a radioactive tailings stockpile of 60 million tonnes, growing at 10 million tonnes annually. Mining company WMC will pass responsibility for long-term management of its waste stockpile to the South Australian government at some stage after the mine's closure and future generations of South Australians will need to monitor and manage the waste stockpile for millennia.

* Enrichment plants generate large volumes of waste, including depleted uranium.

* Reactors emit radioactive emissions to air and water in addition to the spent fuel they create.

* Reprocessing plants generate a high-level radioactive waste stream and radioactive emissions to air and water, in addition to uranium and (weapons-useable) plutonium.

In addition to the public health and environmental hazards posed by radioactive waste, it also poses military risks, e.g. depleted uranium (used in munitions) is a by-product of enrichment, and spent fuel from power reactors contains large quantities of plutonium.

High-level waste is by far the most hazardous of the waste streams arising from the nuclear fuel cycle. High-level waste includes spent nuclear fuel, and the waste stream from reprocessing. As discussed below, reprocessing poses a significant public health and environmental hazard, as well as a proliferation risk, and little progress has been made with respect to final disposal of spent fuel or high-level reprocessing wastes.

Nuclear proponents put forward disingenuous arguments on radioactive waste issues, such as:
* Stating that the volume of radioactive waste generated by nuclear power reactors is relatively small compared to gaseous emissions from fossil fuel powered electricity plants. Such statements generally ignore the vast volumes of waste arising across the nuclear fuel cycle, not least from uranium mining and enrichment. Moreover, high-level nuclear waste emits a great deal of radioactivity and heat, and in some cases is prone to radionuclidic concentration leading to criticality accidents, as well as the potential separation and military use of plutonium (or the separation and military use of highly-enriched uranium from some research reactor spent fuel).
* Claiming that radioactive wastes are contained. This is simply false radioactive emissions to air and/or water are emitted across the nuclear fuel cycle.
* Claiming that the technical problems associated with waste management have been solved and that the only problems concern public acceptance. A myriad of technical problems remain unresolved, and the problem of public acceptance is no less a problem for being of a non-technical nature.
* Claiming that spent fuel is not radioactive waste but is an 'asset' or 'resource'. However, only a small fraction of uranium or plutonium recovered from reprocessing is re-used as fuel, and the main purpose of reprocessing plants has been to serve as long-term *de facto* storage sites - out of sight, out of mind.
* Claiming that reprocessing spent fuel reduce waste volumes and toxicity. In fact reprocessing does nothing whatsoever to reduce overall radioactivity or toxicity. The overall waste volume is increased by reprocessing, albeit the case that the volume of the high-level waste stream is reduced.
* Pretending that repositories or stores for radioactive waste exist even when they demonstrably do not. For example, ANSTO states that reprocessing wastes from its research reactors "will be returned to Australia for storage at the Commonwealth's national intermediate level waste store" but no such store exists. Sometimes it is claimed that Finland, Sweden or other countries have final repositories for high-level waste though they do not (see the country profiles at <www.radwaste.org>).
* Claiming that "nuclear power is the only energy-producing industry which takes full responsibility for all its wastes and fully costs this into the product." (Hore-Lacey, 2003.). This claim is demonstrably false a range of wastes across the nuclear fuel cycle are not factored into costs.

Spent nuclear fuel

A typical power reactor (1000 MWe, light water type) produces 25-30 tonnes of spent fuel annually. Annually, about 12,000 to 14,000 tonnes of spent fuel are produced by power reactors. By 2010, the total accumulated amount of spent fuel will be about 340,000 tonnes, with about 110,000 tonnes having been reprocessed and the rest stored. (Rosen, 1998.)

Under a scenario mapped out by the International Panel on Climate Change in which the installed nuclear capacity would grow from to about 3,300 GW in 2100, the total accumulated spent fuel by 2100 would be about 6.3 million tonnes.

The following approaches are being pursued in relation to spent fuel management (Hore-Lacey, 2003, ch.5):

* Reprocessing followed by vitrification of high-level reprocessing wastes with a view to eventual deep underground disposal. This is the policy in the UK, France, Japan, China, and India. (German nuclear utilities will no longer send spent fuel to France or the UK for reprocessing from mid-2005.)
* Treating spent fuel as high-level waste with a view to eventual direct disposal. This is the policy in the USA, Canada, and Sweden.
* A number of countries operating nuclear power plants have yet to choose between reprocessing, direct disposal or long-term storage.

Technologies exist to encapsulate/immobilise radionuclides to a greater or lesser degree, but encapsulated radioactive waste still represents a potential public health and environmental threat for millenia. Synroc the ceramic immobilisation technology developed in Australia seems destined to be a permanently 'promising' technology. As nuclear advocate Leslie Kemeny (2005) notes, Synroc "... showed great early promise but so far its international marketing and commercialisation agendas have failed".

Reprocessing

Civil reprocessing releases significant quantities of radioactive wastes into the sea and gaseous discharges into the air. Cogema's reprocessing plant at La Hague in France, and BNFL's plant at Sellafield in the UK, are the largest source of radioactive pollution in the European environment (WISE-Paris, 2001). The radioactive contamination can be traced through the Irish Sea, the North Sea, along the Norwegian coast into the Arctic and Atlantic Oceans, and gives rise to elevated levels in biota. There is an increase in the rate of childhood leukaemia and other radiation-linked diseases in the vicinity of both Sellafield and la Hague although the contribution of the reprocessing plants to the increases is disputed.

The OSPAR Commission regulates marine pollution in the North-East Atlantic under the terms of the 1992 OSPAR Convention (<www.ospar.org>). Fifteen European countries are parties to the Convention, as is the European Union. Most of the European countries party to the Convention have been calling for a sharp reduction in radioactive emissions from Sellafield and La Hague.

At the Ministerial-level OSPAR meeting in 1998, all parties agreed to progressive and substantial reductions in radioactive discharges to achieve by the year 2020 close to zero concentrations in the marine environment above historic levels.

At the 2000 OSPAR meeting, a resolution was passed stating that: "The current authorisations for discharges or releases of radioactive substances from nuclear reprocessing facilities shall be reviewed as a matter of priority by their competent national authorities with a view to, inter alia, implementing the non-reprocessing option (for example, dry storage) for spent nuclear fuel management at appropriate facilities." (OSPAR, 2000.)

The 2000 OSPAR resolution was supported by 12 countries Denmark, Belgium, Finland, Germany, Norway, The Netherlands, Switzerland, Portugal, Spain, Sweden, Iceland, and Ireland but not by France or the UK.

The serious proliferation issues associated with reprocessing are discussed elsewhere in this submission.

Repositories

Not a single repository exists anywhere in the world for the disposal of high-level waste from nuclear power.

Only a few countries such as Finland, Sweden, and the US have identified a repository site. Plans are being advanced in several countries to build deep underground repositories for high-level waste, but as IAEA Director-General Mohamed El Baradei (2000) notes, these plans face significant obstacles: lack of public acceptance; cost; lack of expertise; and lack of suitable sites.

The proposed repository at Yucca Mountain in the US still faces significant obstacles. A legal limit of 70,000 tonnes of spent fuel equivalent has been established, yet US reactors now operating are expected to generate 105,000 tonnes over their lifetime, possibly considerably more. The Massachusetts Institute of Technology (MIT) Interdisciplinary Study into the future of nuclear power notes that if global nuclear output was increased almost three-fold to 1000 GWe, and assuming direct disposal rather than reprocessing, new repository storage capacity equal to the legal limit established for Yucca Mountain would have to be created somewhere in the world "roughly every three or four years". The US itself would need additional new capacity of the scale of Yucca Mountain about every 12 years if nuclear output was trebled. (Ansolabehere et al., 2003.)

The MIT Interdisciplinary Study goes on to say that "the organizational and political challenges of siting will surely be formidable." (Ansolabehere et al., 2003.)

The MIT Interdisciplinary Study assumes a major reduction in the volume of spent fuel generated per unit of nuclear output such that an output of 1000 GWe results in the generation of 20,000 tonnes of spent fuel annually. That is only about one third higher than the current figure of 12-14,000 tonnes from a global nuclear capacity of 364 GWe. Thus, formidable challenges lie ahead even at the current level of nuclear power output.

Several themes can be identified in recent discussions and debates over final disposal of high-level wastes (some discussed by El Baradei, 2003).

First, a range of alternative technologies (e.g. transmutation - discussed below) or options (e.g. sea-bed disposal) have been discussed. However, all are seen to be non-starters for economic, technological or political reasons. Putting a positive spin on this situation, there is said to be an 'international consensus' on the wisdom of placing high-level waste in deep underground repositories.

Second, deep repositories are promoted as final disposal sites and contrasted with storage or other options which require ongoing vigilance for long periods into the future. However there is some movement within the nuclear industry towards accepting the need for monitoring and 'retrievability' of radioactive waste in case of leaks and other problems. This shift is generally supported by environmental organisations, but it undercuts the alleged 'benefit' of disposal by conceding that high-level waste will be a burden on future generations whether or not it is placed in repositories.

Third, partly driven by the failure to establish national repositories, there has been growing interest in attempting to establish multinational/international repositories. However, there is also acknowledgement that multinational repositories could generate more intense public opposition than national repositories, e.g. the fierce opposition to

Pangea Resources in Australia. Russia may accept foreign-origin high-level waste for disposal, and the UK may dispose of some wastes previously destined for return to their country of origin.

A number of themes are taken up by Steve Kidd (2004) from the World Nuclear Association: "So what can the industry do in the future to get out of this mess? I would say four things. Number one, don't be afraid to say that you don't know whether spent fuel will be an asset or liability, as you can't be certain what future nuclear fuel markets will look like or how technology will shift. Try to sell the idea of long-term surface storage to the public on the basis that you are passing a potential asset onto the next generation, not a certain liability. Secondly, continue to investigate and demonstrate the technical merit of deep repositories as, whatever occurs, some of these are going to be needed in the future. Thirdly, look positively at the concept of international repositories. There are significant regulatory (and perhaps public acceptability) problems with these, but the idea of each nuclear country having its own looks ludicrous from several angles. Finally, actively pursue research in improved reprocessing technology, which should take place at a limited number of safeguarded sites around the world (as has also been suggested for enrichment facilities). The world could well be short of nuclear fuel in the coming decades, as was originally predicted, so this option must be investigated."

Transmutation

Transmutation is a technological 'solution' sometimes proposed to deal with high-level, long-lived waste. The aim is to use reactors, spallation technology or particle accelerators to generate beams of neutrons or charged particles to transform long-lived radionuclides into shorter-lived or stable isotopes. For example, neutron bombardment of radioactive iodine-129 results (indirectly) in its conversion to stable, non-radioactive xenon. And neutron bombardment of plutonium and neptunium leads to their fission which converts them into shorter-lived radionuclides.

Problems with transmutation include the following (Zerriffi and Makhijani, 2000; Makhijani, 2001; Ansolabehere et al., 2003; Gibson, 1991):
* The technology is immature and its future uncertain.
* It is useful only for certain types and forms of waste. It does not do away with the need for long-term management (storage or disposal) of the resulting wastes.
* It may require the use of reactors (with the attendant proliferation, public health and environmental risks).
* It may require reprocessing (with the attendant proliferation, public health and environmental risks) to separate waste streams prior to selective treatment. Failure to separate/partition can lead to unwanted outcomes such as conversion of stable isotopes into radioactive ones.

A report from the UK's government's Radioactive Waste Management Advisory Committee (2003) concluded that partitioning (separation of different radionuclides) followed by transmutation could deal with only a small fraction of the UK's higher-activity wastes, it would be costly, and would require new nuclear reactors and reprocessing plants.

The MIT Interdisciplinary Study concludes that: "Decisions about partitioning and transmutation must ... consider the incremental economic costs and safety, environmental, and proliferation risks of introducing the additional fuel cycle stages and facilities necessary for the task. These activities will be a source of additional risk to those working in the plants, as well as the general public, and will also generate considerable volumes of non-high-level waste contaminated with significant quantities of transuranics. Much of this waste, because of its long toxic lifetime, will ultimately need to be disposed of in high-level waste repositories. Moreover, even the most economical partitioning and transmutation schemes are likely to add significantly to the cost of the once-through fuel cycle." (Ansolabehere et al., 2003.)

2.The adequacy of social impact assessment, consultation and approval processes with traditional owners and affected aboriginal people in relation to uranium mining resource projects.

Current social impact assessment, consultation and approval processes are clearly inadequate. This is a serious issue that must be addressed further. There is need for a thorough independent investigation and assessment of past dealings of mining companies with traditional owners and aboriginal people. Evidence exists that past dealings have been seriously flawed. A comprehensive plan for future engagement in these processes needs to be designed in direct consultation with Aboriginal communities and Traditional owners and implemented before any further developments occur.

We travel regularly to meet with traditional owners and aboriginal communities who are affected by the mining of uranium on their land. Many aboriginal people we have met with have voiced disapproval of the activities of mining companies on their land. They have raised serious concerns about damage done to their sacred sites and inadequacies of the consultative processes.

We have noted that mining companies have been involved with the establishment of small Aboriginal groups that are willing to support their activities and challenge concerns of other parties involved. The divisive tactics used by mining companies in the past have been well documented. Some of the impacts of these dealings, which have served to divide communities have cause ongoing conflict and distress. This is not acceptable practice. Future consultation must involve all Aboriginal stakeholders not just those who support the mining companies aims and objectives.

Open and inclusive community consultation processes should be established and administered by an independent body. Mining companies must not have control over the consultation process or have veto over who is considered a stakeholder.

In South Australia the Aboriginal Heritage Act was established to facilitate identification and protection of sites of cultural significance to aboriginal people. The *Roxby Downs indenture Ratification Act of 1982* overrides the Aboriginal Heritage Act. A consequence of this is that only sites identified in the EIS were noted. In this instance although the Kokatha Peoples Committee prepared an anthropologic report for inclusion in the EIS three months before it was issued, they were told it was too late for inclusion. As a result many sites were denied legal protection. In addition the lease arrangement established under the indenture act prohibits the Kokatha people access to these sacred sites except in the presence of company personnel, thereby violating the sanctity of these sites.

Mining leases must come under the existing Aboriginal Heritage Acts and independent and thorough assessment of culturally significant sites must be carried out before operations can proceed.

Cultural and social issues must be approached with sensitivity and mining companies must respect the right of aboriginal people to retain confidentiality of sacred sites, and also the right to access these sites.

Expansion of uranium mining in Australia will result in further examples of companies and/or governments exerting undue pressure on Indigenous communities and the further use of divide-and-rule tactics against Indigenous communities.

In relation to the Olympic Dam / Roxby Downs mine, information on the use of divide and rule tactics against the Arabunna people is on the internet at: <www.geocities.com/olympicdam/articles.html>.

In relation to Beverley, information is available from the written and verbal submissions of Ms Jillian Marsh and Mr Michael Anderson, from the Adnyamathanha community, to the 2002-03 Senate inquiry into uranium mining. The transcript of the hearing is at: <www.aph.gov.au/hansard/senate/commttee/S5903.pdf>.

5. The effectiveness of safeguards regimes in addressing the proliferation of fissile material, the potential diversion of Australian Obligated fissile materials.

By exporting uranium, and through broader policies supporting the peaceful use of dual-use civil/military facilities, Australia contributes to a range of global problems. Some are briefly addressed immediately below then the issue of nuclear weapons proliferation is discussed in more detail.

Nuclear smuggling – much of it from civil nuclear programs – presents a significant challenge. The IAEA´s Illicit Trafficking Database records over 650 confirmed incidents of trafficking in nuclear or other radioactive materials since 1993, at least 17 of which involved small quantities of fissile material. Smuggling can potentially provide fissile material for nuclear weapons or a wider range of radioactive materials for potential use in 'dirty bombs'.

Terrorism.

Civil nuclear plants are potentially "attractive" targets for terrorist attacks because of the importance of the electricity supply system, because of the large radioactive inventories in many facilities, and because of the potential or actual use of civil nuclear facilities for weapons research and/or production.

Nuclear weapons proliferation

Australia contributes to global and regional proliferation risks and tensions because of uranium exports and the willingness of successive governments to permit reprocessing even when it leads to plutonium stockpiling.

Supposedly 'peaceful' nuclear facilities and materials can be – and have been – used in various ways for weapons production including the production or diversion of fissile material. Of the 60 countries, which have, built nuclear (power or research) reactors, over 20 are known to have used their 'peaceful' nuclear facilities for covert weapons research and/or production. In some cases the R&D was small-scale and short-lived, but in other cases nation states have succeeded in producing nuclear weapons under cover of a peaceful nuclear program – India, Pakistan, Israel, South Africa and possibly North Korea. In other cases – with Iraq from the 1970s until 1991 being the most striking of several examples – substantial progress had been made towards a weapons capability before the weapons program was terminated.

Civil nuclear programs also support nuclear weapons programs in the five 'declared' nuclear weapons states – the US, Russia, the UK, France, and China. In particular, civil programs provide pools of expertise from which military programs draw. It is no coincidence that the five declared nuclear weapons states account for almost 60% of global nuclear power output.

Of the nine states known to have produced nuclear weapons, only Israel has no power reactors – and even in Israel the pretence of a civil nuclear program provided a rationale for key technology transfers.

Foreign minister Alexander Downer says in his submission to the current inquiry: "In itself nuclear power does not present a problem for the proliferation of nuclear weapons. But nuclear energy requires fissile material, and the technologies used to produce nuclear reactor fuel—uranium enrichment or plutonium separation—can also be used to produce fissile material for nuclear weapons." However, nuclear power reactors do present a problem since they produce almost all of the plutonium that is separated at reprocessing plants.

The 'peaceful' nuclear power and research sectors have produced enough fissile material to build about 160,000 nuclear weapons, with 1,600 tonnes of plutonium from power reactors accounting for a large majority of the total. If 99% of the 1,600 tonnes of plutonium is indefinitely protected from military use, the remaining 1% would suffice for 1,600 nuclear weapons (each with a yield similar to the nuclear weapons dropped on Hiroshima and Nagasaki).

Adding to the proliferation risk is the growing stockpile of separated/unirradiated plutonium, as reprocessing outstrips the use of plutonium in MOX (mixed oxide fuel containing plutonium and uranium). The use of plutonium in weapons is far simpler if it does not first have to be separated from spent nuclear fuel. Global 'civil' stockpiles of unirradiated plutonium amount to about 240 tonnes (of the total of 1,600 tonnes of 'civil' plutonium). If 99% of the 240 tonnes of separated/unirradiated plutonium is indefinitely protected from military use, the remaining 1% would suffice for 240 nuclear weapons

The problem is not just the separated plutonium itself, but what this situation says about the integrity of global non-proliferation efforts. Reprocessing is difficult to justify even when the plutonium and/or recovered uranium are used as fuel. To be reprocessing well in excess of the demand for extracted plutonium or uranium is indefensible and poses a significant proliferation risk.

Likewise, the willingness of successive Australian governments to permit reprocessing in excess of any 'need' for separated materials (plutonium or uranium) is indefensible.

Nuclear interests are promising a new generation of reactor types and one of the selling points is the potential to adopt more proliferation-resistant reactors and regimes. However, much of the work centres on fast-breeder reactor concepts involving large-scale production of plutonium with significant proliferation risks. Nuclear fusion as a potential power source also poses proliferation risks, and faces seemingly insurmountable technical and economic problems. The use of thorium as an energy source also poses proliferation risks (through the production of fissile uranium-233).

Safeguards

The International Atomic Energy Agency's (IAEA) safeguards system still suffers from flaws and limitations despite improvements over the past decade.

At least eight Nuclear Non-Proliferation Treaty (NPT) member states have carried out weapons-related projects in violation of their NPT agreements, or have carried out permissible (weapons-related) activities but failed to meet their reporting requirements to the IAEA – Egypt, Iraq, Libya, North Korea, Romania, South Korea, Taiwan, and Yugoslavia.

In particular, the nuclear weapons program in Iraq from the 1970s to 1991 demonstrated numerous, serious flaws in the safeguards system. Despite Iraq's status as an NPT signatory, its nuclear facilities have been bombed by three nation states - Iran, Israel, and the US - to prevent, disrupt or destroy the suspected weapons program. Iraq itself bombed 'peaceful' nuclear facilities in Iran, and the Iraqi regime claimed to have targeted Scud missiles at Israel's Dimona nuclear plant during the 1991 Gulf War.

Australians were repeatedly reassured that the IAEA safeguards system was robust although it was demonstrably flawed on numerous counts with many of the loopholes exploited by Iraq. It is difficult to see why similar claims now made about the modified safeguards system should be given credence.

Motivated by the Iraq fiasco in particular, efforts have been made to improve the IAEA safeguards system through the development of a Strengthened Safeguards Program. The improvements are welcome, but the system will still face major problems, limitations and contradictions even if 'Additional Protocols' do become the norm.

The Strengthened Safeguards Program does not address some of the fundamental problems and contradictions of the NPT/IAEA system. Some or all of the five declared weapons states are in breach of their NPT obligation to pursue good-faith negotiations on nuclear disarmament. The intransigence of the nuclear weapons states provides incentives and excuses for other states to pursue nuclear weapons – and civil programs can provide the expertise, the facilities and the materials to pursue military programs. IAEA Director General Mohamed El Baradei said last year: "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."

The IAEA has dual and contradictory role – promoting the use and spread of nuclear technologies (which can in many cases be used to produce nuclear weapons) while preventing weapons proliferation.

Another concern is that membership of the Board of Governors of the IAEA is weighted in favour of countries with significant nuclear programs. Thirteen of the 35 seats on the Board are reserved for member states which are advanced in nuclear technology in their region of the world (Australia holds one such seat).

An obvious, ongoing limitation of the NPT/IAEA safeguards system is that it is of no relevance to non-NPT states – India, Pakistan, Israel and, since its withdrawal, North Korea.

Another problem is the timeliness of detecting diversions. For material such as plutonium or highly enriched uranium, it could be diverted and incorporated into a nuclear weapon in a short space of time.

Another unresolved (and perhaps unresolvable) proliferation problem is 'Material Unaccounted For' (MUF) – discrepancies between the expected and measured amounts of nuclear materials. The problem is particularly difficult for large-throughput facilities such as large reprocessing plants, enrichment plants, or fuel fabrication plants, from which enough fissile material for several weapons could be diverted without detection.

There is no resolution to the problem highlighted by North Korea. NPT signatory states can simply withdraw from the NPT. Prior to their withdrawal, they can potentially make full use of their NPT-enshrined "inalienable right" to pursue the full range of nuclear technologies for peaceful nuclear activities despite the obvious proliferation implications of many of the facilities and materials involved.

Recent statements from the IAEA and US President Bush about limiting the spread of enrichment and reprocessing technology, and to establish multinational control over sensitive nuclear facilities, amount to an acknowledgement of fundamental flaws and limitations of the international non-proliferation system.

While proposals for multinational or international control of enrichment and reprocessing technology have the potential to reduce the risks of horizontal proliferation, there are many problems and obstacles. Even if enrichment and reprocessing were limited to certain states, the potential for diversion of fissile material by customer states (or terrorists) could not be eliminated, in addition to the proliferation potential in the host states. The proposals would most likely be applied selectively (as evidenced by the acquiescence to the unnecessary reprocessing plant at Rokkasho in Japan). Perhaps the greatest difficulty with proposals to limit the spread of enrichment and reprocessing technology, or to establish multinational or international control, is that they are likely to face insurmountable opposition - this pessimism is evidently shared by Mr Downer judging from his submission to the current inquiry.

Australian obligated nuclear materials

The regime designed to attempt to prevent military misuse of Australian obligated-nuclear material (AONM) – mainly uranium and uranium derivatives such as plutonium – involves:
* Uranium exports are subject to Australian Safeguards and Non-Proliferation Office audits (ASNO).
* Consignment weights are recorded and passed on to IAEA.
* All recipient countries must be NPT signatories and the AONM must be subject to IAEA safeguards inspections (in both declared weapons states and non-weapons states).
* In addition, without Australian government consent there can be no on-transfer of AONM to a third country, no reprocessing and no enrichment above 20% uranium-235.

A detailed critique of the safeguarding of Australian uranium is provided by Prof. Richard Broinowski in his 2003 book 'Fact or Fission? The Truth About Australia's Nuclear Ambitions' (Melbourne: Scribe). Broinowski details how Prime Minister Fraser's 1977 safeguards regime was gradually weakened in various ways to accommodate uranium exporting companies and their customers. As Mike Rann wrote in his 1982 book *Uranium: Play It Safe*: "Again and again, it has been demonstrated here and overseas that when problems over safeguards prove difficult, commercial considerations will come first."

Broinowski (2003, ch.11) discusses problems with the current safeguards system. He states (p.256): "Terms such as 'fungibility' and 'equivalence' are used by Australian nuclear officials to explain the fact that Australian uranium cannot be identified once it leaves Australian shores and enters the commercial international nuclear fuel cycle. Instead, it becomes a book-keeping entry. This is meant to ensure that somewhere in the complex international fuel cycle system, in some country, and in some form, an equivalent amount of material is not being used to make nuclear weapons. But the accounting method is tenuous, and subject to distortion or abuse."

Broinowski notes the difficulty of safeguarding AONM because of its quantity, the variety of its forms, and the variety of locations and circumstances in which it is held. He states (p.257): "Despite assurances of the Safeguards Office to the contrary, it is not credible that none of this material has been lost through accounting errors, illegally diverted, or otherwise mishandled without detection." Incidents of large-scale Material Unaccounted For have occurred in countries that hold AONM – such as Japan and the UK.

The Uranium Information Centre (2004) states: "A further concern is that countries may develop various sensitive nuclear fuel cycle facilities and research reactors under full safeguards and then subsequently opt out of the NPT. Bilateral agreements such as insisted upon by Australia and Canada for sale of uranium address this by including fallback provisions, but many countries are outside the scope of these agreements." However, it is unlikely that a state willing to pull out of the NPT would be unwilling to abrogate its responsibilities under a bilateral agreement.

A potential risk with uranium exports is that even if the uranium (or derivatives such as plutonium) is not used directly in military programs, it could potentially free other sources of uranium (most likely indigenous sources) for use in military programs.

Mr Downer says in his submission to the current inquiry: "There have been four cases, all involving undeclared plutonium separation (reprocessing) or uranium enrichment activities, where the IAEA Board of Governors has found that the country concerned was in non-compliance with its safeguards agreement, and reported the non-compliance to the Security Council in accordance with the IAEA Statute: Iraq in 1991, Romania in 1992, DPRK in 1993, and Libya in 2004. At the time of writing, the IAEA is continuing to investigate serious safeguards violations in Iran, and Board has not yet reached a conclusion. None of these cases involved countries eligible to use Australian uranium, and none of these countries were operating nuclear power programs at the time."

Mr Downer (or DFAT/ASNO) should be asked by the Committee to explain on what grounds the above countries were ineligible. Does he just mean that they were ineligible because bilateral safeguards agreements had not been negotiated?

The Uranium Information Centre (2004) states: "Australia's position as a major uranium exporter is influential in the ongoing development of international safeguards and other non-proliferation measures, through membership of the IAEA Board of Governors, participation in international expert groups and its safeguards research program in support of the IAEA."

However, successive Australian governments have used whatever influence they enjoy in support of flawed policies that undermine non-proliferation and disarmament objectives. The flawed policies can be attributed in large part to the commercial interests of the Australian uranium export industry and also to the military-nuclear alliance between Australia and the US. On the second of those points, Professor Broinowski (2005) notes: "Australian diplomats may argue with their American colleagues at the margins, for example, over the desirability of the US ratifying the comprehensive nuclear test ban treaty, or interpretation of the Fissile Materials Cut-Off Treaty. But what really shapes their position is the unstated but well-understood Australian Government policy that its great protector – the US – should never forfeit its overwhelming superiority over all other nations in nuclear weaponry."

Examples of flawed policies include the focus on non-proliferation with far less attention given to the problem of disarmament by nuclear weapons states, or granting approval for reprocessing even when that is likely to result in plutonium stockpiling.

It is frequently claimed that the "stringent" conditions placed on AONM encourage a strengthening of non-proliferation measures generally, and that the more uranium exported from Australia the better because it means that a significant proportion of the world's uranium trade is covered by Australia's "stringent" conditions. However, by permitting the stockpiling of plutonium the Australian government is not 'raising the bar' but setting a poor example and encouraging other uranium exporters to adopt or persist with equally irresponsible policies. (The Australian government does not have the authority to prohibit stockpiling itself, but it does have the authority to prohibit transfers and reprocessing and could therefore put an end to the separation and stockpiling of Australian-obligated plutonium.)

Successive Australian government have appeared to want to take credit for opposing stockpiling even while they grant permission to stockpile. Thus the majority (Coalition/Labor) 1997 report from the Senate Select Committee on Uranium Mining and Milling stated that: "Stockpiles of plutonium are a concern to Australia and it supports moves to avoid them."

Australian-obligated separated plutonium is held in Japan and (unspecified) Euratom countries. There is no justification for supporting plutonium programs in Europe or Japan (such as reprocessing or the use of MOX fuel). Permission should be withdrawn for the reprocessing of all spent fuel containing Australian-obligated plutonium. At the very least, permission should be withdrawn in circumstances of plutonium stockpiling.

John Carlson from ASNO has noted that Australian conditions are very similar to those of Canada and the United States" and that most or all other suppliers require peaceful use assurances. (21/12/98, Joint Committee on Treaties.) Bilateral agreements make no provisions for inspections other than through the normal IAEA system.

According to ASNO's John Carlson (1998), "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." However:
* Australia sells uranium to nuclear weapons states - the UK, France and the USA - which pay lip-service to their NPT disarmament obligations. Australian-sourced nuclear materials can be used for nuclear weapons productions in these countries on the condition that an equivalent amount of material is transferred from military to civilian uses.

For example, Australian sourced materials may have been used in the French nuclear tests in the Pacific in 1995.
* Further, the Australian government is negotiating sales to China, a nuclear weapons state that, like the other (declared) nuclear weapons states, pays lip service to its NPT disarmament obligations. China refuses to sign/ratify the Comprehensive Test Ban Treaty (the same applies to some other states including the USA). The Committee should ascertain from the federal government whether all authoritarian military regimes with WMD programs are now eligible to buy Australian uranium, or is China an exception? Further, are authoritarian, undemocratic military regimes *without* WMD programs now eligible to buy Australian uranium?
* South Korea is another customer whose behaviour has been far from 'impeccable' - its secret, undeclared weapons-related experiments, carried out in violation of its NPT commitments, extended from the 1980s to the year 2000.
* Japan could not be said to be 'impeccable' because of its plutonium program and its plutonium stockpiling despite the resultant regional tensions and proliferation risks. Further, successive Australian governments have given programmatic consent for plutonium separation by Japan (whether in Japan or at Cogema or Sellafield).
* Federal resources minister Ian Macfarlane is promoting uranium exports to India, which is not a NPT signatory.

Australia is not 'raising the bar'. It is difficult to imagine Australian uranium policies being any weaker or more irresponsible.

Mr Downer says in his submission to the current inquiry: "There has been some ill-informed comment that programmatic consent [for enrichment or reprocessing] is a diminution of Australian conditions. This is untrue. " Programmatic consent is problematic because it entrenches reprocessing as the norm despite the significant proliferation, public health and environmental risks and despite the fact that most separated plutonium and uranium serves no useful purpose whatsoever - it is simply stockpiled. Further, the problem is not so much whether consent is given on a case-by-case basis or on a programmatic basis, the problem is that consent is given at all in circumstances where it cannot be justified - e.g. reprocessing leading to plutonium stockpiling in Japan and Europe.

Mr Downer says in his submission to the current inquiry that adherence to IAEA Additional Protocols will in future be a pre-condition for the supply of Australian uranium to non-nuclear weapon states. The Committee should ascertain why weapons states will not also be required to adhere to Additional Protocols. As an example of current problems concerning Additional Protocols, Brazil has been reluctant to agree to Additional Protocols and the Brazilian ambassador to the US has cited the exemptions in the Additional Protocol of the US that contains a broad "national security exemption" and includes provisions for (limited) "managed access" to nuclear facilities. (Horner, 2004.)

Australian uranium & north-east Asia

Australia, through its uranium sales and associated policies, is implicated in civil nuclear programs in north-east Asia and in the attendant proliferation risks and tensions. Australian-obligated nuclear materials – including separated plutonium stockpiled in Japan – could be used as fissile material in nuclear weapons. Even in the absence of a systematic nuclear weapons program, Japan's plutonium program exacerbates regional tensions in north-east Asia. Successive Australian governments have permitted the separation and stockpiling of Australian-obligated plutonium by Japan though the bilateral nuclear agreement contains provisions for Australia to prohibit the reprocessing or the transfer of Australian-obligated nuclear materials including plutonium.

There has been some degree of high-level political support for the construction of nuclear weapons in Japan since the 1950s, motivated largely by regional concerns over China and the Korean peninsula. Recent developments have added to such concerns, such as Japan's involvement in 'theatre missile defence' programs (potentially complementary to a nuclear weapons program), and North Korea's apparent pursuit of nuclear weapons.

While the construction of nuclear weapons by Japan is an unlikely development, it cannot be discounted and the assessment could change quickly, for example in the event of a North Korean nuclear test. Australian Foreign Minister Alexander Downer acknowledged in February 2005 that North Korea's claim to have nuclear weapons would lead some people in Tokyo or Seoul to argue for nuclear weapons, and he noted that the importance of North Korea's nuclear program was not only due to "the danger of the weapons systems themselves but also because of the risk of contributing to proliferation". (ABC, 2005.) It can hardly be denied that Japan's plutonium program has a similar regional impact.

Further, it is not difficult to find examples of incorrect assessments of a state's perception of its interests. For example, ASNO's John Carlson said in November 2002 that: "The North Koreans have to come to a realisation that building up nuclear weapons is not in their interest." (Koutsoukis, 2002.)

Japan could construct nuclear weapons in a short space of time because of its advanced nuclear program, its rocket/missile capabilities, and its scientific and technological advancement more generally.

Japan's plutonium program is of particular concern because it is a likely source of fissile material should Japan build weapons. That program involves the production of large quantities of plutonium in power reactors (as a by-product of electricity generation), reprocessing spent fuel from power reactors in reprocessing plants in Europe and Japan, the stockpiling of plutonium, (largely stalled) plans for MOX usage, and a program to develop plutonium breeder reactors.

Importantly, the separation and stockpiling of plutonium occurs in far greater quantities than can be justified by Japan's limited use of plutonium in MOX fuel, and the troubled breeder program. Claims that the plutonium program is fully consistent with a peaceful program are met with understandable scepticism. For example, a 1992 shipment of 1.7 tonnes of separated plutonium from Europe to Japan was said to be urgently needed for the Monju breeder reactor – but when the shipment was underway it was announced that the plutonium was to be stockpiled (Leventhal and Dolley, 1999).

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 U.S. 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.)

As at the end of 2003, Japan's holdings of unirradiated plutonium amounted to 5.4 tonnes, in addition to 35.2 tonnes of civil unirradiated plutonium held overseas and 105 tonnes of plutonium in spent fuel at reactor sites and reprocessing plants.

Despite this huge stockpile of plutonium, Japan's nuclear utilities plan to begin commercial operation of a reprocessing plant at Rokkasho in 2007. The plant will have the capacity to separate about eight tonnes of plutonium per year. It will be the first large-scale reprocessing plant in a country not possessing nuclear weapons.

Regardless of the intentions driving Japan's plutonium program, it certainly enhances Japan's capacity to produce nuclear weapons, and to do so in a short space of time. That latent potential is an ongoing source of tension in north-east Asia – it provides both an incentive and an excuse for countries such as North Korea, South Korea and Taiwan to pursue nuclear weapons programs or to steer ostensibly civil nuclear programs in such a way as to reduce the lead-time for weapons production (e.g. the development of reprocessing capabilities). It generates resentment when South Korea and Taiwan are prevented from pursuing similar policies to Japan.

Kang et al. (2005) state that: "South Korea's hidden actions exemplify the impulse toward proliferation that arises in response to the discriminatory treatment the United States shows to different states, permitting, for example, Japan to have tons of plutonium while South Korea may have none, and Japan to explore mixed oxide fuels for reactors while South Korea may not. The disparity in the application of ostensibly universal non-proliferation norms is felt keenly by Koreans who remain resentful of Japan's big-power status and its colonial aggression in Korea."

Japan's plutonium program may be partly responsible for the series of illicit and/or unreported nuclear weapons research activities in South Korea. Conversely, Japan's plutonium program may be partly motivated by South Korea's nuclear program.

Kang et al. (1995) state that: "[T]he fact that South Korea has not kept to the spirit and letter of the NPT-IAEA safeguards system stirs already troubled waters in Japan, Korea, and Taiwan about the future of their nuclear status. Japan's security culture is already shifting away from its historical commitment to sole reliance on U.S. nuclear deterrence. The notion of a Korean bomb, whether of North or South origin, is one more factor suggesting that the non-proliferation regime is in trouble in East Asia."

China is all the less likely to take its NPT Article VI disarmament obligations seriously because of Japan's plutonium program – and Japan is all the less likely to abandon its program while China pays lip-service to its disarmament obligations. (For discussion on the regional implications of Japan's plutonium program, see Leventhal and Dolley, 1999, 1999B; Kang et al., 1995; von Hippel and Jones, 1997.)

An obvious source of fissile material for a weapons program in Japan would be the stockpile of separated 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: "If China gets too inflated the Japanese people will get hysterical. 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." (Quoted in Koutsoukis, 2002), The plutonium stockpile is not the only potential source of fissile material in Japan (Miller, 2002, discusses the various options). However the existing stockpile would be available immediately Japan chose to use it. NPT obligations would be breached regardless of the source of fissile material (unless Japan withdrew from the NPT). The breaching of bilateral safeguards agreements (including the Australia-Japan agreement) would be of little concern given that NPT obligations were also being breached.

That much of Japan's plutonium is 'reactor grade' rather than weapon grade would be of little consequence. Physicist Marvin Miller (2002) notes that: "... a study of Japanese work in such areas as high-explosive technology, inertial fusion, and production and handling of hydrogen isotopes leads me to the conclusion that they are capable of solving the problems involved in using [reactor grade plutonium] in weapons, specifically predetonation."

Following the shipment of 1.7 tonnes of separated plutonium from Europe to Japan in 1992, far from taking action to prevent stockpiling in Japan, the then Labor government in Australia took steps to facilitate it. In a September 1993 treaty-level exchange of notes, Australia agreed to provide advance consent on a generic basis for the transfer of Australian-obligated plutonium from Europe to Japan, whereas previously case-by-case consent was required. In 1998 this advance generic consent was further extended to cover the small fraction of Australian-obligated plutonium that is not also US-obligated.

The Australian government refuses to state how much Australian-obligated plutonium has been stockpiled in Japan, but some non-country-specific figures are published. ASNO provides the following information in its 2003-04 Annual Report (Annex C):
* 78 tonnes of irradiated Australian-obligated plutonium are held overseas, in Canada, Euratom, Japan, South Korea, USA, and Switzerland. This includes plutonium contained in spent power reactor fuel, or plutonium reloaded in a power reactor following reprocessing.
* Japan and Euratom countries hold about 600 kilograms of Australian-obligated separated plutonium. This comprises plutonium separated from spent fuel from reactors in Euratom countries and in Japan, and the separated plutonium itself is in both Euratom and Japan.

Australian consent to the separation of Australian-obligated plutonium and its stockpiling in Japan should be withdrawn on proliferation grounds. That consent should also be withdrawn on the basis of the unacceptable safety record of Japan's plutonium/reprocessing program over the past decade.

Shipments of spent fuel from Japan to Europe for reprocessing, and the on-shipments and return shipments of plutonium, high-level waste and MOX fuel all present risks of accidents, attacks, or the theft of plutonium and its potential use in weapons. Adam Cobb, from advisory firm Stratwar.com, states: "These shipments are vulnerable targets for terrorist organisations like Al Qaeda. Part of that radioactive material is Australian-sourced and in that sense is our responsibility." (Quoted in Koutsoukis, 2002.)

Australia's involvement in South Korea is also problematic. The 2004 revelations of a number of undeclared activities is one concern. 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. (Kang et al., 2005.) The IAEA can take some credit for having accrued evidence of unreported activities, but failed to detect them for many years following South Korea's accession to the NPT in 1975.

Australia has supplied South Korea with uranium following the conclusion of a bilateral agreement in 1979. It is not known – and may never be known – whether Australian-obligated nuclear materials were used in any of the illicit research. South Korea's claim that only local sources of uranium were used has not (and perhaps cannot) be reconciled with the quantity of uranium metal produced nor with its isotopic composition (Kang et al., 1995).

South Korea's pursuit of reprocessing and breeder technology is also cause for concern. The development of reprocessing and breeder expertise has been assisted by the US Department of Energy, the IAEA and the OECD's Nuclear Energy Agency (Burnie, 2005).

ASNO's John Carlson says: "To simply leave our uranium in the ground would be of no benefit to anyone. And it certainly wouldn't benefit the non-proliferation cause. It would have a neutral effect and there's no point in that." (Quoted in Koutsoukis, 2002.) However, using bilateral treaty provisions to prevent (or greatly restrict) the stockpiling of Australian-obligated plutonium, combined with concerted diplomacy, could reduce stockpiling. And if it failed to curb stockpiling and led to a reduction or cessation of exports, Australia would at least enjoy the credibility that would come with a principled approach to the plutonium proliferation problem.

As the situation stands, nations such as the US and Australia talk about limiting the spread of reprocessing while at the same time providing permission for the reprocessing and stockpiling of plutonium.

Summary

The nuclear industry is inherently unsafe and dangerous. It leads to the production of radioactive wastes and fuels radioactive impacts at mines sites and around the world. Radioactive waste requires storage and monitoring for thousands of years.

People of the world have clearly stated their opposition to nuclear weapons. Despite bilateral agreements there is no absolute guarantee that Australian sourced uranium is not used in military nuclear technology or nuclear weapons testing activities.

Uranium mining industry leads to the contamination of surrounding environments and compromises the lifestyles of local indigenous peoples. It leads to pollution of groundwater and surface soil and jeopardises the long term sustainability of surrounding ecosystems.

Inadequate regulation of uranium mining presents an unacceptable risk to the worker, public and environmental health.

Nuclear power is not a viable solution to the need to reduce global greenhouse gas emissions. A combination of existing energy efficiency and renewable energy technologies can meet this need without the production of long-term environmental hazards.

Alternatives to all aspects of nuclear technology exist and are more environmentally friendly and more cost effective.

Australia has the largest uranium resources in the world has a unique opportunity to lead the way in putting an end to a dangerous and polluting industry and introducing sustainable and environmentally forms of energy production.

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