Submission No. 45

Submission to the Inquiry into Australia's Non-Fossil Fuel Resources

from

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Prepared by

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and

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Abstract:

This submission addresses two of the Terms of Reference of the Inquiry, namely

1) the contention that nuclear power addresses the greenhouse gas emission problem, by providing a source of electricity which does not produce greenhouse gases. It is the conclusion of this submission that nuclear power is not a greenhouse-gas-friendly source of electricity, and that greenhouse gas reduction cannot be used as a justification to increase the exportation of uranium from Australia, and

2) the contention that there are no negative strategic implications in increasing the exportation of Australian uranium, in particular in exporting Australian uranium to a new customer in the North Asian region, namely China. It is the conclusion of this submission that there are very significant strategic implications for expanding the mining and export of uranium, particularly to North Asia, and that these implications would argue against any expansion of mining and exporting Australian uranium.

For these two reasons any postulated expansion of uranium mining in, and exportation from, Australia should not proceed.

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Material for this submission was also made available by Jim Green, Friends of the Earth.

Introduction

"What Australia does makes a difference." It is this belief which drives the efforts of conscientious Australian bureaucrats and politicians at home and abroad, particularly for those engaged in issues regarding foreign relations. Unfortunately, it is oft-times not the case. Reading either the foreign press, or statements from foreign governments, leads one to conclude that what Australia does is largely ignored, because it is largely unimportant. There is perhaps one exception to this rule: the mining and export of uranium.

In the field of the mining and export of uranium, what Australia does does make a difference. Hosting the largest single amount of recoverable uranium, Australia can rightly be called the Saudi Arabia of the field. That Australia is only the second largest exporter of uranium is testament to the controversy surrounding the substance itself and the uses to which it is, and can be, put.

It is fitting that the mining and export of uranium be subject to ongoing inquiry, and particularly at any stage of potential expansion. The community stands to lose a great deal if the substance is abused, and do not stand to gain much if it is used only as agreed. And even in this case, the Australian community opens itself, or more correctly is opened by others, to the risk of ongoing consequences from the initial mining and export of uranium.

This inquiry is ostensibly about the question of whether Australia's non-fossil fuel resources are being used to their maximum potential, and if not, what changes could be made to ensure that they might be used to their maximum potential. In reality, it is about the expansion of the uranium mining and export industries, with other non-fossil fuels to be considered only in the some-time distant future. Uranium is the case being considered now; others may be considered later. Those with any experience of this government will not be holding their breath for the others to get their turn.

This is a great pity, for Australia used to lead the way in some non-fossil fuel fields, particularly solar energy. That this is the case no longer is solely due to governmental neglect, as governmental interest in other parts of the world have seen others supercede Australia's potential in solar energy long ago.

It is the opinion of this group, People for Nuclear Disarmament NSW, that the expansion of the uranium mining in, and export from, Australia is not in the interests of the Australian or world community. We submit that no expansion should proceed: indeed, the present uranium mining in Australia, and its export around the world, should cease immediately.

Dictionaries of early last century used to define uranium as 'a heavy metal of no value'. Unfortunately, this rather neutral conclusion has turned out to be overly optimistic. Uranium became the menace of the last century, and on no few occasions was very nearly its global nemesis. Even so, throughout last century, its toll of human life, and on relations between nations, was as tragic as it was unnecessary.

Uranium's extraction from the earth, and its conversion into other, entirely new entities, will have consequences over an unimaginable period. Two of these new entities deserve

special mention. Plutonium remains toxic and deadly for over 250,000 years. This is 25 times recorded history. What method do we think will be able to protect people from the fatal consequences of this material in 250,000 years time? What financial instruments will be competent to this task, or competent to deal with any failure?

Secondly, depleted uranium remains toxic and deadly for over 4.5 million years, if it is aerosolised at any point during that time. In terms that humans can grasp, this means forever. It is certainly longer than the period for which humans have been around. To put the problem another way: if our ancestors of 4.5 million years ago had developed nuclear energy, we would still be looking after their waste. What can be done to guard against material of this sort?

Two other issues come to mind here. To describe the sites of the extraction of uranium as 'mines' is, in our opinion, misleading. A 'Mine' is a hole in the ground, albeit perhaps a rather large one, or an opening into a collection of tunnels underground. But this is to hide the truth about the extraction industry, with particular implications for the uranium extraction industry.

Looked at in the long-term, the actual extraction of the material of interest – uranium in this case - is brief. Staff and machines come, work and go, never to return. Material is moved about, and some is removed from the site. But most of the material that was moved about is left at the site. Leftovers. Looked at longitudinally, or intergenerationally as is presently in vogue, this leftover material is the major consequence for the site of the activity.

A mine is, then, a site-at-which-a-lot-of-unwanted-material-will-be-left-in-the-open-after-some-small-amount-of-wanted-material-is-removed. There has never been any attempt to deal with these leftovers in any way than to leave them and hope that no harm comes to them or the site and its surrounds. Often some time and effort is spent in making this hope more likely than doing nothing about the leftovers, but this is not always the case. Returning a site to its former condition is very rarely attempted and never achieved. Cleaning up properly after a major failure is impossible.

The implication for the uranium extraction industry is more serious than for other extraction industries, as the leftovers present a real danger to the environs.

A second issue here is that, whilst the workers and machines are not expected to come back, the wanted material - uranium - may. The calls for the return of the wanted material from the uranium-using industry are growing around the world. Countries which produce significant quantities of waste from using uranium to generate electricity are struggling to cope with this waste, and are looking to offload it. Australia, as a supplier of a significant quantity of the raw material from which this waste has come, is being targeted as a potential recipient. This inquiry needs to consider these calls as it considers expanding this process to any great degree.

This submission will not be addressing the issue of how to cope with the waste from the nuclear industry, but we expect that the members of the inquiry will not neglect this issue.

Because Australian uranium is already mined and exported, any expansion of its mining or export only increases our exposure to any adverse consequences, rather than

threatening us with entirely new dangers. Nevertheless, we are of the opinion that this increase in danger is entirely avoidable, and that taking the actions which would increase this risk brings no benefit to Australia. Any expansion of the mining and export of uranium in Australia should therefore not proceed.

The submission continues in two parts. Firstly, nuclear power's capacity to provide a source of electricity without producing greenhouse gases is examined. We will show that nuclear power is not a greenhouse-gas-friendly source of electricity, and that greenhouse gas reduction cannot be used as a justification for the mining or export of uranium from Australia.

Secondly, this submission will examine the strategic problems inherent in the mining and export of uranium from Australia. We will show that there are very significant strategic problems with the current practice of mining and exporting uranium from Australia, particularly concerning the North Asian region. These strategic problems will only increase with any expansion of uranium mining and export from Australia, particularly if a new destination for Australian uranium in this region – namely China – is added to the current list.

Is uranium a solution to the greenhouse problem?

No. Nuclear power is not a greenhouse-friendly source of electricity, and electricity production is only one part of the problem of reducing greenhouse gas emissions. Leaving aside considerations about proliferation, waste management and reactor safety, a dispassionate observer would be forced to come to the conclusion that nuclear power cannot make much of an impact on the emissions of greenhouse gases in the production of electricity, and that what contribution it could make comes at too high a cost. We outline the various reasons for this below. This being the case, that inquiry would be misleading the Australian public if it decided to expand uranium mining and exportation on the basis of nuclear power being a solution for the greenhouse problem. It is not.

There are numerous constraints on the growth of nuclear power such as its high capital cost and lack of public acceptability. As a method of reducing greenhouse emissions, nuclear power is further limited because it is used almost exclusively for electricity generation, which is responsible for only about one third of greenhouse emissions globally.

Because of economic and public acceptability problems, and nuclear power's limited potential other than in electricity generation, the potential for nuclear power to contribute to reducing greenhouse emissions is limited.

A doubling of nuclear power by 2050 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 'sold' as *the* solution to nuclear power, as a technical fix or magic bullet. Clearly it is no such thing. As a senior analyst from the International Atomic Energy Agency said last year: "Saying that nuclear power can solve global warming by itself is way over the top".

Contrary to the claim made by US President George W. Bush, among others, nuclear power is not a 'renewable' energy source. Relatively high grade, low cost ores are limited and will run out 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 achieved 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. Nuclear fusion as a potential power source also poses proliferation risks, and faces seemingly insurmountable technical and economic problems.

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. Nonetheless, fossil fuel derived electricity is considerably more greenhouse intensive. However, 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). Conversely, nuclear power emits more greenhouse gases per unit energy than renewable energy sources, and that comparative deficit is likely to widen as uranium ore grades decline. Those trends would of course be hastened in a scenario in which nuclear power replaces large numbers of fossil fuel fired electricity plants.

A further problem with the debate over nuclear power as a solution to climate change is that it distracts attention from the task of addressing climate change through energy conservation, efficiency and renewable energy sources. In theory, nuclear expansion could proceed in tandem with concerted efforts in the areas of energy efficiency and renewable energy sources. In practice, nuclear expansion would most likely divert social and economic resources away from efficiency and renewables.

Nuclear power is often said not to produce any greenhouse gases, but this is not the case. The US Environmental Protection Agency has found that uranium enrichment plants produce and release CFCs. These not only destroy the ozone layer; they are also significant greenhouse gases. CFCs make up as much as 26% of all greenhouse gases released by human activity.

Nuclear reactors produce significant quantities of carbon dioxide, a key greenhouse gas, over their life-cycle. The Oko institute in Germany has calculated that in the best possible scenario, 34 grams of carbon dioxide are emitted per kilowatt of electricity produced by a nuclear power plant. In the worst case, 60 grams are produced. This means that for a typical late model nuclear power plant of 1000Mw capacity, at least 221,000 tonnes of carbon dioxide are emitted per year, and up to 248,000 tonnes are emitted per year. For a large, 2000Mw nuclear power station, the figures are 390,000 tonnes and 438,750 tonnes per year respectively.

Nuclear reactors also cause the production of greenhouse gases during their operation. They require large amounts of electricity to be produced independently of the electricity they produce, to power essential safety and back-up procedures such as pumping cooling water or gas. This electricity must be independent of the reactor's own output, in case the reactor is suddenly switched off (scrammed). If pumping stations to the reactor would lose their power at this point, meltdown of the reactor core would inevitably occur. If the electricity for these essential services is not provided from renewable energy sources, then the reactor must be held accountable for the production of the greenhouse gases for its own electrical needs. You can imagine the irony of a wind farm or set of solar panels providing essential electricity to a nuclear power station. As far as we are aware, nowhere in the world is this essential electricity provided by renewable energy. Every nuclear power station in operation must be held accountable for this production of greenhouse gases for their own needs.

Even if we were to assume that nuclear power did not produce greenhouse gases, that it was a greenhouse-friendly source of electricity, what difference could it conceivably make? Various authors have made the calculations, and they are worth referring to.

Christopher Flavin, in a paper published by the Worldwatch Institute, October 1989 wrote that "for nuclear power to offset even 5 percent of global carbon emissions would require that worldwide nuclear capacity be nearly doubled from today's level. That means that nuclear is simply not a medium term option for slowing global warming."

US Senator George Mitchell wrote in 1991 that ".If nuclear plants replaced all coal-fired plants in the world, global warming could be cut by 20 to 30 percent by the middle of the next century (2050). But it would require bringing a nuclear power plant on line somewhere in the world every one to three days for the next forty years. The cost would be $9 trillion; the pace of construction would be ten times larger than any the world has ever seen. Both figures are unthinkable. A totally safe reactor, a totally safe place to dispose of its deadly wastes, and a totally safe way to keep the wrong kind of nuclear materials from falling into the wrong hands. None of these things have been resolved. By the time they are resolved, if they ever can be, it will be too late. The projected global warming will be full upon us."

Bill Keepin and Gregory Katz posited in 1988 a conservative scenario in which one-half of non-fossil energy is supplied by nuclear power with a construction program beginning in 1988. "This results in a total nuclear installed capacity of 8,180 GW by the year 2025, equivalent to some 8000 large nuclear power plants. This represents a 20-fold increase in world nuclear capacity, requiring that nuclear plants be built at an average rate of one new 1000 MW plant every 1.61 days for the next 37 years. At an assumed cost of $1.0 billion/1000MW installed, this results in a total capitol cost of 8.39 trillion (1987) dollars, an average of $227 billion each year for 37 years to build the required nuclear plants. Total electricity generation cost is $31.48 trillion, or an average of $787 billion/year. The required capitol investment is economically unfeasible for the developing world."

Keepin and Katz point out that even with a massive nuclear construction program, the use of fossil fuels will continue to grow. "Thus, in this scenario, even bringing a new nuclear plant on line every day and a half for nearly four decades does not prevent annual CO2 emissions from steadily increasing to a value 60% greater than they are today."

It is true to say that there is no one solution to the problem of reducing greenhouse emissions caused by human activity. To maintain living standards in the industrialised countries, and raise them in the less industrialised countries, will require the adoption of a range of technologies and, more importantly, and change in thinking regarding the generation and use of energy.

Nevertheless, as can be seen above , the role that nuclear power can usefully play in any such scenario is extremely limited if all the other drawbacks from nuclear power are ignored. Once all the many other drawbacks of nuclear power are brought back into the equation, there is no chance that any sane person would choose to include it in any range of strategies to reduce greenhouse gas emissions.

The inquiry should then not rely on the role of nuclear power to reduce greenhouse gas emissions in any consideration of expanding Australian uranium mining and export.

Is Australian uranium safe once it leaves our shores?

This question is essentially about the threat that all uranium and its by-products pose to the spread of nuclear weapons. Is Australian contributing to this threat? Can steps be taken to eliminate this threat? Can we be sure that it is safe to export uranium, free of the danger of it falling into the wrong hands, or being used for the wrong purposes?

Throughout the nuclear age, various attempts have been made to prevent the spread of nuclear weapons. With regard to the trading of uranium, the most comprehensive attempt to prevent this proliferation is the safeguard regimes of the IAEA, which Australian diplomats have worked so hard to help develop.

It would be satisfying to say that the safeguard system works, and that nuclear weapons proliferation through the trading of uranium has never occurred and will never occur. Unfortunately, it is not possible to give such an assurance as this. There are various reasons.

Firstly, uranium, like many commodities traded internationally, is termed 'fungible'. That is, any one atom of uranium may be replaced by another, and noone can tell the difference. Sampling uranium and its by-products to attempt to trace their origin is really the attempt to discover all those contaminants in the sample, not the uranium or other radio nuclides present, and is impossible once uranium has entered the international trade network.

For this reason, international conventions have been developed to deal with the problem. The solutions centre upon the notion of equivalence. Some amount of uranium, in whatever form, is entered into a process, and an equivalent amount is determined to be removed afterwards. This equivalent amount is now deemed to be the uranium which entered. The inquiry will note that this is as much as accounting procedure as a scientific procedure.

Australian uranium cannot be identified after it leaves Australian shores. It becomes a book-keeping entry. This is meant to reassure us that somewhere, in some form, an amount of uranium is held which is equivalent to that which was exported, and that *this* amount of uranium is not being used for purposes other than which it was agreed, that is, not for nuclear weapons.

But the accounting method is subject to distortion and abuse, and is itself tenuous. It is a fact of international trade that other fungible commodities, such as wheat, coal, iron ore (all of which Australia exports a great deal) are neither easy to trace, nor easy to quantify once they enter international trade network. Uranium is no different, and the alarming increase in fissile material gone missing – Material Unaccounted For – indicates that the accounting system designed to reassure governments, exporters and the public is inadequate.

Partly this is a problem of there being so much fissile material being traded. As of 2000-2001 Australian Obligated Nuclear Material (AONM) inventories included 19,045 tonnes of natural uranium at facilities in Canada, the Euroatom countries, Japan, and the US; and 47,787 tonnes of depleted uranium in facilities in Euroatom countries, Japan and the US. There were also 7073 tonnes of low-enriched uranium held in Canada, Euroatom countries, Japan, South Korea, Switzerland and the US, and 56.4 tonnes of irradiated

plutonium held in facilities in Canada, Euroatom countries, Japan, South Korea, Switzerland and the US. Despite assurances by the Safeguards Office to the contrary, it is not credible that *none* of this material has been lost through accounting errors, somehow been mishandled or been illegally diverted without having been detected.

Stringent bi-lateral safeguards Prime Minister Malcolm Fraser applied to Australian uranium exports from May 1977 were substantially modified over the years to accommodate commercial demands. The changes included accounting devices including book transfers, flag-swaps and multi-labeling. Some recipients were given the right to enrich and reprocess without case-by-case approval. Some miners were allowed to negotiate export contracts before safeguards agreements were reached. Sometimes references to safeguards agreements were removed from contracts.

All of these considerations are themselves enough to convincably argue that the export of uranium is not watertight. This should act as a strong warning to the inquiry that any further exportation of uranium from Australia, should it occur, will need not only the strictest safeguards being attached. Any decision to increase uranium exportation from Australia will need to be undertaken with the expectation that these safeguards will fail, that some Australian uranium will go missing, and that the possibility that some Australian uranium will end up in a nuclear weapons program cannot be excluded.

All of the above must be taken on board before any consideration of the political consequences of the international trading in uranium and other radionuclides. Uranium is subject to political pressure and interference perhaps more than any other internationally traded commodity, because of the potential consequences of its use. These political considerations, often called strategic considerations, should now been addressed.

It is no secret that China is being eyed off as the next big market for Australian uranium. The Foreign Minister, Alexander Downer, says Australia and China have begun to negotiate a bilateral treaty on uranium. Therefore this inquiry should focus its attention specifically on the strategic implications of exporting Australian uranium to North Asia.

Much has been written about the potential for nuclear conflict in the Middle East or on the Subcontinent. In our opinion, North Asia is at least as likely to suffer a nuclear catastrophe. Indeed, in North Korea, the North Asia region contains the latest ambitious member of the growing nuclear weapons club. North Asia is a nuclear disaster waiting to happen.

Two of the non-nuclear states in the region – Japan and South Korea – are increasingly disposed to acquire nuclear weapons, and Taiwan may chose to do so as well. All this time, china continues to increase its nuclear weapons forces.

Let us look at Japan and the Koreas to see what we are getting – and have already got – ourselves in for.

Japan has 53 nuclear power reactors, two fast-breeder reactors and a number of experimental and research reactors. Australia signed a bi-lateral safeguards agreement with Japan in 1982 with every expectation of all safeguards agreements being met. Japan had no nuclear weapons, and being the only country to suffer a wartime nuclear attack, would seem to be allergic to acquiring them. Even its conventional military forces are constrained by a non-aggression constitution. Successive Japanese governments

successfully resisted attempts by outsiders, particularly the US, for Japan to play a bigger security role in the region. All looked well, but appearances can be deceiving.

Despite the Japanese penchant for quality and correct behaviour, the Japanese nuclear industry has been plagued by a high and increasing number of accidents and accounting discrepancies. This includes an admission in 1994 that 70 kilograms of plutonium – enough for several nuclear bombs – had gone missing. Accidents have closed Japan's only heavy water reactor and one of its fast breeder reactors. Workers at a fuel fabrication plant were loading uranium with their bare hands when they caused a modified chain reaction. They paid for this with their lives, and some 320,000 people in the surrounds now risk long term morbidity and mortality from chronic, stochastic radiation effects.

Electricity shortages have occurred in the last few years in Japan because power reactors have been closed. These closures were precipitated by revelations that power companies have been for years covering up numerous cases of safety breaches and falsified safety reports. These indications that the famed industrial competency of the Japanese does not include their nuclear industry may well surprise outsiders. What is even more revealing, however, is the attitude the Japanese have regarding nuclear weapons.

Technically, Japan could acquire nuclear weapons overnight, and can quickly modify its M-5 and J-1 rockets to deliver them to the region. How did this come about?

In a tragic twist of the Faustian bargain, where the price is paid before any benefit has been granted, the Japanese have hidden underneath the nuclear umbrella of the US since the nuclear attacks upon Hiroshima and Nagasaki. This has meant that the US Navy, Airforce and Army have routinely breached the three nuclear 'Nos' of successive Japanese governments – No possession, No production, No passage - of nuclear weapons. The fig-leaf of the US' routine refusal to confirm or deny nuclear weapons' presence has not stopped the rising cynicism this has caused many Japanese officials towards their own government's refusal to acquire nuclear weapons, if not towards the pacifist nature of their post-war constitution.

Furthermore, confidence in the US nuclear umbrella as an effective deterrence against Chinese, Russian or North Korean military pressure – conventional or nuclear – may not remain sufficient to deter Japan from embarking on the path to its own nuclear deterrent.

Indeed, since the end of World War II, many Japanese leaders and officials have advocated that Japan should acquire nuclear weapons. Over many years, officials have ensured that the possibility remained open, and that the capacity to do so has been acquired. They have successfully put the building blocks in place to create and deploy a nuclear weapons capability.

Outside forces have helped this process along. Not the least of this help has come from the US itself, which has either bowed to Japanese pressure to ensure that the nuclear weapons option remained open, or acquiesced in the face of Japanese determination to build such a capacity. This is in direct contrast to, for instance, US behaviour towards similar efforts by South Korea.

Competition with nuclear armed China for regional pre-eminence is also a major factor. Just one example of this thinking is a statement from Ichiro Ozawa, then opposition Liberal Party leader, in April 2002, "If China gets too inflated the Japanese people will

get hysterical. It would be easy for us to produce nuclear warheads: we have plutonium at nuclear power plants in Japan, enough to make several thousands such warheads."

Fear of former colonial subjects, particularly the North Koreans, is also a major driving force. Just one example of Japanese thinking regarding North Korean nuclear weapons is a statement by Yoshifumi Okamoto, then Deputy Director General of the Nuclear Division of the Japanese Foreign Ministry, in 1993 "..if North Korea obtains nuclear weapons, there will be a debate in Japanese public opinion regarding the means of confronting the situation. And this could weaken our commitment to the NPT."

In response to North Korea's claim to have nuclear weapons in February this year, the Japanese Diet (parliament) amended the 1954 Self-Defense Law so that the Prime Minister alone, without first gaining the Diet's approval, can activate a defense force brigade. The brigade in this case being that employing the missile defense system. This is a major alteration of the way the Japanese military is controlled by the Diet and through it, the Constitution. All the forces in the region are pushing in the direction of further changes along the same lines.

South Korea, like Japan, is energy deficient and, like Japan, has sought nuclear power as a mainstay of its energy policy. South Korea has 16 nuclear power reactors, as well as research reactors and an ambitious nuclear research program. Also like Japan, South Korea has made several attempts at developing a capacity to produce nuclear weapons.

South Korea established an Atomic Energy Commission in the mid 1950s and commissioned plans for power and research reactors. In the early 1970s a reprocessing plant was sought from France, but US pressure saw Seoul cancel the order. During the 1980s, a post irradiation examination facility was constructed. Hot-cells, which enable the handling of irradiated fuel, were ordered but the US prevented their supply. Of course, it has not gone unnoticed in South Korea that Japan's efforts in these matter have not been similarly treated.

South Korea is also aware that it stands at the intersection of great power tensions – between Russia, China, Japan and the US. Whilst presently sheltering under the nuclear umbrella of one of these four (and not under either of two of the others, and the most remote one at that), the awareness of the need to protect themselves in this situation is acute.

Another concern is the nascent nuclear weapons industry of their northern brothers. Whilst this is, perhaps surprisingly, the least of their problems, any credible nuclear deterrent held by North Korea will do nothing to reduce the determination of bomb advocates in the South to develop their own.

North Korea was determined to maintain its scientific independence from the Soviets, and so used a simple British design for their first nuclear reactor, of 5 Mew capacity. They also built small fuel fabrication and reprocessing plants. Using locally mined uranium, moderated by locally supplied graphite, their reactor went critical in 1986. The fuel rods produce abundant bomb-grade plutonium when irradiated, and were extremely dangerous to store. Pyongyang successfully argued that, under these circumstances, they should be reprocessed.

Signing the NPT in 1985 and accepting safeguard condition in 1992, IAEA inspectors found discrepancies between the plutonium the North Koreans said they had removed from the spent fuel and the inspectors' calculations. Diversion to a nuclear weapons program was suspected. During a time of considerable tension, an agreement was reached to close the whole program down. Very little happened on either side to keep this agreement.

Unexpectedly, North Korea revealed in 2002 that it had developed a second path to nuclear weapons – not plutonium this time, but enriched uranium. The former agreement was replaced by still-ongoing negotiations, which too have achieved very little. The US seems determined to isolate North Korea, and has had some success in doing so. Yet brotherly affection and solidarity is evident in the South, and is reflected in political results such as the election of the young, progressive Room Moo Hyun to the Presidency.

Where does Australia stand on all this? The Howard government took a positive initiative in re-establishing diplomatic relations with North Korea in late 2000. That at least established the basis for sensible dialogue.

But the Australian government seems impervious to the potentially destabilizing effects in the region of a Theatre-Missile-Defense armed Japan, or that the Bush administration's attempts to isolate and demonise North Korea may encourage it in its plans to develop nuclear weapons and delivery systems.

Like Liberal and Labor governments before it, the Howard government wants Japan to develop a stronger military capability and play a bigger regional security role.

Prime Minister Howard and Foreign Minister Downer echo the US in urging Japan to free itself of the constitutional constraints of half a century and engage in 'collective defence' with allies.

Nor does Minister Downer have any reservations about missile defence systems. He refuses to see the potential proliferation effects, saying instead, and quite unrealistically, that they are 'common throughout the world' and are a legitimate deterrent. He is quoted by The Australian newspaper as saying, in November 2002, "We have taken the view that missile defence is a component of military architecture these days. As long as Japan feels threatened by missiles, it is a legitimate consideration for Japan to have missile defence capability." He fails to point out that, because missile defence systems are frighteningly expensive, in fact very few countries have them.

Minister Downer and his nuclear diplomats also seem remarkably unconcerned at the possibility that Japan, or South Korea, or both, could walk away from their commitments under the NPT and IAEA, and develop their own nuclear weapons. *If they did this, there would be little doubt that a high proportion of the fissile material fuelling those weapons would have come from Australia.*

As stated before, it is no secret that this inquiry is being held as negotiations continue towards a bi-lateral agreement on nuclear safeguards, with a view to exporting Australian uranium to China. How tight will these agreement finally be? Are we going to insist that

China must seek our permission to transfer, enrich beyond 20 per cent or re-process Australian uranium on a case-by-case basis as the original safeguards stipulated, or allow the commercially more attractive option of a program approach, as we've done with Japan and South Korea? Will Australian companies be allowed to negotiate commercial contracts before a bilateral agreement is in place with the Chinese Government, as happened with the Japanese, thus weakening our capacity to insist on a proper safeguards regime?

Are we going to take a whole-of-region approach to considering whether it is in Australia's interests, or the interests of the world, to export more uranium to another country in such a region, with such tensions as outlined above? Will we find, in some years down the track, that events have cascaded to the point where Japan and South Korea will announce their intentions to deploy nuclear weapons? If these countries announce such an intention, would a similar announcement from Taiwan be far behind? If Australia does indeed supply China with uranium, we should be under no illusions about the Chinese government's attitude to its nuclear industry, for example as reported by Reuters in January 1998 from a senior Chinese official: "Our nuclear industry [has] splendid achievements and made important contributions to protecting national security and expanding our national military prestige."

It is not out of the question that all of these countries will decide it is in their interest to deploy nuclear weapons. At this point, Australia will find itself in the unenviable position of knowing that it has supplied uranium to all sides in this conflict bar one. This knowledge, of course, will not be ours alone.

Conclusions

We have endeavored to show that uranium is not an effective measure against the emission of greenhouse gases, and that it cannot be assumed that uranium exported from Australia will not fuel a nuclear weapons program, particularly in our region.

In doing so we have addressed two of the terms of reference of the inquiry, namely the question of uranium as a means of reducing greenhouse gas emissions, and the strategic concerns for Australia of exporting uranium.

We conclude then, from the material above, that no expansion of the mining and exportation of uranium mining should proceed.