Submission from

Cameco Corporation

To the

Standing Committee on Industry and Resources

Parliament of Australia

House of Representatives

Concerning

The Strategic Importance of Australia's Uranium Resources

Submitted by:

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1. Introduction

1.1 Cameco Corporation (Cameco) welcomes the inquiry into developing Australia's non-fossil fuel energy industry, and is pleased to provide the following information to the House of Representatives Standing Committee on Industry and Resources. Cameco hopes the Committee finds the company's submission useful as it undertakes its case study into the strategic importance of Australia's uranium resources.

1.1.1 Cameco believes the inquiry is timely as 2004 saw a shift in the global perception of nuclear energy. Worldwide, people are recognizing that nuclear energy must play a role in any reasonable plan to meet the accelerating demand for reliable and clean electricity.

1.2 Our submission addresses the first three of the four major elements in the Committee's terms of reference in detail. In summary, Cameco believes:

1.2.1 Global demand for Australia's uranium resources is real and provides the basis for a sustainable industry. Consumption has exceeded mine production by wide margins since 1985 and this continues to be the case. Consumers of uranium – electrical utilities, have been living on inventories for the past 20 years and will do so for several more years.

1.2.2 Australia's uranium resources are strategically important as they represent the world's largest known uranium resources. As the world moves to address the challenge of global warming, and to reduce the burning of fossil fuels through a variety of means, non-fossil fuel energy resources will grow in importance.

1.2.3 The potential implications for global greenhouse gas emission reductions from the further development and export of Australia's uranium resources are real and significant.

1.3 While we do not have direct experience as a mining company with Australia's regulatory authorities, it is our belief (based on professional contacts) the current structure and regulatory environment of the uranium mining sector is generally sound and comparable to that within Canada. Canada is, at present, the world's largest producer and exporter of uranium.

1.3.1 As Cameco is not presently mining uranium in Australia, it is not our intention to address the supplemental list of issues members of the Committee have indicated they would also welcome advice on in a substantive manner. While Cameco is the world's largest producer of uranium, within Australia we are presently exploring for uranium. However, from our global experience with the world's nuclear industry we would advise members of the Committee that:

1.3.2 Nuclear waste management overseas is the subject of both international treaty and national legislation and regulation in all countries that enjoy the advantages of nuclear power. Spent fuel is either recycled or safely managed and awaiting disposal.

1.3.3 Health risks to workers and to the public from exposure to ionising radiation from uranium mining (and in fact from all parts of the nuclear fuel cycle) are well known and well regulated, and are generally less than those of other industries and other sectors of the mining industry.

1.3.4 While the effectiveness of safeguards regimes (both national and international) in addressing the proliferation of fissile material is substantial, we are aware of current international efforts to further strengthen the safeguards regime. We note these efforts are focused on the areas of reprocessing and enrichment, and not on uranium mining as safeguards regimes in this area were strengthened in the 1990s.

2. Global Demand for Australia's Uranium Resources

2.1 The world's almost 440 nuclear reactors provide 16% of the world's electricity and consume about 80,000 tonnes uranium oxide concentrate (also known as yellowcake) per year. In 2004, the world's mines produced only 46,000 tonnes uranium oxide concentrate and the remainder came from secondary supplies, mostly from inventories.

2.2 Through to 2014, existing sources of uranium will fall some 170,000 tonnes short of consumption, illustrating the imperative for exploration and new mine production. Australia, with the largest known reserves of uranium, is therefore globally important with respect to both exploration for economic deposits and the development of new mines.

2.3 Beyond 2014, optimism and enthusiasm about the opportunities for nuclear energy are underpinned by growing demand for electricity. This growing demand, combined with life extensions and refurbishments, is expected to result in 470 nuclear reactors being in operation by 2015.

2.4 Beyond this steady growth in demand for nuclear power, there are prospects for accelerated growth. In Asia, 42 new reactors are under construction or planned to address energy needs driven by rapid economic expansion, primarily in China and India.

2.5 The renewed interest in nuclear power is not restricted to the developing world. In the US, the Bush administration has launched a $1 billion effort aimed at resuming construction of nuclear plants by the end of this decade. In Europe, the first new reactor in 20 years is under construction in Finland – the European Pressurized Water Reactor, and France has ordered one as well.

2.6 Worldwide, 31 nations representing two-thirds of humanity use nuclear energy. Other countries – including Indonesia, Poland, Vietnam, Belarus, Turkey, Serbia and Egypt – are considering building nuclear plants to meet their growing electricity demand.

3. Strategic Importance of Australia's Uranium Resources

3.1 Uranium produced in Australia is used only for peaceful purposes, following processing and enrichment, as the source of fuel in nuclear power plants. At present Australia provides approximately 25% of the world's production from three mines. Australia's in ground resources are close to 1 million tonnes representing almost one third of the world's low cost uranium.

3.2 Worldwide, uranium production presently supplies approximately 60% of the world's annual demand of 80,000 tonnes of uranium oxide concentrate, the remainder comes from secondary supplies, primarily from the downblending of weapon's grade highly enriched uranium (HEU – with a U235 content > 90%) to low enriched uranium (LEU – with a U235 content of between 3 and 6%), suitable for use in fueling nuclear power plants. This balance will change in coming years as secondary supply dries up and new nuclear power stations are built requiring additional primary uranium production. The uncertainty in supply has over the last year resulted in a significant increase in the price of uranium.

3.3 Australia is extremely well placed to take advantage of this situation, both in the immediate future and in the long term. This would have a significant impact on exports and the Australian economy and also, by providing the world with clean energy, would assist in reducing global greenhouse gas emissions and global warming. Uranium exports in thermal terms represent approximately 40% of Australia's energy exports and this number could readily be increased. This is clearly a win-win situation.

3.4 The current three producing mines include Ranger in the Northern Territory and Olympic Dam and Beverly in South Australia. It is only in these two jurisdictions that any significant level of exploration has been undertaken in recent years. Exploration expenditures for uranium has been low since the early eighties, when it dropped below $30 million per annum and particularly low since the late nineties, falling to around $5 million per annum in 2002/3. Cameco Australia accounted for the lion's share of this expenditure.

3.4.1 Although the depressed uranium market substantially influenced the decline in exploration activity, political factors have also contributed considerably to the current low level. The recent increase in interest in uranium will certainly result in a boost in exploration expenditure in coming years. However, a change in perception and support could result in a significant jump in activity. What is required for this to happen is the support of both Federal parties and a change in position and attitude with respect to uranium in a number of States, in particular in Queensland and Western Australia.

3.4.2 Clearly a reversal of the ALP's "no new mines policy", which replaced its "three mine policy" in 1996 and is now clearly out of touch with the rest of the world, is also required to enable the States to follow suit and to enable them to come out clearly in support of the uranium industry.

3.5 Uranium in significant concentrations to be economic has been known to exist in Australia since late in the 19th century and mining of uranium for commercial as well as military purposes was carried out during the middle part of the last century.

3.5.1 The development of nuclear power resulted in a significant increase in exploration activity in Australia from the mid-sixties until the mid-eighties, as shown on the attached figure. During this period annual exploration expenditure increased to as high as $100 million. This period of activity saw the discovery of the Beverly sandstone deposit in South Australia, the Alligator River Uranium Field, which hosts the Ranger and Jabiluka deposits, as well as Olympic Dam.

3.5.2 It is interesting to note that that the dip in exploration expenditure in the mid-seventies corresponds to the ALP holding office and the major decline in the early eighties corresponds to the introduction of the ALP's "three mine policy" in 1983.

3.5.3 The distribution of Australian uranium deposits and prospects is shown on the attached map. The main deposits are also listed in the attached table.

3.5.4 Since the sharp drop off in exploration in the eighties, exploration has been primarily focused in the Northern Territory and South Australia. In recent times, this was mainly because both the Queensland and Western Australia Labor governments had put in place anti-uranium policies. The situation is worse in New South Wales and Victoria where legislation banning uranium mining has been in place since the mid-eighties.

3.6 Previous active mines include Rum Jungle and Nabarlek in the NT, Mary Kathleen in Queensland and Radium Hill in South Australia. Apart from the three current mines significant reserves have been identified at Jabiluka, Koongarra (NT), Honeymoon (SA), Yeelirrie and Kintyre (WA).

3.7 Apart from these deposits numerous other uranium prospects were identified or proven during the significant exploration activity in the seventies and eighties. All these deposits and prospects, however, represent relatively easily defined targets identified by airborne geophysics and follow up surface mapping. Significant potential remains throughout Australia in a variety of geological provinces and settings. Exploration to date has only relatively scratched the surface.

3.8 The decline in exploration expenditure has resulted in activity being focused in a limited number of areas, including the Frome Embayment in South Australia, the Alligator River Uranium Field (ARUF) in the NT and in the early eighties in the Rudall Province in Western Australia. Apart from the limited activity in these areas, exploration has effectively stopped in the rest of Australia for the past twenty years. The potential for new discoveries, in both previously defined terrains and new areas, using advanced techniques and deep exploration tools is very high.

3.9 There is potential for finding new significant deposits in a number of geological settings. Since the mid-nineties Cameco Australia has been based in Darwin and has been focused on exploration in the Pine Creek Inlier in particular the ARUF in West Arnhem Land. This area is regarded as highly prospective for unconformity type mineralisation, where uranium is deposited at the base of ancient proterozoic sandstone basins. Unconformity deposits represent the highest-grade deposits, and include Cameco's McArthur River, Cigar Lake and Rabbit Lake mines in Northern Saskatchewan in Canada.

3.10 Previous work was carried out in the Alligator Rivers Region by a variety of companies, leading to the discovery of the Ranger, Jabiluka, Nabarlek and Koongarra deposits. Other potential proterozoic sandstone basins include the Ashburton and Bresnahan basins in Western Australia, the Birrindudu in the NT and the Eyre Peninsula in South Australia. These basins have seen varying amounts of exploration. Cameco Australia presently holds licenses in the Eyre Peninsula and in the Rudall area, which is host to the Kintyre deposit. However, Cameco Australia's exploration efforts are effectively on hold in WA because of the State government's policy with respect to uranium mining.

3.11 Over the past year a number of junior companies have applied for licenses over prospective ground in Western Australia, but realistically the level of exploration expenditure will be limited until this policy is changed.

3.12 South Australia is home to the Beverly sandstone deposit and Olympic Dam breccia complex deposit. In South Australia the Labor government is openly supportive of uranium exploration and mining. Sandstone deposits occur in coarse young sandstone beds and are amenable to in situ leach mining. Sandstone deposits represent a large proportion of the world's known uranium resources, though they are generally low to medium grade.

3.12.1 As well as the Beverly mine, the Frome Embayment also hosts the Honeymoon, East Kalkaroo and Goulds Dam deposits. Other younger prospective basins, which have seen past work, and are now the focus of increased interest include the Gunbarrel, Carnarvon and Canning basins in WA, which host the Manyingee and Oobagooma deposits, and the Amadeus and Ngalia basins in the NT, which include the Angela, Pamela and Bigrlyi deposits. The potential for discovering additional economic orebodies in the tertiary basins of South Australia, Western Australia and the Northern Territory is very high.

3.13 Australia's most significant deposit is Olympic Dam. It is located in the Gawler craton in South Australia and is the world's largest uranium deposit. Olympic Dam also includes significant copper and gold reserves and is the only known breccia complex that has a significant resource of uranium. The discovery of the Prominent Hill deposit in 2001 has sparked further interest and there is renewed activity for the search for Olympic Dam type deposits in the Gawler.

3.14 There is also significant potential in Western Australia for near surface uranium deposits in very young sediments. Uranium in calcrete hosts the largest deposits of this type. In Western Australia surface deposits overlie granite and greenstone basement in the northern portion of the Yilgarn craton. This district hosts the Yeelirrie deposit as well as a number of other prospects including Lake Way, Centipede, Thatcher Soak and Lake Maitland. This region has been the focus of significant ground acquisition but to enable this to be followed through a clear indication of support at the State level is required.

3.15 Other deposit types found in Australia include Valhalla in Queensland, where disseminated uranium is deposited in deformed rocks (metasomatite type deposits). Intrusive deposits such as Maureen and Ben Lomond are found within the Georgetown inlier in Northwest Queensland and the Westmoreland area, which straddles the Queensland and NT border, hosts a number of prospects, representative of vein and sandstone deposits. Companies are beginning to refocus on these areas, but again a change in policy is required to support increased levels of exploration activity.

3.16 Without doubt Australia's known resources could be increased significantly beyond the current 29% of world resources. The improved economics of uranium has created considerable interest but there needs to be a significant change in how uranium is viewed and a clear level of support shown at both the Federal and State level. A change in political will and direction is required to give the clear message to companies that it is worthwhile exploring for uranium. Australia already plays an important role in supplying low cost uranium to support the generation of clean nuclear energy, which provides 16% of the world's power, and if properly funded and supported uranium exploration is encouraged the unfortunate trend of the past ten plus years can be reversed and Australia could take its rightful place as the world's most important exporter.

4. Implications for Greenhouse Gas Reductions

4.1 A recent study out of Canada (World Energy: The Past and Possible Futures) includes the following conclusion – Energy has been and remains an essential element of human evolution and progress. To attain a sustainable future, we must not only achieve efficiency in using global resources but also ensure that the capacity of the biosphere to absorb residual products and waste from our activities is not breached.

4.2 Australia, like Canada and the US, is a larger primary energy consumer. All three countries consume more than 6 tonnes of oil equivalent (toe) per capita. All three also primarily consume fossil fuels when it comes to energy generally (coal, oil and natural gas), and power generation specifically (coal).

4.3 World generation fuel demand is met 44% by coal, 8% by oil and 19% by natural gas. Nuclear is the third largest fuel source for electricity generation at 18%.

4.4 While at present fossil fuels dominate global energy supply, nuclear energy had the highest growth rate in global primary energy supply from 1982 to 2002 with an average annual growth rate of 5.7%. One of the primary historical reasons for the rise of nuclear power has been the low cost of fuel compared to other primary (predominantly fossil) energy sources.

4.5 Looking forward, one of the primary reasons for the continued growth of nuclear power will be the growing concern with the costs associated with the environmental issues arising from the development and consumption of fossil fuels.

4.6 Numerous studies have noted the generation of electricity from fossil fuels, notably coal and natural gas, is a major and growing contributor to the emissions of carbon dioxide – a greenhouse gas that contributes significantly to global warming. There is a scientific consensus that these emissions must be reduced, and a growing opinion the increased use of nuclear power is one of only a few realistic options for reducing carbon dioxide emissions from electricity generation.

4.7 This growing opinion is not limited to executives in the nuclear industry. Prominent environmentalists, including Greenpeace founder Patrick Moore and former Friends of the Earth chair Hugh Montefiore, have recently stated publicly that a rapid expansion of nuclear energy is necessary to avert environmental calamity.

4.8 Celebrated environmentalist James Lovelock – who was among the first scientists to sound the alarm over global warming 16 years ago and the originator of the Gaia theory (now known as earth system science) – stated a year ago that "Civilization is in imminent danger and has to use nuclear, the one safe, available, energy source, now or suffer the pain soon to be inflicted by our outraged planet."

4.8.1 More recently (March 2005), James Lovelock argued the Earth is nearing a temperature threshold beyond which we will be in crisis, but that there is a lot we can do to forestall the disaster that is global warming. He argued a lifeline does exist, and by grasping it now we can rescue the world from both the consequences of global warming and our looming energy shortages. It is safe, proven, practical and cheap.

4.8.2 Our lifeline, he said, is nuclear energy, and noted Australia, along with Canada as a stable source of plentiful uranium.

4.8.3 The environmental benefits of nuclear energy identified by James Lovelock are real: zero emissions of greenhouse and acid-generating gases, no toxic ash or dust, and the small quantities of high-level radioactive waste created can be safely stored.

4.8.4 Cameco concurs that to not use nuclear energy now, when it is needed the most to combat global warming is, in the words of James Lovelock, madness.

4.8.5 Global emissions from the burning of fossil fuels (coal, oil and natural gas) contribute some 9,000 million tonnes (Mt) of carbon dioxide into the atmosphere each year. On a fuel basis, coal releases some 4 tonnes of carbon dioxide for every tonne of oil equivalent burned, oil some 3.2 tonnes for every tonne burned and 2.3 tonnes of carbon dioxide are released from every tonne of oil equivalent of natural gas. Nuclear has no emissions of carbon dioxide.

4.8.5.1 With respect to electricity generation, on a terawatt-hour basis (TWh), coal releases slightly more than 1 Mt of carbon dioxide and oil some 0.8 Mt. Natural gas, the cleanest of the fossil fuels, still releases 0.63 Mt of carbon dioxide for every TWh of electricity generated. Nuclear has no such emissions.

4.8.5.2 The greenhouse gas emission reduction advantages offered by nuclear power are magnified by the concentration of energy in uranium when compared to fossil fuels. One tonne of coal on average generates some 3.13 MWh of primary energy. One tonne of oil generates 4.48 MWh of primary energy. One thousand cubic metres of natural gas generates 3.84 MWh of primary energy. One tonne of uranium, by comparison, generates between 44,000 and 72,000 MWh of primary energy, depending on the type of reactor and enrichment level of the fuel.

4.8.6 It is this energy fact that is causing environmentalist attitudes towards nuclear to change. In his recent article Lovelock asks people to imagine they were a government minister required to decide what fuel to use for a new power station being built to supply half a large city. Every year, there are the following environmental consequences: using coal requires a 1,000 kilometre line of railway cars filled with coal which will emit billions of cubic feet of greenhouse gases, creates dust and more than 500,000 tonnes of toxic ash; using oil needs four or five-super tanker loads of heavy oil imported from unstable parts of the world, emits nearly as much greenhouse gases as coal plus huge volumes of sulphur and other deadly compounds that turn into acid rain; importing natural gas over long distances by ships and pipelines prone to accidents and leaks, emissions are highly polluting and the gas supply is vulnerable; or about two truckloads of cheap and plentiful uranium with essentially no emissions. For Lovelock, the benefit of using nuclear energy instead of fossil fuels is overwhelming.

4.8.7 International studies support this view as well. Overall, waste generation by fuel type is lowest for nuclear and solar power at 0.01Mt of waste for every gigawatt equivalent of electricity produced (IAEA). Another study found that with respect to greenhouse gas emissions (a form of waste), nuclear releases less carbon dioxide to the atmosphere than coal, oil, natural gas and renewables on a life cycle basis (IAEA). Coal releases some 360 grams carbon equivalent for every KWh generated, renewable some 80 grams, and nuclear only 10 grams.

4.8.8 World wide, the use of nuclear energy already avoids the release of more than 600 million tonnes of carbon emissions or 2.2 billion tonnes of carbon dioxide annually. The IAEA and the WNA calculated that this level of carbon avoidance is more than twice the likely savings from the Kyoto Protocol by the end of 2010.

4.8.9 The Intergovernmental Panel on Climate Change published a special report on emissions scenarios in 2000. The report developed 40 scenarios reflecting different assumptions about global economic growth and environmental concern. Most scenarios anticipate that nuclear energy will play a growing role in mitigating global carbon accumulation throughout this century.

4.8.9.1 In two typical scenarios with high economic growth, annual carbon savings from nuclear power rise above 1.2 million tonnes by 2030 – a doubling of the current benefit from nuclear.

4.9 Cumulatively, over these three decades the carbon saving from nuclear exceeds 25 billion tonnes. Realistic assessment shows that nuclear energy is indispensable in abating the intensification of greenhouse gases resulting from the inexorable rise of global energy consumption.

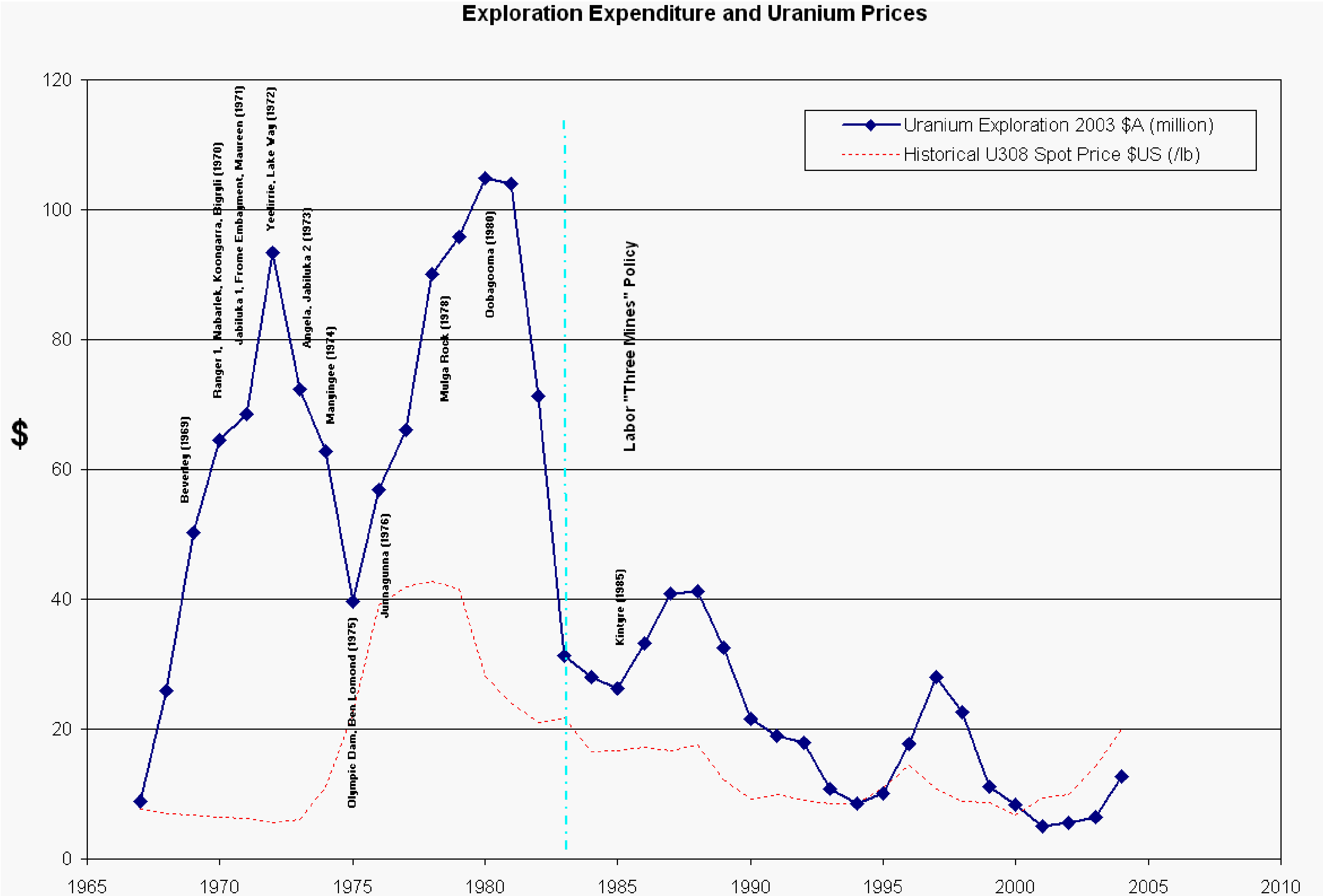
5. Conclusion

5.1 The House of Representatives Standing Committee on Industry and Resources' inquiry into developing Australia's non-fossil fuel energy industry is both timely and significant. It is timely with respect to the shift in global perception of the role nuclear energy can and must play in meeting the demand for clean energy, and significant in that Australia's world-class uranium resources will only rise in importance as this realization spreads and takes hold.

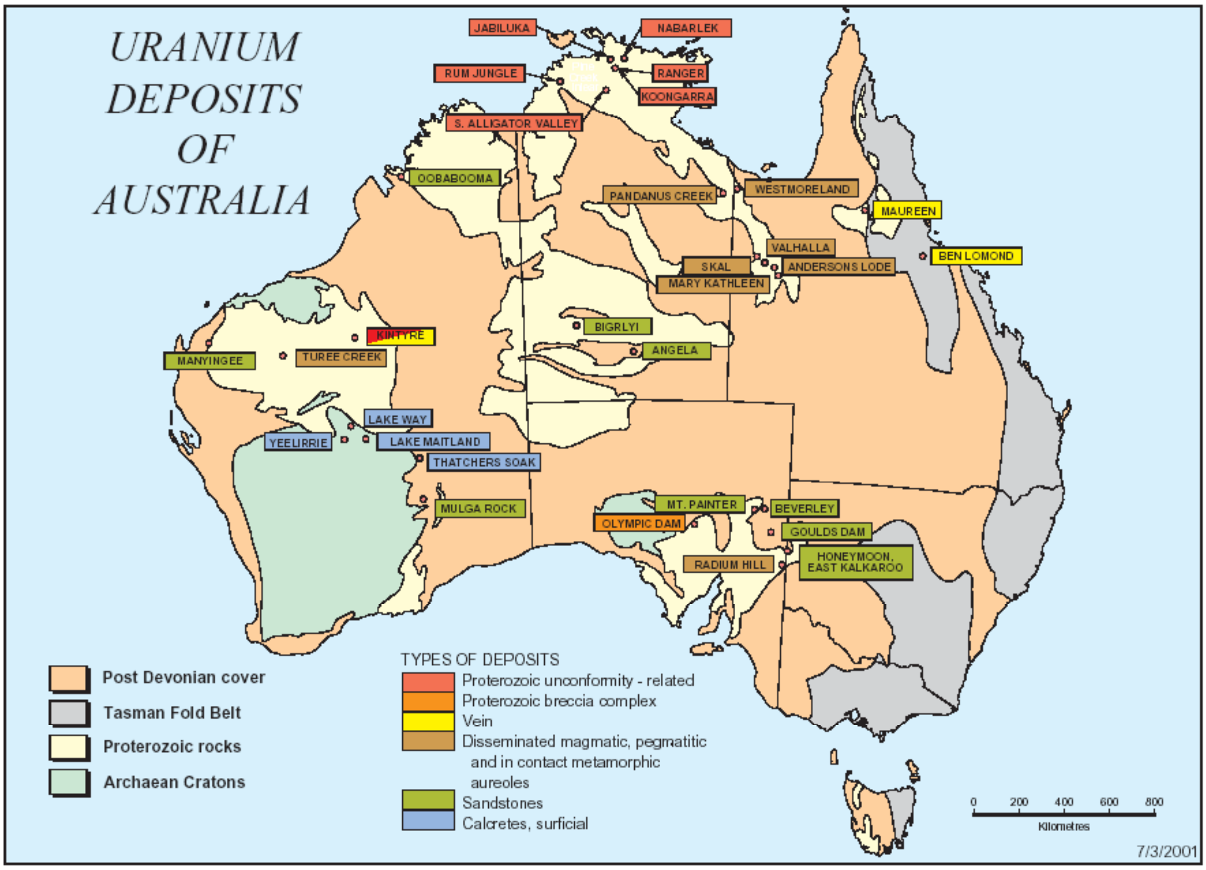
5.2 As Australia has the world's largest known uranium resources and significant uranium exploration potential, the further development and export of Australia's uranium resources takes on a strategic importance globally with the ratification and entering into effect of the Kyoto Protocol. Nuclear power is the only carbon-free energy source readily available on a global scale that can replace fossil fuels as a baseload generator of electricity.

5.3 The real implications for global greenhouse gas emission reductions are evident today – without nuclear power the challenge to reduce greenhouse gas emissions would more than double as a further 600 million tonnes per year would have to be removed from the atmosphere.

5.4 Nuclear power's value as a carbon-free electricity supply technology has to be recognized in the non-fossil fuel energy policies of the Government of Australia. The further exploration for, and development of, Australia's uranium resources should therefore be supported, as a matter of policy, and Australia should throw the world a climate lifeline.


Exploration Expenditure and Uranium Prices
Uranium Exploration 2003 $A (million)
Historical U308 Spot Price $US (/lb)
$
120
100
80
60
40
20
0
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
Beverley (1969)
Ranger 1, Nabarlek, Koongarra, Bigrgli (1970)
Jabiluka 1, Frome Embagment, Maureen (1971)
Yeelirrie, Lake Way (1972)
Angela, Jabiluka 2 (1973)
Mangingee (1974)
Olympic Dam, Ben Lomond (1975)
Junnagunna (1976)
Mulga Rock (1978)
Oobagooma (1980)
Labor "Three Mines" Policy
Kintyre (1985)

Map of Australia's Major Uranium Deposits



Australia's Major Deposits and Prospective Mines (as at December 2000)

Deposit	Grade U_3O_8	Contained U_3O_8	Category
Northern Territory			
Ranger	0.26%	57,000 t	Measured Resources
	0.26%	23,251 t	Inferred Resources
Jabiluka	0.51%	71,000 t	Reserves
	0.57%	88,000 t	Measured and Indicated Resources
	0.48%	75,000 t	Inferred Resources
Koongarra	0.8%	14,540 t	Reserves
Angela	0.13%	11,500 t	Reserves
South Australia			
Olympic Dam	0.05%	280,000 t	Measured Resources
	0.04%	524,000 t	Indicated Resources
	0.03%	192,000 t	Inferred Resources
Beverley	0.18%	10,600 t	Resources
Honeymoon	0.11%	3,300 t	Resources
Billeroo West (Gould Dam)	0.12%	2,000 t	Indicated Resources
Prominent Hill	0.01% (as by-product of copper mining)	9,000 t	Inferred Resources
Western Australia			
Kintyre	0.2 – 0.4%	35,000 t	Reserves and Resources
Yeelirrie	0.15%	52,000 t	Indicated Resources
Manyingee	0.12%	7,860 t	Indicated & Inferred Resources
Oobagooma	Not known	9,950 t	Resources
Lake Way	Not known	4,000 t	Resources
Queensland			
Westmoreland – Queensland/Northern Territory	Up to 0.2%	21,000 t	Inferred Resources
Ben Lomond	0.25%	4,760 t	Resources
Maureen	0.123%	3,000 t	Resources
Valhalla	0.144%	16,500 t	Indicated Resources
		25,000 t	Inferred Resources