PALADIN RESOURCES LTD
A.C.N. 061 681 098

GRAND CENTRAL 1ST FLOOR, 26 RAILWAY ROAD
SUBIACO WESTERN AUSTRALIA 6008
PO BOX 201, SUBIACO WESTERN AUSTRALIA 6904

TELEPHONE: (+61 8) 9381 4366 FAX: (+61 8) 9381 4978
EMAIL: paladin@paladinresources.com.au
Web: www.paladinresources.com.au

Submission to the House of Representatives Standing Committee on Industry and Resources

"The Strategic Importance of Australia's Uranium Resources"

PALADIN RESOURCES LTD

9 June 2005

1. INTRODUCTION

Paladin Resources Ltd is an Australian company listed on the ASX (with a dual listing on the Toronto Stock Exchange) which has been involved in the mineral resource sector, with an emphasis on uranium, since its establishment in 1993.

Over the past eight years Paladin Resources has assembled a number of uranium projects in Australia and Africa and has recently announced its commitment to develop a new uranium mine and mill at its Langer Heinrich Project in Namibia which will begin production in late 2006. In parallel with the construction of Langer Heinrich, Paladin Resources will complete a feasibility study on its Kayelekera Project in Malawi, with the intention of bringing that project into production in 2008 or 2009.

Paladin Resources' major Australian uranium interests are Manyingee and Oobagooma which are both in Western Australia where the development of uranium mines is prohibited by state law.

2. GENERAL STATEMENT CONCERNING AUSTRALIA'S URANIUM INDUSTRY.

For too long Australia's attitudes and policies governing uranium mining and the nuclear fuel cycle have been based on misconceptions, ignorance, and the occasional deliberate lie. The result has been unjustifiable restrictions on the development of new mines, which confers privilege on existing operations, and the perpetuation of negative attitudes towards nuclear power which, if not reversed, may see Australia fail to play its potentially major role in the supply of nuclear fuel to a successful, and expanding, world nuclear electricity industry.

The 1977 Commonwealth uranium policy, which marked the beginning of the purely civil uranium mining industry in Australia, laid down the key ground rules for the development of the new generation mines. The most enduring legacy of that period is the comprehensive non-proliferation safeguards system which has put Australia at the forefront of ensuring the peaceful use of uranium sold for electricity generation purposes. One corollary of expanding Australia's uranium exports is that a greater amount of uranium in use overseas is subject to Australian safeguards control.

Less desirable aspects of the 1977 policy were the mandating of extensive government oversight of uranium marketing arrangements which included a minimum floor price for uranium sales contracts and government scrutiny and approval of all sales contracts prior to their becoming effective. The combined effects of the escalating minimum floor price and the bureaucratic contract approval procedure, both of which were intended to protect Australia's uranium patrimony, impeded the commercial development of Australia's resources (to the primary advantage of Canada) and paved the way for the infamous "three mines policy" of the eighties and nineties.

Arbitrary Commonwealth restrictions on new uranium developments were lifted in 1996 (the floor price was abandoned in 1989) only to be superseded by State prohibitions which do not seem to have any basis in reasonable policy.

Australia has a significant uranium endowment in a world where nuclear power is an established component of global electricity supply. Nuclear power is likely to expand as countries confront the harsh dilemma of maintaining and increasing electricity production without adding to the greenhouse loading.

The only "special treatment" needed for the uranium industry is the maintenance of an effective international safeguards regime and the continuation of the best practice standards for occupational health and environment management systems which are the hallmark of Australian uranium production and out-class many foreign uranium operations.

Nuclear power has been a growing component of the world energy mix for fifty years. Increased use of nuclear power will be a key strategy to combat greenhouse emissions over the next fifty years. Paladin Resources submits that the House of Representatives Standing Committee should use this opportunity to embrace and enunciate the real value of a large Australian uranium industry which, if allowed to develop in response to global demand, will enable Australia to make a substantial contribution to greenhouse abatement without compromising non-proliferation objectives.

3. SUBMISSIONS RELATING TO SPECIFIC TERMS OF REFERENCE

Paladin Resources has obtained permission to refer to the Appendices to the Uranium Information Centre's (UIC) submission to this inquiry to avoid duplicating data.

(a) Global demand for Australian uranium resources

The salient points are:

- Nuclear-generated electricity already accounts for 17% of world electricity consumption, which is slightly less than natural gas' contribution but slightly more than hydro. Coal is the dominant fuel.

- Nuclear power has maintained its proportional contribution through continuous and significant operating improvement at existing plants as well as by building new nuclear plants in some countries. Nuclear generating capacity has grown even where the number of plants has declined (eg Sweden, the USA).

- The improved performance of existing nuclear plants has occurred during a period where the cost of other base load energy sources has been rising, a factor that is bringing fresh economic interest to nuclear power. Nuclear is now not a high cost option.

- The key component of nuclear fuel for the current fleet of reactors, and for the foreseeable future, is uranium.

- Australia possesses about 30% of the world's known recoverable resources of uranium.

World demand for uranium to provide fuel for existing and new plants now under construction exceeds world uranium production twofold. The supply deficit over the past fifteen years has been variously made up by inventory disposals: first, excess inventories accumulated by utilities who over-bought in the eighties, then military material flowing from decommissioned weapons stockpiles. There is ample evidence that the inventory disposals are coming to an end and the industry must now elicit new uranium supplies to meet present demand and to underwrite future nuclear power expansion.

Australia currently supplies about 23% of world uranium production, second to Canada (28.5%) but only a little less than the contribution of the next three countries, Niger, Russia, and Namibia combined. Australia's production now comes from two large operations, Ranger in the Northern Territory, and Olympic Dam in South Australia, and one smaller in situ leach project, Beverley, also in South Australia. A lot of Australia's undeveloped resources are in the Northern Territory, Queensland, and Western Australia. The UIC's Appendices 2 and 3 illustrate the opportunities for an expanded Australian uranium industry.

The challenge for future uranium supply is greater than is generally recognized. Most industry analysts now predict uranium shortages and extreme tightness of supply extending for up to twenty years unless there is a significant rebalancing of the uranium market. Sustained higher prices will be needed to justify investment in new long term mining operations. Australia will be the prime beneficiary of this new investment, if our uranium policies and regulations are brought into alignment with the realities of the world's civil nuclear power industry.

(b) Strategic importance of Australia's uranium resources

If Australians understood the energy value of uranium oxide (once it has been enriched for use in a light water reactor) in comparison with coal or natural gas it is possible we would have created a much wider consensus in favour of uranium mining and a better appreciation of the strategic value of the Australian uranium industry. (The comparisons are set out in UIC Appendix 1).

- One tonne of uranium oxide generates as much heat as 20,000 tonnes of black coal. That means Australia's 2004 uranium production of 9406 tonnes U was energy-equivalent to 188 million tonnes of black coal, or about 85% of Australia's coal exports in 2003-2004. Australia is the world's largest exporter of coal, and the fourth largest producer. When uranium and coal are added together the energy content is formidable. However, it would only take a small increase in Australia's uranium production to surpass the export coal industry, in energy-equivalent terms.

- In one sense Australia's uranium industry is a complement to the coal industry. Australia's uranium exports "neutralise" the carbon content of Australia's thermal coal exports by generating in our customers' countries an amount of carbon-free electricity to balance the inevitable carbon emissions of burning the coal equivalent. This contribution should be more

widely recognized. In fact, a good argument can be made that uranium exports should earn credits against CO2 taxes imposed on coal combustion in some jurisdictions.

- Uranium production is usually small scale (compared to coal, iron ore, or base metals), situated in geological formations which in Australia are in remote areas, and imposes relatively low stress on the environment and social infrastructure. Transport volumes are small (i.e. 9406 tonnes v 188,000,000 tonnes), and lifetime impacts of well-managed operations are minimal (e.g. Mary Kathleen Uranium in Queensland, Nabarlek in the Northern Territory, both closed and their sites rehabilitated). There is ample evidence in Australia that exhausted uranium mines can be rehabilitated safely, leaving minimal disturbance to the environment, and certainly leaving nothing which reflects the amount of energy extracted from the mines during their operating life.

Uranium is an energy-intense and comparatively efficient energy source. Uranium mining has no inherently difficult attributes, operates with minimal environmental disturbance, leaves a small footprint, and is a major contributor to Australia's energy trade. Australia's uranium resource endowment is substantially bottled up by current policies and attitudes in some parts of the country. It is clear the world's reliance on nuclear generated electricity will not diminish; in fact it will increase significantly over the next twenty years. Australia's major trading partners (Japan, China, the EU, and the USA) have significant nuclear power installations, and consequently have a continuing dependence on imported uranium. (UIC Appendix 3 shows where Australia's uranium production is consumed). The *US Energy Information Administration 2004 Uranium Marketing Annual Report* shows that Australia supplied 18% of the USA's 2004 uranium purchases – a number which indicates Australian uranium generated 3.6% of the USA's total electricity, a big number.

There is an overwhelming case for acknowledging the strategic value of Australia's uranium resources by overturning outmoded antagonistic attitudes to nuclear power and permitting development of resources in accordance with global market demand.

(c) Greenhouse implications

- There are a lot of tendentious and spurious arguments mounted to rebut claims that nuclear power is good for the environment. However, the facts speak for themselves. A nuclear-powered electricity generating plant does not emit combustion gases when raising steam. A nuclear power plant is a CO2-free energy source at point of generation. Life cycle analysis has been conducted on the entire nuclear fuel cycle by several authorities (see UIC Submission), taking into account greenhouse gas creation at each stage prior to, and subsequent to, uranium used in a reactor (e.g. at the mining stage, equipment fabrication, construction, decommissioning) and the conclusions are unsurprising. Nuclear power creates the lowest amount of CO2 emissions compared with coal (highest), gas, solar photovoltaic, and in some cases wind. The only rival to nuclear is hydro. It is difficult to see how the

world's voracious appetite for energy, and particularly electricity, will be met without compromising greenhouse gas limits unless there is an increasing reliance on nuclear power for base load, high volume electricity production.

- Looking ahead there is an expectation that hydrogen will play a more important role in energy supply, especially as a transportation fuel to replace greenhouse gas-emitting petrol. Industrial-scale production of hydrogen by electrolysis will require large amounts of electricity, which itself must be generated by a CO2-free source if the total greenhouse loading is to be reduced. Large nuclear power plants obviously have a key role in future hydrogen manufacture. Nuclear power plants are also ideally suited for large scale water desalination plants which may become necessary in some parts of the world as water resources become severely over taxed by social demand.

- CO2 and the other greenhouse gasses are "waste products" of fossil fuel combustion and use. They are a cost, but the primary fuel use confers immense benefits. Nuclear power also generates wastes, principally in the form of various radioactive components arising from different stages of the fuel cycle. (UIC Appendix 1 deals with waste). Public attention concentrates on "high level waste", the fission products contained in spent fuel assemblies, or arising from separation and reprocessing of used reactor fuel. What is not fully appreciated is that reactor waste is:

  (i) very small in volume;

  (ii) "contained" in the fuel assembly itself – it is not dispersed into the atmosphere as stack emissions or exhaust pipe gases;

  (iii) inevitably decays at an absolutely predictable rate; and

  (iv) is readily amenable to separation, encapsulation, and isolation for the period necessary to render it harmless to the environment and people. The argument put by some that nuclear waste is "not worth the risk" misunderstands the real risk v benefit equation which applies to all sources of energy. Nuclear power deals with waste more explicitly and transparently than many other fuels.

The Greenhouse Effect is a contentious policy issue. However, if it is decided that countries must act to reduce greenhouse gas emissions substantially, it follows, *inter alia*, that large greenhouse gas generators (such as, but limited to, fossil fuel power stations) must be either made "green" (which is possible, but expensive), or shut and the power replaced by greener sources. One interesting conclusion from the life cycle ranking of energy sources referred to above is that the classical renewables such as wind and solar are not without their own greenhouse contributions, which may in some cases exceed those of the nuclear fuel cycle. No one would advocate abandoning solar or wind on those grounds alone, but

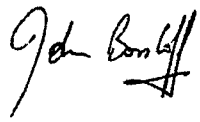
neither should wind or solar advocates deny nuclear's positive contribution to greenhouse mitigation. Responsible and balanced policy would strive for a mix of low-greenhouse energy sources: CO2-free nuclear for base load power in countries with high ambient power demand; low-CO2 coal, because coal is abundant; natural gas for peaking loads; hydro, wind, tidal, solar where suitable and appropriate. Achieving better energy efficiency in product design and use and reducing excessive consumption in the developed world through better electricity pricing are also important strategies. There is no single panacea, but no likely remedy should be arbitrarily rejected. Windmills and reactors each have parts to play.

(d) Regulatory Environment

This topic has been addressed comprehensively elsewhere and has been the subject of several other inquiries and reviews. South Australia has developed a regulatory regime which seems to have married the requirements of the State and the Commonwealth across the wide range of issues affecting uranium mining. The most important aspects of regulation should be:

- Avoidance of State/Commonwealth duplication;
- Regulation that is appropriate, but not excessive (for example, exaggerated spills reporting, excessive administrative burdens);
- Reassuring to the public that the uranium industry is fully capable of operating in compliance with best standards, and, provided it does so, uranium producers should be seen as legitimate, socially and economically positive contributors to Australia, as well as playing a role in greenhouse abatement measures overseas.

Submitted with respect on behalf of:
Paladin Resources Ltd



John Borshoff
Managing Director

Perth
9 June 2005