SUBMISSION:

AGREEMENTS BETWEEN AUSTRALIA AND THE PEOPLE'S REPUBLIC OF CHINA ON THE TRANSFER OF NUCLEAR MATERIAL AND FOR COOPERATION IN THE PEACEFUL USES OF NUCLEAR ENERGY

SEPTEMBER 2006

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EXECUTIVE SUMMARY

The Minerals Council of Australia (MCA) welcomes the Agreements reached between Australia and China on Nuclear Material Transfer and Nuclear Cooperation. These Agreements are timely and opportune. They pave the way for exports of Australian uranium and related mining technology and services without compromising Australia's strict uranium regulatory regime. They also add impetus to the need for reform of Australia's domestic arrangements governing development of uranium mines in Australia.

China a growing market for Australia's minerals

China's and Australia's economies have strong and wide-ranging economic complementarities. In particular, Australia is a competitive and highly reliable supplier of a wide range of resources required by China.

Nuclear electricity generation in China

China is now the world's second largest energy consumer behind the US and by 2030 is expected to be generating electric power equivalent to that currently generated by the US, Japan, Canada and Germany combined.

Key challenges for China include how to provide economically secure and stable power and how to reduce the environmental impacts of generating this power. Conventional thermal sources of electricity generation (coal, which makes up 70 per cent of China's primary energy consumption, and natural gas) are expected to remain the dominant fuel for electricity generation for the foreseeable future. The Chinese government is giving priority to the expansion of natural gas, hydro and nuclear electricity generation under its current Eleventh Five Year Plan. China has five nuclear power plants under construction (18 per cent of world activity), 13 planned (21 per cent) and 50 proposed (31 per cent). China's uranium resources are *insufficient* to fuel its expansion plans. As a consequence, China is seeking secure, long-term sources of energy to fuel its economic growth and Australia holds around 36 per cent of the world's economic demonstrated resources of uranium.

Australia's Uranium Export Policy

The MCA supports Australia's Uranium Export Policy and the requirements that all Australian trading partners must meet all aspects of the Nuclear Non-Proliferation Treaty (NPT) and enter into specific bilateral arrangements with Australia. These agreements endeavour to ensure Australia's uranium is only exported for peaceful, non-explosive purposes. The MCA also supports the Australian Government's position on encouraging all uranium trading partners to sign the Additional Protocol (which seeks to strengthen the effectiveness and improve the efficiency of the international safeguards system). Australia should continue to press for the International Atomic Energy Agency's (IAEA's) Additional Protocol to become a condition of nuclear supply and assist regional states to implement this Protocol effectively.

China - a nuclear weapons state – is a party to the NPT under which a safeguards agreement has been in force since 1982. China has ratified the Additional Protocol, which has been in force since 28 March 2002, and has signed, but is yet to ratify, the Comprehensive Test Ban Treaty. In May 2004 China joined the Nuclear Suppliers' Group. All China's imported nuclear power plants - from France, Canada and Russia - are under IAEA safeguards, as is its centrifuge enrichment plant.

Australia has similar safeguards agreements to the one proposed with China with three of the other nuclear weapon states – namely US, UK and France – and a safeguards agreement with Russia, which covers processing of uranium on behalf of other Australian safeguards agreement partners.

In the MCA's view the two agreements under review:

- **reassure the community of the integrity of Australia's strict regulatory controls for the export and use of uranium** – Australia's nuclear safeguards give objective assurance that Australia's uranium is only to be used for peaceful, non-military purposes. Australia's safeguards arrangements are technical measures providing materials accounting and auditing procedures on the peaceful use of Australia's uranium throughout the uranium fuel cycle;
- **complement the 19 existing Australian bilateral nuclear safeguard agreements** covering 46 countries (Euratom represents 28 countries of the EU);
- **recognise the strength of Australia as a strategic location for the supply of minerals and energy** in an increasingly globalised industry with converging global supply – global markets are simply not there for the taking and there is no guarantee Australia will be a preferred source of supply – China has concluded nuclear cooperation agreements with 16 other countries some of which compete or could compete with Australia for uranium trade opportunities;
- **emphasise the growing trade and investment relationship between China and Australia** centred on mineral resources;
- **focus on the capacity constraints of the ALPs "no new mines" policy** in restricting the Australian uranium industry from realising its economic potential – the policy is inherently flawed in that there are no production restrictions on existing operations, and it, obviously, places no limits on global supply given that other countries (notably Canada and Kazakhstan) will fill the vacuum created by Australia;
- **enhance the potential of Australian mining technology and service industries** to build partnerships with Chinese technology firms in servicing the Chinese minerals industry. The Nuclear Cooperation Agreement stands to contribute to the mining technology and services sector's goal of $6 billion for exports by 2010 from the current level of around $2 billion. The Agreement covers the transfer of nuclear related material, equipment or technology, building on the existing relationship between Geoscience Australia and the Chinese National Nuclear Corporation involving technical exchanges on geological and exploration techniques.

The Agreements are a necessary adjunct to Australia's trade and investment relationship with China. Once ratified, they will pave the way for commercial negotiations for uranium to be part of a suite of growing exports of minerals and energy resources and related technology and services to China. The Agreements will add further weight to the conclusion of a free trade agreement between China and Australia deepening the strategic complementarity of the two economies.

A brief outline of relevant MCA policies on environment (including climate change), safety, indigenous relations and uranium stewardship is also included to provide context to this submission.

1. INTRODUCTION

1.1. The Minerals Council of Australia

The Minerals Council of Australia (MCA) represents Australia's exploration, mining and minerals processing industry, nationally and internationally, in its contribution to sustainable development and society. MCA member companies produce more than 85 per cent of Australia's annual mineral output.

The MCA's strategic objective is to advocate public policy and operational practice for a world-class industry that is safe, profitable, innovative, environmentally and socially responsible and attuned to community needs and expectations.

The Minerals Council supports the Australian Government's policy approach to uranium exports and the concluding of the two treaties under review by the Committee in accordance with that existing policy. Together the two treaties have the same affect as treaties on uranium exports that Australia has concluded with many other countries.

1.2 The importance of China to the Australian minerals sector

China is the world's second largest economy in purchasing power parity terms (fourth largest in exchange rate terms) and the third largest trading nation. China's economic growth, which has averaged 9.5 per cent over the past 20 years, has been the single largest contributor to global growth over the past five years and in 2005 accounted for around one quarter of world economic growth. It is also the world's most populous nation. These factors underline the importance China is playing in international trade.

China's and Australia's economies have strong and wide-ranging economic complementarities that have been strengthening economic and trade ties. In particular, Australia is a competitive and highly reliable supplier of a wide range of resources required by China. Australia is also close in proximity to and has a long-standing minerals trading relationship with Asia. Japan, South Korea and Chinese Taipei have been important markets for 30 to 40 years and continue to be so.

China is now Australia's second largest merchandise trading partner and there is a growing trade and investment relationship between China and Australia centred on mineral resources. In 2005, Australia exported goods and services worth $16 billion to China. This included a range of mineral commodities.

Over the 15 year period to 2004/05, the major contributors to the growth in Australian mineral resources (including oil and gas) exports have been Japan (22.2% of total), China (15.8%), India (12.6%) and South Korea (12.2%). China's contribution has been mainly in the past five years or so. Over the five years to 2004/05, China contributed just over 50 per cent of the growth in demand for mineral resources exports from Australia. Some recent data for selected mineral exports are shown in **Table 1**. In 2005 mineral resources exports accounted for just over 60 per cent of Australia's merchandise exports to China.

TABLE 1: SHARE OF AUSTRALIAN EXPORTS OF SELECTED MINERALS GOING TO CHINA (IN VOLUME TERMS)

Mineral	2004/05	2005/06
Iron ore concentrate	44%	51%
Copper concentrate	30%	35%
Zinc concentrate	15%	11%
Lead concentrate	27%	50%

Source: Australian Bureau of Agricultural and Resource Economics, *Australian Mineral Statistics, June quarter 2006*

Consistent with its development needs and a desire to have security of supply of upstream resources for its ongoing rapid industrialisation, China's largest investments in Australia have been in the resources sector and further investment can be expected.

The two Agreements being considered by the Standing Committee:

- **recognise the strength of Australia as a strategic location for the supply of minerals and energy** in an increasingly globalised industry with converging global supply; and
- **emphasise the growing trade and investment relationship between China and Australia** centred on mineral resources – China is seeking secure long term sources of energy to fuel its economic growth and Australia holds around one-third of the world's economic demonstrated resources of uranium.

2. CHINA'S ELECTRICITY INDUSTRY

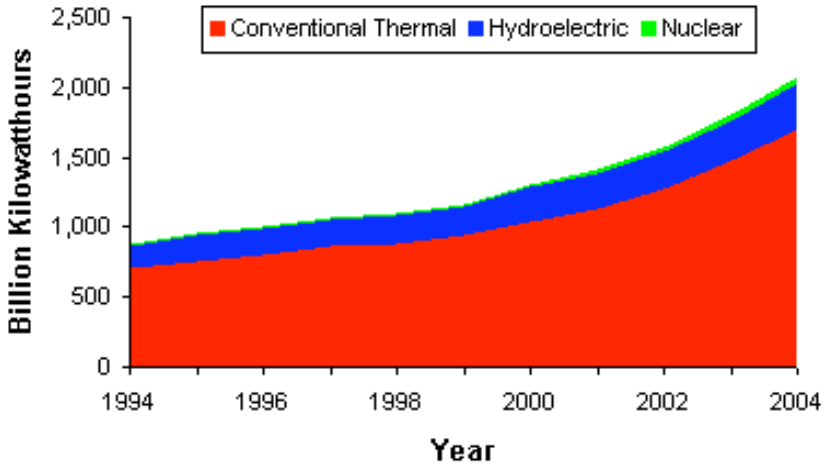
Consistent with its strong economic growth, China's demand for energy is growing rapidly. Between 2000 and 2004 China increased its installed electricity generating capacity by 60 per cent (to 391.4 GW) and its consumption also increased by 60 per cent. China is now the second largest electricity consumer in the world after the USA. In 2005, China built the equivalent of Australia's entire installed electricity grid (around 48 GW) in about 9 months and the equivalent of all the power plants in both Norway and Sweden (around 60 GW) in 12 months. Every two years it is adding as much power generation capacity as the total for Canada or France (around 115 GW). [1] By 2030 it is expected to be generating electric power equivalent to that currently generated by the US, Japan, Canada and Germany combined.

As shown in **Figure 1**, China's electricity generation continues to be dominated by fossil fuel sources, particularly coal. Coal makes up almost 70 per cent of China's total primary energy consumption and represented the source of about 80 per cent of the growth in electricity generating capacity last year. China is both the largest producer and consumer of coal in the world. Conventional thermal sources of electricity generation (coal and natural gas) are expected to remain the dominant fuel for its electricity generation for the foreseeable future. Indicative of this, at the end of 2005 it is estimated that China had a further 120GW of generating capacity under construction (that is around 30 per cent more capacity). Many of these power plants as well as those planned under the Eleventh Five Year Plan (2006-2011) will use coal or natural gas.

Key challenges for China include how to provide economically secure and stable power and how to reduce the environmental impacts of generating this power. As part of its response to these challenges, the Chinese government is giving priority to the expansion of natural gas fired power plants and significant investment in new hydro [2] and nuclear energy power stations is also under way and planned. The Eleventh Five Year Plan calls for an increase in the share of these "cleaner production" technologies into the Country's electricity fuel mix. Even so, analysts expect coal fired plant capacity to show the largest increase in absolute terms. Given the rising costs of planned LNG imports, uncertainty over future Russian gas supplies and the abundance of thermal coal in China, coal fired capacity may still increase more in percentage terms as well. [3]

[1] International Energy Agency, *China's power sector reforms – where to next?,* 10 July 2006.
[2] China is the world's second largest producer of hydropower behind Canada (15.8 per cent of generation in 2004) with significant planned expansions (including the largest Hydro project in the world, the Three Gorges Dam, which will include 26 separate 700 MW generators to be fully completed in 2009).
[3] US Energy Information Administration, *Country Analysis Brief: China*, August 2006, www.eia.doe.gov, page 12.

FIGURE 1: ELECTRICITY GENERATION IN CHINA
BY FUEL TYPE, 1994 to 2004



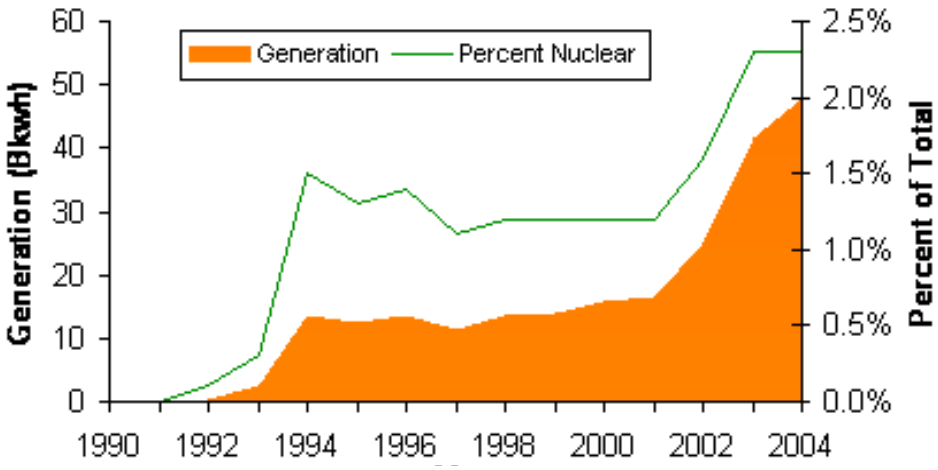
Source: US Energy Information Administration, *Country Analysis Brief: China*, August 2006

3. CHINA'S NUCLEAR POWER INDUSTRY AND URANIUM RESOURCES

3.1 Overview of China's nuclear power sector

China's nuclear power industry is relatively new (see **Figure 2**). As part of its drive to adopt cleaner production technologies into the Country's fuel mix, China is building five new nuclear power plants and is actively encouraging further investment. Although China's current nuclear capacity is about 7.6 GW (i.e. only about 1.9 per cent of total electricity generation capacity), there are 13 projects in the planning stage and a further 50 reactors proposed – representing 21 per cent and 31 per cent of the world's proposals respectively (see **Table 2**). If all the planned projects go ahead and some or all of the proposed new reactors (together with the five reactors under construction), this will add a further 17 to 53 GW of installed capacity.

FIGURE 2: CHINA'S NUCLEAR POWER GENERATION
1994 to 2004



Source: US Energy Information Administration, *Country Analysis Brief: China*, August 2006

The US Energy Information Administration forecasts in August 2006 that nuclear capacity in China will increase by between 15 and 30 GW by 2020. Even with that expansion, nuclear power (which currently represents 1.9 per cent of China's electricity production) will represent only between 2.5 and 4.5 per cent of total installed capacity.

As set out in **Table 2**, China currently has 10 operating nuclear power reactors. [4] To fuel these reactors it is estimated that China requires 1,294 tonnes U in 2006. If its current plans to build a further 18 to 68 plants come to fruition, it is estimated that China will require between 3.3 and 8 times more uranium annually (i.e. a total of 5 550 to 11 600 t U).

TABLE 2: CHINA & WORLD: NUMBER OF NUCLEAR REACTORS IN OPERATION, UNDER CONSTRUCTION, PLANNED AND PROPOSED AND CURRENT URANIUM FEEDSTOCK DEMAND, 2006 (a)

	IN OPERATION		ESTIMATED URANIUM REQUIRED 2006	UNDER CONSTRUCTION		PLANNED		PROPOSED	
	No.	MWe	(tonnes U)	No.	MWe	No.	MWe	No.	MWe
CHINA	10	7 587	1 294	5	4 170	13	12 920	50	35 880
WORLD	442	370 721	65 478	28	22 510(b)	62	68 021	160(c)	118 825
China as % of World	2.3	2.0	2.0	17.9	18.5	21.0	19.0	31.3	30.2

Sources: World Nuclear Association, ***World Nuclear Reactors 2005-06 and Uranium Requirements***, 21 September 2006.

Notes: **(a)** **In Operation** = connected to the grid; **Under Construction** = first concrete for reactor poured or major refurbishment under way; **Planned** = approvals and funding in place, or construction well advanced but suspended indefinitely; **Proposed** = clear intention but still without funding and/or approvals. **MWe** = Megawatt net (electrical as distinct from thermal).
(b) Canada's "under construction" figure includes two laid-up Bruce A reactors.
(c) South Africa's proposed 24 new units are only 165 MWe each.

3.2 China's uranium resources

The International Atomic Energy Agency, in its latest joint publication *Uranium, Production and Demand* (2005 edition) estimates that China has 60,000 tonnes of identified uranium resources (reasonably assured plus inferred resources) recoverable at less that US $130/kg U. That represents 1.3 per cent of the world's resources. The World Nuclear Association estimates that China's total known uranium resources are slightly higher, at 70 000 t U. This resource is sufficient in the short term to meet China's nuclear reactor demand. However, if most or all of China's 68 new plants (i.e. under construction, planned and proposed from **Table 2**) are built it will clearly need to import the majority of uranium feedstock.

Current annual uranium mine production in China is estimated to be 840 t **(Table 3A)**. This can supply about 65 per cent of China's current needs with imports (reportedly from Kazakhstan, Namibia and Russia) providing the balance. The International Atomic Energy Agency estimates China has a capacity to process 1 320 t U/year. China has undertaken significant uranium exploration since it began to develop its nuclear energy generating capacity and particularly since 2000. Looking ahead,

[4] Further information is provided in the World Nuclear Association's Information and Issues Brief on China. **Attachment 1** provides additional details regarding China's current, planned and proposed/possible nuclear plants which is taken from that Brief.

China has one major proposed uranium mine expansion on the table and a planned expansion at the Yining mine **(Table 3B)**.

TABLE 3A: CHINA'S OPERATING URANIUM MINES

Mine	Province	Type	Nominal capacity Tonnes U per year	Started
Fuzhou	Giangxi	Underground & open pit	300	1966
Chongyi	Giangxi	Underground & open pit	120	1979
Yining	Xinjiang	In-situ leach (ISL)	200	1993
Lantian	Shaanxi	Underground	100	1993
Benxi	Liaoning	Underground	120	1996
Hengyang	Hunan	Underground	On stand-by (a)	1963
		TOTAL PRODUCTION	**840**	

TABLE 3B: PROPOSED EXPANSIONS AND NEW URANIUM MINE

Mine	Proposal
Fuzhou	New mine – 200 t U/year
Yining	Expansion by 100 t U/year

Source: World Nuclear Association, *Nuclear Power in China*, Information and Issues Brief, July 2006
Note: (a) Nominal production capacity of 500 to 1 000 tU/year

In recognition of increasing uranium requirements, China has entered into a number of bilateral agreements with uranium exporting countries and other countries. These agreements are for co-operation in the peaceful use of nuclear energy and have been entered into by the Chinese Government with 16 countries: Argentina, Belgium, Brazil, Canada, Egypt, France, Germany, Iran, Japan, Pakistan, Republic of Korea, Russia, Switzerland, UK, USA and Viet Nam. [5] **In particular, China has concluded nuclear cooperation agreements with a number of other countries competing with Australia for trade opportunities.**

In the highly competitive uranium market, in common with other resource markets, Australia should never assume global market opportunities are there for the taking. Moreover, even though Australia has some 36 per cent of the world's Economic Demonstrated Resources (EDR) of uranium at December 2006, [6] there are significant obstacles to the development of some of these resources.

Table 4 shows Australia's uranium resources by State/Northern Territory location. Around 97 per cent of Australia's total uranium resources in EDR are within six deposits:

- Olympic Dam in South Australia (Australia's largest known uranium deposit, representing 70 per cent of Australia's EDR);
- Ranger, Jabiluka and Koongarra in the Alligator Rivers region of the Northern Territory; and
- Kintyre and Yeelirrie in Western Australia.

Of these, two (Olympic Dam and Ranger) are in production. However, Kintyre and Yeelirrie cannot be developed under current Western Australian policy and Jabiluka's reserves require traditional owner consent before they can be developed.

[5] IAEA, ***Country Nuclear Power Profiles: Peoples Republic of China***, 2003 report; Department of Foreign Affairs and Trade website: Australia-China Nuclear Material Transfer Agreement and Nuclear Cooperation Agreement ***Frequently Asked Questions,*** April 2006; Uranium Information Centre.

[6] Geoscience Australia, *Australia's Identified Mineral Resources, 2006,* (preliminary publication), www.ga.gov.au.

TABLE 4: AUSTRALIA'S URANIUM RESOURCES FOR EACH STATE AND TERRITORY, DECEMBER 2005

	Reasonably Assured Resources ($t U_3O_8$)				Inferred Resources ($t U_3O_8$)		Total identified resources (a) ($t U_3O_8$)			
	<US$40/kg U (b)		<US$80/kg U		<US$40/kg U	<US$80/kg U	<US$40/kg U		<US$80/kg U	
SA	604,733	72%	604,733	70%	347,688	358,879	952,421	74%	963,612	72%
NT	152,178	18%	155,583	18%	80,239	86,538	232,417	18%	242,121	18%
WA	70,277	8%	72,626	8%	8,811	22,930	79,088	6%	95,556	7%
Qld	16,575	2%	30,506	4%	9,600	14,771	26,175	2%	45,277	3%
NSW	0	0	0		0	0	0	0	0	0
VIC	0	0	0		0	0	0	0	0	0
TAS	0	0	0		0	0	0	0	0	0
Total $t U_3O_8$	843,763	100%	863,448	100%	446,338	483,118	1,290,101	100%	1,346,566	100%
Total t U	**715,478**		**732,170**		**378,477**	**409,665**	**1,093,955**		**1,141,835**	

Source: Geoscience Australia
Notes: (a) Reasonably Assured Resources (RAR) plus Inferred Resources.
(b) RAR recoverable at < US$40/kg U roughly equate to Economic Demonstrated Resources.

4. AUSTRALIAN POLICY FOR THE EXPORT OF URANIUM

4.1 Australia's export policy

For almost 50 years, nuclear power has been used to produce electricity and over this period, Australia has played an important role in seeking international approaches aimed at ensuring uranium is only used for peaceful purposes. Being a major uranium supplier has strengthened Australia's influence in non-proliferation and safeguards developments.

All of Australia's uranium is exported for exclusively peaceful non-explosive purposes. To be able to import U_3O_8 from Australia:

> Australian uranium exports require an approval from the Minister for Industry, Tourism and Resources and may only be exported for peaceful, non-explosive purposes under Australia's network of bilateral safeguards agreements, which provide for:
  - coverage of uranium exports by International Atomic Energy Agency (IAEA) safeguards from the time they leave Australia;
  - continuation of coverage by IAEA safeguards for the full life of the material or until it is legitimately removed from safeguards;
  - fallback safeguards for Australia in the event that IAEA safeguards no longer apply for any reason;
  - prior Australian consent for any transfer of Australian Obligated Nuclear Material (AONM) to a third party, for any enrichment beyond 20 per cent of uranium-235 and for reprocessing of AONM; and
  - physical security requirements for their transport (both on land and at sea);
> Australia retains the right to be selective as to the countries with which it is prepared to conclude safeguards arrangements;

- non-nuclear weapon state customer countries must, at a minimum, be a party to the Nuclear Non-proliferation Treaty (NPT) and accept full-scope IAEA safeguards applying to all their nuclear related activities (these apply to all existing and future nuclear activities);
- nuclear weapon state customer countries must be a party to the NPT and provide an assurance that AONM will not be diverted to non-peaceful or explosive uses and accept coverage of AONM by IAEA safeguards; and
- commercial contracts for the export of Australian uranium should include a clause noting that the contract is subject to the relevant bilateral safeguards arrangement.

As IAEA safeguards are generally not concerned with origin attribution, countries importing from Australia must also have a bilateral agreement with Australia to cover Australian Obligated Nuclear Material (AONM) which covers retransfers, high enrichment and reprocessing of AONM. Recent transfers of AONM are detailed in **Table 5**. The NPT establishes a standard of behaviour, together with an objective mechanism (IAEA safeguards) for identifying non-compliance and a process for dealing with this. Australia's network of bilateral safeguards Agreements complements and builds upon this safeguards regime. They establish treaty-level conditions on the use of all nuclear material exported from Australia. These Agreements endeavour to ensure that Australia's nuclear exports remain in exclusively peaceful use, and may only be retransferred to a party with a bilateral safeguards Agreement with Australia.

TABLE 5: SUMMARY OF AUSTRALIAN OBLIGATED NUCLEAR MATERIALS TRANSFERS (a) (b)

	DESTINATION	Tonnes of Uranium			
		2001	2002	2003	2004
Conversion	Canada	1 349	864	1 024	2 086
	European Union	3 398	3 559	3 452	2 145
	United States	3 389	1 887	3 500	3 982
	TOTAL	**8 136**	**6 310**	**7 976**	**8 213**
Enrichment	European Union	1 043	1 062	2 275	2 907
	Japan	0	172	20	0
	United States	432	358	207	206
	TOTAL	**1 475**	**1 592**	**2 502**	**3 113**
Fuel Fabrication	Japan	124	131	92	193
	Korea, Rep of	34	231	256	45
	United States	155	187	182	219
	TOTAL	**313**	**549**	**530**	**457**
Reprocessing		56kg	0	<100kg	0
Reactor Irradiation		11	<10kg	17	0

Sources: Australian Safeguards and Non-Proliferation Office, Annual Reports.

Note: (a) Transfers completed in calendar year. Data exclude transfers of AONM made within the fuel cycle of a state or of Euratom, return of residual UF_6 remaining in cylinders and damaged product.

(b) Nuclear materials are often mixed during processes such as conversion and enrichment and cannot therefore be separated by origin thereafter. Therefore the tracking of individual uranium atoms is impossible. Since nuclear material is **fungible** – any given atom is the same as any other – a uranium exporter is able to ensure its exports do not contribute to military applications by applying safeguards obligations to the overall **quantity** of material exported. This practice of tracking quantities rather than atoms has led to the establishment of universal conventions for the industry, known as the **principles of equivalence and proportionality**:

- The equivalence principle provides that where AONM loses its separate identity because of process characteristics (e.g. mixing) an equivalent quantity of that material is designated as AONM. These equivalent quantities may be derived by calculation, measurement or from operating plant parameters. The principle does not permit substitution by a lower quality material.
- The proportionality principle provides that where AONM is mixed with other nuclear material and is then processed or irradiated, a corresponding proportion of the resulting material will be regarded as AONM.

The MCA does not support the ALP's 'no new uranium mines' policy position. The ALP position is that unless a mine is fully operational by the time the ALP takes office, then the ALP would not provide the necessary permits to complete that mine, nor export permits for it to market product from that mine in the future. It will however allow the export of uranium from existing mines (presumably including expansions).

Australia currently has three operating uranium mines (Ranger in the Northern Territory and Olympic Dam and Beverley in South Australia) and a fourth – Honeymoon in South Australia – is planned to be commissioned early in 2008. [7] Olympic Dam's proposed expansion will dwarf any other new uranium mine production in Australia.

Table 6 shows known uranium identified resources by country. Despite Australia's known resources (which are among the cheapest to develop in the world), Canada (with only 17 per cent of known world EDR compared with Australia's 36 per cent) produces (see **Figure 3**) and exports more uranium to world markets than Australia. The reason is easily explained – Canada has no restrictions on mining.

TABLE 6: KNOWN WORLD IDENTIFIED RESOURCES OF NATURALY OCCURING URANIUM, 2005 (a)

	kt U 2005	% of world 2005
Australia	1 142	24.2
Kazakhstan	816	17.2
Canada	444	9.4
USA	342	7.2
South Africa	341	7.2
Namibia	282	5.9
Brazil	279	5.9
Niger	225	4.7
Russian Fed.	172	3.6
Uzbekistan	116	2.4
Ukraine	90	1.9
Jordan	79	1.7
India	67	1.4
China	60	1.3
Other	287	6.1
WORLD	**4 743**	**100.0**

Source: OECD, Nuclear Energy Agency & IAEA, *Uranium: Resources, Production and Demand* 2005 edition.
Notes: (a) Reasonably Assured Resources plus Inferred Resources <US$130/kg U.

Both of the Agreements being considered by the Standing Committee:

> **reassure the community of the integrity of Australia's strict regulatory controls for the export and use of uranium** – Australia's nuclear safeguards give objective assurance that Australia's uranium is only to be used for peaceful, non-military purposes – electricity generation. Australia's safeguards are technical measures providing materials accounting and auditing procedures on the peaceful use of Australia's uranium throughout the uranium fuel cycle;

> **complement the 19 existing Australian bilateral nuclear safeguard agreements** covering 46 countries (Euratom represents 28 countries of the EU);

> **focus on the capacity constraints of the ALPs "no new mines" policy** in restricting the

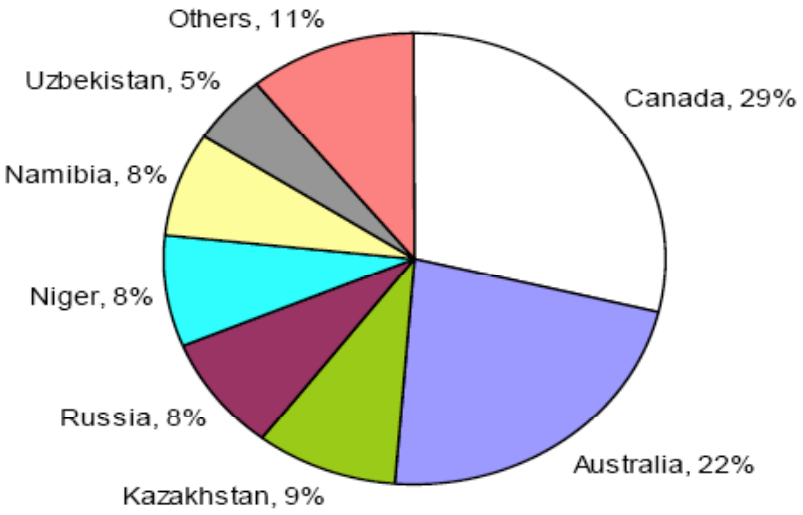
[7] SXR Uranium One recently announced that development of the Honeymoon deposit in South Australia will proceed as a 400 t/yr in situ leach (ISL) mine. A 20-year mining licence was issued in 2001.

Australian uranium industry from realising its economic potential – the policy is inherently flawed in that there are no production restrictions on existing operations, and it, obviously, places no limits on global supply given that other countries (notably Canada and Kazakhstan) will fill the vacuum created by Australia; and

> **enhance the potential of Australian mining technology and service industries** to build partnerships with Chinese technology firms in servicing the Chinese minerals industry. The Nuclear Cooperation Agreement stands to contribute to the mining technology and services sector's goal of $6 billion for exports by 2010 from the current level of around $2 billion. The Agreement covers the transfer of nuclear related material, equipment or technology, building on the existing relationship between Geoscience Australia and the Chinese National Nuclear Corporation involving technical exchanges on geological and exploration techniques.

In summary, the MCA considers that these Agreements are a necessary adjunct to Australia's trade and investment relationship with China. Once ratified, they will pave the way for commercial negotiations for uranium to be part of a suite of growing exports of minerals and energy and related technology and services to China. The Agreements will add further weight to the conclusion of a free trade agreement between China and Australia deepening the strategic complementarity of the two economies.

FIGURE 3: 2004 URANIUM PRODUCTION



Source: Luis Echávarri, Director General, Nuclear Energy Agency and Yuri Sokolov, Deputy Director General, International Atomic Energy Agency, *Uranium Resources: Plenty to Sustain Growth of Nuclear Power* presentation, 1 June 2006, www.nea.fr.

4.2 Nuclear safeguards and future treaty action

China - a nuclear weapons state – is a party to the Nuclear Non-Proliferation Treaty under which a safeguards agreement has been in force since 1982. China has ratified the Additional Protocol, [8] which has been in force since 28 March 2002, and has signed but is yet to ratify the Comprehensive Test Ban Treaty. [9] In May 2004 China joined the Nuclear Suppliers' Group. All imported nuclear power plants - from France, Canada and Russia - are under IAEA safeguards, as is the centrifuge enrichment plant supplied by Russia.

[8] An agreement designed to complement a State's Safeguards Agreement with the IAEA in order to strengthen the effectiveness and improve the efficiency of the safeguards system. Australia was the first state to sign and ratify an Additional Protocol, (in 1997). For a full list of countries that have ratified the Additional Protocol, see www.iaea.org

[9] http://disarmament.un.org/wmd/ctbt/index.html

Australia has similar safeguards agreements to the one proposed with China with three of the other nuclear weapon states – namely US, UK and France – and a safeguards agreement with Russia, which covers processing of uranium on behalf of other Australian safeguards agreement partners.

The two agreements under consideration by the Committee are designed to meet all Australia's safeguards requirements. These agreements endeavour to ensure that any uranium transferred between Australia and China will be used solely for peaceful, non-military purposes. Likewise, any uranium, nuclear equipment or technology transferred between Australia and China, as well as any nuclear material produced using Australian sourced uranium, equipment or technology, is only to be used for peaceful, non-military purposes. In summary:

- Australian Obligated Nuclear Material (AONM) must be covered by the state's safeguards agreement with the IAEA. The Australia/China Nuclear Material Transfer Agreement ensures that AONM will be used or processed only within the jointly agreed list of facilities, which will be subject to China's safeguards agreement with the IAEA;
- monitoring of AONM will be based on safeguards procedures applied at the facilities where AONM is handled, in accordance with China's safeguards agreement with the IAEA and procedures under the Australia-China Nuclear Material Transfer Agreement; [10]
- China has the right to choose which facilities are eligible for IAEA inspections. However, Australia and China must jointly agree on which facilities will be eligible to use AONM under the Australia-China Nuclear Material Transfer Agreement. These agreed facilities must then be subject to IAEA safeguards under the China-IAEA safeguards agreement;
- Australia's prior consent is required for there to be retransfers to third countries (other than those for which consent is given in the agreement); for enrichment to 20% or greater in the isotope uranium-235; and for any reprocessing;
- China provides an assurance that internationally agreed standards of physical security would be applied to all AONM during use, storage and transport; and
- detailed administrative arrangements setting out procedures for accounting for and reporting on AONM are to be concluded between ASNO and its counterpart, the China Atomic Energy Authority.

Australia has the right to suspend or cancel further transfers of nuclear material should China fail to comply with the provisions of the Nuclear Material Transfer Agreement or IAEA safeguards arrangements

[10] ASNO (Australian Safeguards and Non-Proliferation Office) will cross-check reports on AONM provided by China for consistency with information from the IAEA and from other sources.

5. BRIEF OUTLINE OF OTHER RELEVANT MCA POLICY POSITIONS

5.1 Environment and social issues

In addition to meeting strict regulatory requirements governing uranium production and exports, members of the **MCA are required to be a signatory to *Enduring Value: the Australian Minerals Industry Framework for Sustainable Development***.[11] This Framework is an effective tool for the industry in managing social and environmental impacts. The Framework assists companies translate the principles of sustainable development into relevant, risk-based activities at the minerals site level.

The Australian uranium industry is subject to extensive environmental regulation by the Federal and State/Territory governments. This regulation includes public input to the assessment of operations before they are approved, and the requirement for environmental management programs which seek to manage and minimise impacts and publicly report outcomes.

Safety and health

Improving safety and health performance is an integral component of *Enduring Value* and the industry has determined there can be no trade-offs regarding the safety and health of its workforce or the communities in which it operates. The mining of uranium, transport, use and disposal of radioactive materials in Australia are regulated by State and Territory authorities, and by the Australian Government. The acts and regulations governing radiation safety in Australia, including the management of radioactive waste, are consistent with international standards.

The MCA supports minerals producers being required to report any hazardous-material operation spills where they have material[12] environmental and/or safety implications. The application of hazardous-material reporting should be consistently applied, so that there is appropriate public reporting of both the impacts and any remediation.

Based on the demonstrated safety and environmental performance of existing mines, the Minerals Council considers there is no justification for restricting the establishment of further uranium mines in Australia.

Indigenous relations

The minerals industry recognises that the success of present and future operations is linked to building and enhancing relationships with Indigenous communities. Through the MCA's Indigenous Relations strategy, the industry has committed to operating in ways that recognise and respect Indigenous Australians' rights in law, interests and special connections to land and waters in Australia.

Consistent with these values, the minerals industry is actively engaged with governments and Indigenous communities in capacity building, to enable Indigenous Australians to more effectively engage in the broader economy, including through wealth creation and the establishment of vibrant, diversified and sustainable regional economies.

5.3 Uranium stewardship

Ongoing community concerns and associated political restrictions remain key impediments to the sustainable growth of the uranium mining industry in Australia, to its ability to respond to expected growth in world energy demand, and to maximise its contribution to sustainable development.

[11] Further information is available at www.minerals.org.au/enduringvalue

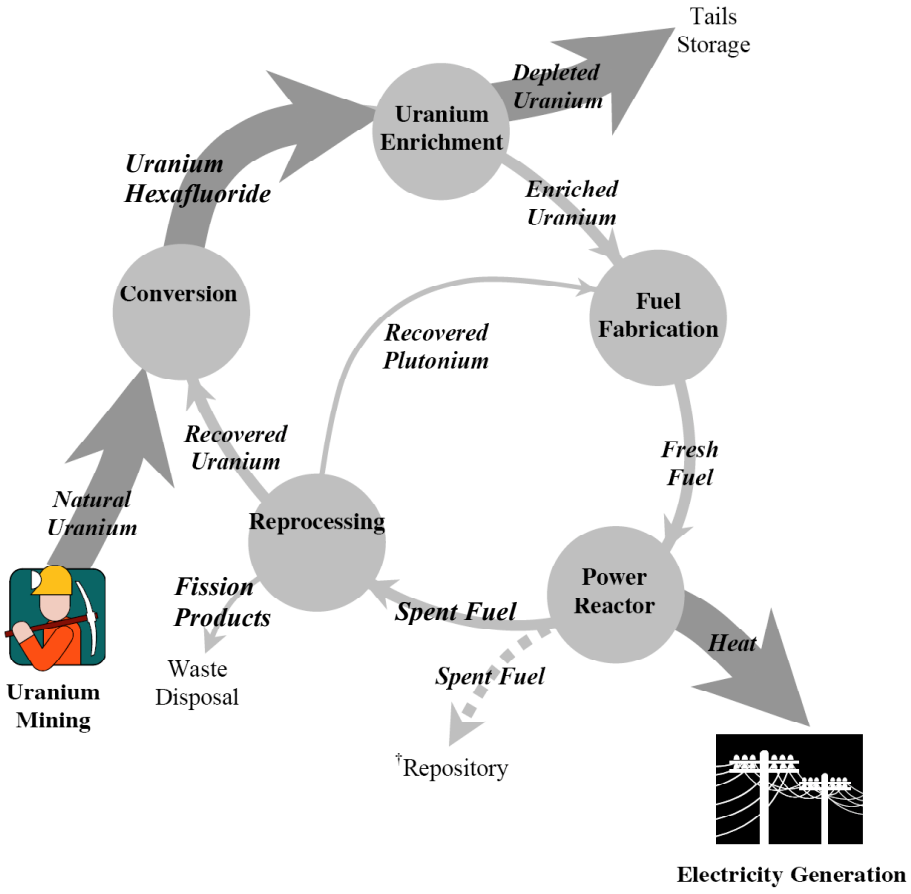
[12] Companies are required to report significant incidents as outlined in regulation. However, some companies go further and report incidents more broadly than those required by law.

There is a need to reassure the community that the flow of uranium throughout its value chain and the potential risks (both real and perceived) to human health and the environment are both understood and adequately controlled through effective regulation. In addition, the controls currently provided by international safeguard agreements operated by the International Atomic Energy Agency and the Australian Safeguards and Non-Proliferation Office need to be more widely understood.

The Minerals Council considers that as a complement to existing regulation, the implementation of materials stewardship is critical to the minerals industry's commitment to sustainable development. This is articulated in Principle 8 of *Enduring Value*.

Uranium stewardship provides a useful complement to the international community's stringent non-proliferation regime. It provides a means of addressing current impediments to the uranium industry's contribution to sustainable development and building community confidence through better demonstration of how uranium is managed by operators of each step of the uranium fuel cycle (see **Figure 4**).

FIGURE 4: CIVIL URANIUM FUEL CYCLE



†Some countries choose to dispose of their spent fuel in repositories instead of recycling it.

Source: Adapted from Australian Safeguards and Non-Proliferation Office *Annual Reports*, 2002/03 and 2004/05.

Australia's direct responsibilities centre on developing Australia's uranium resources sustainably and ensuring and maintaining a receptive political and community response to this development – a critical adjunct of which is Australia's engagement in a global uranium stewardship dialogue. Any programs developed within the Australian uranium industry relating to stewardship should be informed by, and not unnecessarily duplicate, the established principles and practices already being implemented in the global uranium energy industry.

From a sustainable development point of view, government also has a responsibility to assign rights and regulate the mining and export of uranium in a manner that promotes the efficient exploitation of Australia's uranium resources for peaceful purposes. This in turn calls for regulations that are based on sound principles designed to achieve safe, equitable and efficient outcomes.

5.4 Climate change

In a similar vein, government also should work to ensure a nationally consistent and coordinated approach to managing climate change. Australia's interests clearly reside in an effective global solution to climate change. The here and now focus must be on developing technological solutions. Seeking to reduce emissions by establishing an Australian carbon price in the current environment will simply act as a blunt and largely ineffective instrument of change. In the absence of suitable step-change technologies, costs imposed in one zone will merely drive activity to another that does not have the same restrictions.

From a greenhouse perspective, the process of operating a nuclear power generator emits no CO_2. Therefore an attraction of nuclear energy is that every 22 tonnes of uranium (26 t U_3O_8) used saves the emission of one million tonnes of CO_2 relative to coal-fired generator producing the same amount of energy.[13] However, adopting a life-cycle analysis approach recognises that some emissions arise from the mining of uranium, the associated transport, the enrichment process and conversion into nuclear fuel, and the construction of the nuclear plant, etc. After taking this into account, averaged over the entire lifecycle, nuclear power emits less CO_2 than other energy production mechanisms.

Clearly, fossil fuels will continue to be dominant in meeting global energy demand, energy security, and, in Australia's case, generating export income, employment and investment. Equally, there will eventually be a price on carbon that will apply across global, national and regional markets impacting economic activity, regional development and living standards. Already the market is beginning to anticipate a price on carbon. At this stage any unilateral attempt by Government to impose a local carbon price before a portfolio of technologies are available to deliver changes will merely impose costs with little, if any, appreciable reduction in emissions.

The 'here and now' focus must be on developing technology solutions to achieve significant reductions in greenhouse emissions over the next 50 years. The MCA strongly supports the Australian Government's encouragement for innovation, demonstration and 'clean development', both in domestic policy and in cooperation internationally, as the immediate and appropriate response to managing greenhouse emissions.

The **Asia Pacific Partnership for Clean Development and Climate** – in which Australia is participating with the United States, Japan, China, India and the Republic of Korea – is an initiative currently with the greatest prospect of delivering real progress to abate greenhouse gas emissions. Other international collaboration on relevant innovation and technology is being pursued through:

> multinational fora such as the United National Framework Convention on Climate Change and the International Energy Agency; and

> focussed multilateral and bilateral activities, including the Carbon Sequestration Leadership Forum, the Methane-to-Markets Partnership, the 'Generation IV' nuclear power forum, "Iter" (the

[13] Uranium Information Centre, *Uranium, Electricity and the Greenhouse Effect, March 2006*.

international project on nuclear fusion) and the International Partnership for a Hydrogen Economy, together with the various Climate Action Partnership bilateral arrangements in place with Australia.

The MCA advocates a nationally consistent and coordinated approach to manage climate change and supports the Council of Australian Governments (COAG) goal of reducing compliance costs and unnecessary duplication of effort associated with differing energy and greenhouse reporting requirements across the nation. The MCA has concerns with State and Territory Government proposals to promulgate unilateral greenhouse policy measures as these will adversely impact Australia with no discernible impact on global emissions. While the MCA supports rational early action, it believes that this should form part of a longer-term coherent emissions reduction strategy.

Seeking to reduce greenhouse gases by establishing an Australian or other sub-regional carbon price in the current environment will simply act as a blunt and largely ineffective instrument of change and a tax impost. Moreover, in the absence of suitable step-change technologies, costs imposed in one zone will merely drive activity to a different zone that does not have the same restrictions.

The clear focus now must be on developing a mix of technologies to reduce emissions and with this in mind the Australian minerals sector is investing significant resources into R & D and demonstration activities. These include investment in research, demonstration and deployment of technologies that will reduce greenhouse gas emissions from minerals companies' operations and those of our customers.

ATTACHMENT 1: INFORMATION REGARDING CHINA'S CURRENT, PLANNED AND PROPOSED NUCLEAR POWER SECTOR

TABLE A1: CHINA'S OPERATING NUCLEAR POWER REACTORS

Units	Net capacity (each)	Start up
Daya Bay-1 & 2	944 MWe	1994
Qinshan-1	279 MWe	1994
Qinshan-2 & 3	610 MWe	2002, 2004
Lingao-1 & 2	935 MWe	2002, 2003
Qinshan-4 & 5	665 MWe	2002, 2003
Tianwan-1	1000 MWe	2007
Total (10)	7587 MWe	

Source: World Nuclear Association, *Nuclear Power in China*, Information and Issues Brief, July 2006

TABLE A2: NUCLEAR POWER REACTORS UNDER CONSTRUCTION IN CHINA

Reactor	Net capacity	Construction start	Start up[(a)]
Tianwan-2	1000 MWe	2000	2007
Lingao-3	935 MWe	2005	2010
Lingao-4	935 MWe	2005	2011
Qinshan-6	610 MWe	2006	2010
Qinshan-7	610 MWe	2006	2010
Total (5)	4170 MWe		

Note: (a) Latest announced commercial operation

Source: World Nuclear Association, *Nuclear Power in China*, Information and Issues Brief, July 2006

In addition to the 50 proposed plants in **Table 2**, additional projects are being mooted in China under the Twelfth Five Year Plan (2011-2015). Those currently proposed are shown in **Table A3**.

TABLE A3: NUCLEAR POWER UNITS PROPOSED/POSSIBLE

Plant	Province	MWe gross
Hongyanhe, Dalian	Liaoning	2x1080
Haiyang	Shandong	2x1000
Hui'an / Fuqing	Fujian	2x1000
Tianwei, Lufeng	Guangdong	2x1080
Weihai	Shandong	1x200
Bailong	Guangxi	2x1000
Ningde	Fujian	2x1080
Tianwan-2	Jiangsu	2x1000
Yaogu, Taishan	Guangdong	3x1080
Qinshan-5	Zhejiang	2x1060
Hongyanhe-2, Dalian	Liaoning	2x1000
Weihai	Shandong	18x200
Haiyang-2	Shandong	4x1000
Tianwei-2, Lufeng	Guangdong	4x1000
Bailong-2	Guangxi	4x1000

Hui'an / Fuqing	Fujian	4x1000
Yangjiang-2	Guangdong	2x1000/1500
Yangjiang-3	Guangdong	2x1000/1500
Haijia	Guangdong	2x1000?
Jinzhouwan	Liaoning	2x1000
	Jiangsu	2x300
	Hainan	2x300
Taohuajiang, near Yiyang	Hunan	1x600
Fuling	Chongqing	2x900
	Anhui	4x1000
	Jilin	4x1000
Total 78		59-64,000

Source: World Nuclear Association, July 2006