



Mr Jerome Brown  
Committee Secretary  
Joint Standing Committee on Treaties  
PO Box 6021  
Parliament House  
Canberra ACT 2600

30 January 2009

Dear Mr Brown

**Inquiry into Nuclear Non-Proliferation and Disarmament**

I enclose for consideration by the Committee the Australian Uranium Association's submission to the Inquiry into Nuclear Non-Proliferation and Disarmament.

In preparing this submission, the Association was strengthened in its view, conveyed to the Committee by letter on 24 November 2008, that the Committee can best gather the evidence for this Inquiry by visiting experts and policy makers in Europe, North America and Asia. We again urge the Committee to undertake that work.

Yours sincerely

(Signed)  
Michael Angwin  
Executive Director

## **JSCOT INQUIRY INTO NON-PROLIFERATION AND DISARMAMENT**

### **The Association's starting point**

The Association bases its submission on its uranium stewardship platform.

The Association adopted *Principles of Uranium Stewardship* in May 2008. A copy of the *Principles* is attached to this submission.

Uranium stewardship is a program of action by the global nuclear power industry to work cooperatively to ensure uranium and its by-products are managed in a safe, environmentally, economically and socially responsible manner.

A central idea of uranium stewardship is the responsibility shared by all players in every sector in the nuclear fuel cycle to work with all other sectors to give effect to stewardship principles.

Among the principles that found this submission are principles concerning:

- The safe and peaceful use of nuclear technology
- Acting responsibly in the areas that we manage and control and sharing our concern with other sectors of the nuclear fuel cycle
- Responsible sourcing, use and management of uranium and all its by-products

While the emphasis in the principles is on cooperative action within the civil nuclear fuel cycle, the Association takes the view that stewardship requires it to offer its views to governments and others on issues above the civil nuclear fuel cycle where that might serve a broader public good.

The Committee's inquiry is an opportunity to do that.

The Association will address the non-proliferation issues that the inquiry will examine. While the Association shares many of the concerns of others about the existence and implications of nuclear weapons, it is not in a position to analyse the complex issues which an informed consideration of disarmament requires.

### **The Committee's starting point**

The task given to the Committee concerns Australia's foreign policy.

The starting point for the Committee is to acknowledge that nuclear power is a permanent and expanding feature of the world's energy portfolio, for which Australia is a major and continuing uranium supplier. The Committee's terms of reference implicitly assume nuclear power.

In our view, it is essential that the Committee make that assumption explicit for two reasons:

- To focus attention on the task that the Committee has been given: to explore how the international treaties to which Australia is party can be made more effective anti-proliferation and disarmament instruments; and how international inter-parliamentary action can add to that effectiveness
- To avoid confusing the Committee's task with another issue: the opposition that some have to the Australian uranium mining and export industry and to the global nuclear fuel cycle; and the actions they might want to flow from endorsement of their point of view.

The Committee's terms of reference do not ask it to provide the forum for another debate about Australia's uranium industry and its role in supplying the global nuclear power industry.

Indeed, a debate on those issues under the guise of the Committee's terms of reference would diminish the influence of the Committee as its recommendations would be seen as adjudicating on decisions other countries have made to grow their nuclear power industries.

If that construction were able to be placed on the Committee's work, it would stand in the way of Australian engagement with stakeholder countries that are growing their nuclear power industries; and whose non-proliferation activities Australia may wish to support or help make more effective through international inter-parliamentary action and other multilateral initiatives.

The task for the Committee is squarely to examine how the international treaties to which Australia is party, and how international inter-parliamentary action, can give greater assurances of non-proliferation and disarmament.

It follows that the Committee should place little weight on submissions whose starting point is that Australia cease or limit uranium exports on the grounds that civil nuclear power poses an 'unacceptable risk' of nuclear weapons proliferation.

That is an extreme and isolated view that is shared by none of the countries that operate civil nuclear power industries, countries whose anti-proliferation activities Australia wishes to become as effective as possible.

The Association notes the joint-party nature of the Committee and the opportunity this presents to establish a bi-partisan national policy vision of substance and longevity concerning the Australian approach to non-proliferation and disarmament.

We strongly urge the Committee to seek such an outcome as, we submit, a bi-partisan view will maximise Australian influence on international non-proliferation and disarmament treaties; and magnify Australian influence via international inter-parliamentary action.

### **The context of the Committee's inquiry**

In the Association's submission, there are at least two important contextual issues the Committee needs to take into account in its deliberations: the growing use of nuclear power, to which we have already alluded; and the changing relationships between the nations of the world.

The Association is in a position to add to the Committee's understanding of the former.

Attached to this submission is a summary of the evidence about the growth of nuclear power over the next quarter century.

The civil nuclear power industry has been operating for over 50 years. The industry is experiencing a period of growth involving expansion of nuclear power within countries already drawing on it and by extension of nuclear power to countries not currently employing it.

The evidence shows that nuclear power will expand by 50% to 100%, depending on the methodology used for projecting growth. The key drivers of that growth will be economic and population growth, energy security and climate change. Australia will continue to grow its uranium exports to supply that demand.

These figures are another powerful rebuttal of the view that civil nuclear power poses an 'unacceptable risk' of nuclear weapons proliferation. Clearly, the many countries growing their civil nuclear power industries do not subscribe to the view that the growth of nuclear power contains 'unacceptable risks'.

Regarding the changing strategic context, which is a short hand way of describing the changing relationships between the nations of the world, the Association considers that the expertise that it would be safest for the Committee to rely upon is to be found in Australian agencies dealing with foreign affairs and non-proliferation and with similar agencies overseas.

It was for that reason, among others, that in a letter sent on 24 November 2008 (attached), the Association urged the Committee to undertake a series of overseas consultations with recognised experts.

The letter said, in part:

*It is a sensible approach to policy to conduct such reviews (as the inquiry) at times of change to ensure that the arrangements needed for the future are fit-for-purpose.*

*This is a challenging task, examining a complex system built up over forty years.*

*The usual course followed by the JSCOT is to seek and receive submissions, to allow those making submissions a short period of time to speak to those submissions before the Committee and possibly to make supplementary submissions.*

*In our view, the usual process is not sufficient for this Inquiry. It is not sufficient because the subject matter is very complex and because much of the expertise for analysing it resides outside Australia.*

*We have strong doubts that the Committee will receive sufficient guidance in undertaking the task the Prime Minister commissioned it to do from submissions alone.*

*With that in mind, the Association urges the Committee to identify and meet with experts and policy makers who can provide it with insights on the issues it is being asked to examine.*

There are many questions the Committee will have to answer to fulfill its terms of reference, and which people and organisations based overseas are well-placed to provide informed views on.

In the Association's view, the following questions could be used to guide the Committee's thinking:

- What are the nature and scope of the treaties involving Australia?
- What are the measures of performance of the global non-proliferation and disarmament system over the last 40 years?
- How has the system performed on those measures? Where is the evidence for that?
- What have been its strengths and weaknesses? Successes and failures?
- What are the challenges ahead for the system? What are the implications of the challenges?
- What fitness-for-purpose does the system need to meet those challenges?
- To what extent is the current system fit for its future purposes?
- In what respects does it need adjustment?
- What are the best ways to help bring about any required adjustments?

We again urge the Committee to follow the course proposed in our letter of 24 November 2008. In the absence of that, the Committee's findings will be less helpful to the task it has been commissioned by the Prime Minister to do.

The Association wishes to draw attention to what we argue are two issues of substantive interest to the Committee.

### **Australia's bi-lateral treaties for uranium export**

The first of those is the performance of Australia's bi-lateral treaties for the export of uranium, about which there is evidence on the record.

That evidence is to be found in the annual reports of the Australian Safeguards and Non-Proliferation Office, available on its website.

The Association has examined those reports, which have taken a different form over the years. However, the key conclusion of the Office has been consistent: 'All Australian Obligated Nuclear Material was satisfactorily accounted for'.

ASNO's stewardship and reporting show that Australia's uranium has not been diverted from peaceful purposes.

Moreover, there is no evidence to the contrary that would justify a conclusion different from the one that ASNO has reached consistently.

**In short, the Committee has evidence, on the record, by Australia's principal policy adviser and regulator in this area, of the successful performance of Australia's bi-lateral treaties.**

The Association invites the Committee to record the successful performance of Australia's bilateral treaties as one of its conclusions.

The Committee may have to assess other views on this issue.

In assessing those views, it would be unsafe to rely on the flawed approach to analysis and decision-making embraced, for example, by the Friends of the Earth, represented by Dr Green, during the Committee's inquiry into the ratification of the bilateral treaty with Russia (transcript, TR23), where Dr Green said:

*I do not think the claim from the Friends of the Earth and the NGOs is that Australian uranium will be diverted. I think the claim is that it **could** (emphasis added) be diverted.*

The assertion there is that various outcomes *could* ensue. Not that they would ensue, only that they could. That argument was not supported by submissions about the likelihood or probability of those outcomes ensuing. The assertion amounted to belief.

If there is evidence that Australia's exported uranium has been diverted, then it should be put on the record so it can be tested. If there is evidence about the measurable likelihood of Australian uranium being diverted, then it should be put on the record. Unlike belief, evidence can be tested.

### **Potential sources of proliferation**

Two potential sources of proliferation risk in the civil nuclear fuel cycle are usually considered.

*Plutonium.* It is sometimes claimed that a risk arises from the fact that plutonium in spent fuel is used to produce mixed-oxide fuel. The claim is that this plutonium is useable in weapons.

A high proportion of Plutonium 239 is required for weapons-grade plutonium. Plutonium contained in spent fuel elements from civil nuclear power is typically much less, with higher proportions of Plutonium 238 and 240 than is useful for weapons. Weapons-grade plutonium is not produced in commercial power reactors but in a 'production' reactor – one used specifically for the purpose - operated with frequent fuel changes to produce material with a high proportion of Plutonium 239.

The only use for 'reactor grade' plutonium is as a nuclear fuel, after it is separated from high-level wastes by reprocessing.

It is unlikely reactor grade plutonium has ever been used for weapons or would be.

To be more specific, the mix of isotopes of a particular quantity of plutonium will depend on how the plutonium was produced, which will affect its suitability for use in nuclear weapons.

Plutonium 239, the plutonium isotope most suitable for weapons use, is produced in dedicated plutonium production reactors, specially designed and operated to produce high proportions of this plutonium by removal and reprocessing of fuel after short irradiation times.

The plutonium produced in the normal operation of light water reactors, from which mixed-oxide fuel is made, is 'reactor-grade'. Because of the very long time fuel is irradiated in a power reactor (typically 3-4 years), reactor-grade plutonium has a substantially higher proportion of Plutonium 238 and 240 and a lower proportion of Plutonium 239. This is a proliferation barrier because it creates serious technical difficulties for weapons use.

A recent technical paper examined this question:

*Plutonium is undeniably a material of potential interest to state or non-state actors for nuclear explosive devices. But not all plutonium is equal. A high concentration of the isotopes  $^{238}\text{Pu}$  or  $^{240}\text{Pu}$  is particularly undesirable to potential proliferators because of their very high rates of radiation and decay heat, which complicate handling and manufacturing, and of spontaneous neutron emissions, which can affect the reliability and overall yield of the ultimate device.<sup>1</sup>*

It is sometimes claimed that a 1962 weapon test by the USA using what was then described as 'reactor-grade' plutonium points to a contrary conclusion to the one above. On the evidence, however, this seems unlikely. (See *Annual Report*, ASNO, 1999).

The question of the usefulness for weapons of 'reactor grade' plutonium seems to be a technical issue. The Association urges the Committee to examine the evidence on this issue and to consult with independent experts to arrive at its own conclusion about the proliferation risks associated with the production of 'reactor-grade' plutonium.

Should the Committee reach a conclusion that reactor-grade plutonium is a proliferation risk, the Association would wish to consider a further submission to the Committee on the options available to address any risk the Committee identifies.

*Enrichment technology.* The potential for the enrichment phase of the nuclear fuel cycle to be a proliferation risk is more widely agreed.

Uranium processed for electricity generation is not useable for weapons. The uranium used in power reactor fuel for electricity generation is typically enriched to 3-4% of the isotope U-235. To be useable in weapons, uranium must be enriched to over 90% U-235.

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<sup>1</sup> *Neptunium in the fuel cycle: Nonproliferation benefits versus industrial drawbacks*, Nuclear Technology, Vol 164, October 2008

Selena Ng, Dominique Grenèche, Bernard Guesdon and Richard Vinoche, *Areva, Tour Areva, 1 Place de la Coupole 92084 Paris La Défense Cedex, France*

Marc Delpech, Florence Dolci, Hervé Golfier and Christine Poinot-Salanon *Commissariat à L'énergie Atomique Centre de Saclay, 91191 Gif sur Yvette Cedex, France*



It is technically possible for civil enrichment technology to be used illicitly to produce weapons-grade uranium.

Enrichment facilities are located in China, France, Germany, Japan, Netherlands, Pakistan, Russia, UK and USA (*Nuclear Energy Outlook 2008*, Nuclear Energy Agency, 2008, page 57).

We address this issue further below.

### **The effectiveness of the non-proliferation system**

The system itself seems robust enough in its overall design.

It is embraced by all but three of the nations of the world<sup>2</sup>; it requires obligations to disarm and not to proliferate; it contains a range of measures to verify that the obligations are being met; and, in practice, multilateral action is taken to address circumstances in which those obligations are not met.

Two things are very clear about the system. The system itself and its treaties and safeguards do not deter a country determined to acquire nuclear weapons through illicit behaviour in breach of its obligations. Yet it is equally clear that a country cannot illicitly acquire and operate the technology needed to produce nuclear weapons without eventually being detected either by safeguards arrangements or by other means.

A country that did do so would be in breach of its NPT obligations; and would (and does) suffer a range of consequences including global disapprobation, diplomatic pressure, loss of prestige and potentially even more serious consequences, such as UN Security Council-sanctioned corrective and punitive action.

Given the near-certainty of exposure and the seriousness of the consequences, it is no surprise that illicit behaviour of this kind has been rare and has been exposed.

Set out in an attachment is a brief summary of examples of proliferation, the fuller summary of which can be found on the World Nuclear Association website ([www.world-nuclear.org/info/inf73.html](http://www.world-nuclear.org/info/inf73.html)). Similar material is available on the website of the Arms Control Association ([www.amrcontrol.org](http://www.amrcontrol.org)) and the International Atomic Energy Agency ([www.iaea.org](http://www.iaea.org))

We submit that the summary, the more comprehensive WNA document and material on the Arms Control Association and IAEA websites support the observations made above.

The treaty system has been supported for a long time by bodies such as the Nuclear Suppliers Group and the Zangger Committee. A summary of these kinds of arrangements is to be found on the WNA website (See [www.world-nuclear.org/info/inf12.html](http://www.world-nuclear.org/info/inf12.html) )

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<sup>2</sup> North Korea's status is expressed by the IAEA as follows: 'North Korea announced its withdrawal from the NPT effective as of 11 January 2003. No agreed statement on the matter has been issued by the NPT States Parties, or by the NPT depositary States... or by the UN Security Council.'  
[www.iaea.org/NewsCentre/Focus/laeaDprk/fact\\_sheet\\_may2003.shtml](http://www.iaea.org/NewsCentre/Focus/laeaDprk/fact_sheet_may2003.shtml) (accessed 15 January 2009)



## Current initiatives in non-proliferation

New initiatives include establishing international fuel supply arrangements that obviate the need for individual countries to establish national enrichment facilities. These initiatives have involved the IAEA and have its support.

One is the Global Nuclear Energy Partnership sponsored by the United States. In a Statement of Principles signed by its 21 member nations on 16 September 2007, the GNEP countries committed themselves to:

*Establish international supply frameworks to enhance reliable, cost-effective fuel services and supplies to the world market, providing options for generating nuclear energy and fostering development while reducing the risk of nuclear proliferation by creating a viable alternative to acquisition of sensitive fuel cycle technologies.*

(See [www.gnep.energy.gov/pdfs/GNEP\\_SOP.pdf](http://www.gnep.energy.gov/pdfs/GNEP_SOP.pdf) )

There is also an international nuclear fuel manufacturing facility at Angarsk in the Russian Federation. (See [www.nti.org/e\\_research/e3\\_93.html](http://www.nti.org/e_research/e3_93.html) )

Once again, the existence of such arrangements supported by many countries and the IAEA demonstrates powerfully that the extreme view that the growth of civil nuclear power poses an 'unacceptable risk' of proliferation is also an isolated one.

## The terms of reference

The Committee is asked to 'inquire into and report on:

- The international treaties involving Australia which relate to non-proliferation and disarmament
- How these treaties advance Australia's objectives in this field
- How the treaties might be made more effective or comprehensive
- How inter-parliamentary action can assist in strengthening treaty-based aspects of the nuclear non-proliferation and disarmament regime
- How the Committee and the Parliament can contribute to the work of the International Commission on Nuclear Non-proliferation and Disarmament.'

The first term of reference is very broad. If we take it to be a reference largely to Australia's bilateral treaties for the export of uranium and to the Nuclear Non-Proliferation Treaty and the Additional Protocol, then the Committee could conclude that:

- There is no evidence that Australia's exported uranium has been diverted from peaceful purposes; that is, Australia's bilateral treaties for the export of uranium appear to have delivered their stated goals
- Internationally, illicit behaviours in breach of non-proliferation obligations are uncommon, are detected by the IAEA or others and are dealt with by the international community.

Regarding the second term of reference, it perhaps first necessary to make explicit what 'Australia's objectives in this field' are.

On 24 May 1977, the then Prime Minister, Malcolm Fraser, made a Ministerial Statement on 'Government Policy on Nuclear Safeguards'. A copy of the statement is attached to this submission.

The overriding objective 'in this field' stated by the then Prime Minister was 'to establish a framework of control within which the benefits which many countries see in the peaceful use of nuclear energy can be safely realised.' The Prime Minister added that these issues have 'added significance for Australia because of our potential as a supplier of uranium'.

The Prime Minister then went on to outline the policy that has since governed Australia's uranium exports:

- careful selection of customers
- application of IAEA safeguards
- bilateral agreements
- fallback safeguards
- prior Australian consent to re-export, enrichment and re-processing
- physical security
- safeguards provisions in contracts
- international and multilateral efforts to strengthen safeguards.

The policy framework articulated by Prime Minister Fraser still largely shapes Australian policy today.

On the evidence, Australia's bilateral treaties support the overall objective of a 'framework of control' by ensuring that Australia's uranium is not diverted away from peaceful purposes; and do that through the eight policy platforms established by Prime Minister Fraser and followed by all governments since.

The international system of safeguards contributes to Australia's objectives through its content and practice:

- It is embraced by all but three of the nations of the world
- It places obligations on nations to disarm and not to proliferate
- It contains a range of measures to verify that the obligations are being met
- In practice, multilateral action is taken to address circumstances in which those obligations are not met.

The third term of reference asks the Committee how the treaties might be made more effective.

Notwithstanding (now-eliminated) political differences over the development of the Australian uranium industry and, more recently, over the selection of customers, this policy framework has largely been a bi-partisan one.

In our submission, this policy, in its own right, provides an effective basis for future action.

However, the Association would welcome any amendments to the policy that supported the overriding objective articulated by the Prime Minister in 1977, recognising that government policy then and since has acknowledged the continuing role of nuclear power globally and of Australian uranium supply for it.

In the Association's view, there are three possible areas for improvement that would make the treaties more effective.

First, the NPT's coverage is very high but still incomplete, with India, Pakistan and Israel not being signatories. Australia could lend its weight to re-new efforts to bring those countries within the NPT. Failing that, Australia could support efforts to have those nations accept obligations similar to those required of NPT signatories so that there is closer alignment between their behaviours and the goals of the NPT.

The recent efforts made to do that in the case of India are, in the Association's view, commendable, even though they fall short of India becoming an NPT signatory.

The question of Australia becoming a supplier of uranium to those countries is a separate issue. The Association acknowledges the differences in view between Australia's main political parties about it. Efforts to improve the 'framework of control' that applies to those countries need not imply any Australian view on exports of Australian uranium to those countries. Improving the 'framework of control' by applying it to non-signatory countries would be worthwhile in its own right.

The second area for improvement concerns internationally-controlled nuclear fuel manufacturing facilities.

The Association considers that this idea has merit as it reduces the need or incentive for a country to construct enrichment facilities for a civil nuclear power industry, reducing a key area of proliferation risk. We recommend that Australia support the idea of internationally-controlled nuclear fuel manufacturing facilities as a means of limiting the spread of sensitive nuclear technology and use its diplomatic resources to align other countries with that idea.

Further, we recommend that Australia remain a member of the GNEP and play an active role in the formulation of its policies and practices; and that Australia engage with the countries associated with the Angarsk facilities with a view to shaping its policies and practices. This seems particularly apt given the Committee's recent report on the Russia treaty, which insisted that 'It is essential that actual physical inspection by the IAEA occurs at any Russian sites that may handle AONM.'

Notwithstanding our support for this approach, the Association is aware of its some drawbacks and limitations:

- The NPT acknowledges the right of countries to participate fully in the nuclear fuel cycle and some countries, including countries with no likelihood of proliferation behaviour, may wish to do so and will be difficult to dissuade from doing so
- It will institutionalise uranium enrichment activities in existing countries, which may impede economic development in countries that might otherwise embrace enrichment technology; and will reduce competitiveness in the supply of nuclear fuel.

The third area for improvement concerns the resourcing of non-proliferation policy making and practice.

The Association agrees with the adage that, in regard to proliferation, the best posture is 'to trust but verify'. That requires fit-for-purpose safeguard practices and inspection arrangements that act as a disincentive to illicit proliferation behaviours by maximising the prospects of their discovery.

In 2008, the IAEA received a report from a large group of eminent persons about the role and resourcing of the Agency in light of the challenges ahead. (See [www.iaea.org/NewsCentre/News/PDF/20-20vision\\_220208.pdf](http://www.iaea.org/NewsCentre/News/PDF/20-20vision_220208.pdf) )

The Association considers that the Australian Government needs to take a view on the resourcing of the Agency and to promote that view in the Board of Governors. While an Australian view might not prevail in a discussion among the Governors, the Committee could be satisfied that the resourcing issues had been canvassed and decided and that confidence in the Agency and in its safeguards and inspections policies and practices were warranted.

Accordingly, the Association considers that the question of the role and resourcing of the Agency needs to be settled by the Governors with an outcome in which the Governors are satisfied that the Agency's role is clear and that its resourcing is fit-for-purpose.

The Association considers that the initiative taken by the Agency for considering its role and resourcing provides a model for a similar initiative that should be undertaken for the Australian Safeguards and Non-Proliferation Office.

The Association does not share the views of those NGOs that have recently been critical of ASNO.

Nevertheless, there are challenges ahead and it would be wise to ensure the role of the Office is clear as it prepares to meet those challenges and that its resources are fit-for-its purpose.

With that in mind, the Association considers that:

- ASNO should provide a report to the Australian Government on the challenges ahead in its field. The Government would, naturally, also draw on the Committee's work and that of the International Commission on Non-proliferation and Disarmament to inform its views
- The Government should clarify the role it wants ASNO to play in light of the challenges identified
- ASNO should seek the assistance of the Australian Public Service Commission to build its organisational capability to meet those challenges
- The outcome of such assistance should be a report to Government on ASNO's resourcing, on which the Government could then decide resourcing.

If such a process were undertaken, the Committee could be satisfied that the role, resourcing, policies and practices of the Office had been examined for future fitness-for-purpose and that confidence in the Office was warranted.

The fourth term of reference asks the Committee how inter-parliamentary action can assist in strengthening treaty-based aspects of the nuclear non-proliferation and disarmament regime.

There are several possibilities for action to address this issue that the Committee could support in line with its terms of reference:

- On a bi-partisan basis, the Committee could become the main vehicle for Australian-initiated inter-parliamentary action to support non-proliferation and disarmament initiatives
- The inter-parliamentary action could involve engagement between Australian parliamentary delegations and those of other like-minded countries in pursuing non-proliferation and disarmament initiatives, including with parliamentary delegations of NPT non-signatory countries.

The content of inter-parliamentary discussion could cover issues such as identification of matters of mutual interest on which action is possible; the role of parliaments in scrutinizing potential proliferation activity, including by governments, and the obligations of parliaments in regard to such activity; and the prospects for parliament-initiated action to complement international treaties on non-proliferation and disarmament.

We repeat a point we made earlier: international inter-parliamentary action will be most effective – and may only be possible – if the Australian position is a bi-partisan one based on the acknowledgement that countries have embraced nuclear power as a permanent and expanding feature of the world's energy portfolio, for which Australia is a major and continuing uranium supplier.

Finally, the Committee is asked how the Committee and the Parliament can contribute to the work of the International Commission on Nuclear Non-proliferation and Disarmament.

There are several possibilities for the Committee to consider:

- Remove any doubt that may exist about Australia's views about the position of countries that use nuclear power – by recommending that Australia fully acknowledge the right of countries to use nuclear power - and thereby maximise the potential influence of the ICNND on non-proliferation and disarmament behaviour and on the long term impact of Australia's diplomatic efforts in that area
- Build domestic support for this approach by encouraging informed debate in Australia about the future of nuclear energy, putting its growth in the context of climate change and energy security and helping promote a better understanding of its benefits and the management of its risks
- Support keeping the work of the ICNND on top of the agenda despite the global financial crisis and the funding pressures it may impose
- Encourage fit-for-purpose resourcing of the Department of Foreign Affairs and Trade in nuclear diplomacy beyond the NPT Review Conference and defend the role and performance of ASNO against the unjustified attack by NGOs
- Provide regional assistance in export controls and through the Proliferation Security Initiative.

## Conclusion

To summarise:

- The main proliferation risk into the future appears to be the undeclared spread of sensitive nuclear technologies, especially enrichment technology, including by countries that are party to non-proliferation treaties
- New efforts to manage this risk are based on confining the spread of sensitive technologies by sponsoring internationally-controlled facilities for manufacturing nuclear fuel. These efforts are in their early stages
- The non-proliferation system does not guarantee there will be no illicit proliferation behaviour but the strong likelihood is that it will be detected if it occurs and will be managed as a multilateral cooperative exercise
- The main opportunities for greater effectiveness in the existing treaty arrangements and non-proliferation system are to be found in
  - Using Australian diplomacy to help bring the three non-signatories into the NPT or, at least, to find other mechanisms that align their behaviours with the expectations of the NPT
  - Supporting and expanding the mechanisms and facilities for global nuclear fuel supply
  - Supporting role clarity and fit-for-purpose resourcing of the IAEA and ASNO
  - Basing Australia's overall diplomatic efforts on a clear acknowledgement of the permanent and expanding role of nuclear power globally.

The Association urges the Committee to test these conclusions with people and organisations overseas.



## PRINCIPLES OF URANIUM STEWARDSHIP

## ATTACHMENT 1

The global nuclear power industry is committed to working cooperatively to ensure uranium and its by-products are managed in a safe, environmentally, economically and socially responsible manner.

Uranium stewardship is a program of action by the global nuclear power industry to put that commitment into practice.

A central idea of uranium stewardship is the responsibility shared by all players in every sector in the nuclear fuel cycle – from exploration and mining to spent fuel recycling and management, from the production of medical resources to the operation of nuclear power plants - to work with all other sectors to give effect to stewardship principles.

The Australian Uranium Association's *Uranium Stewardship Principles* reflect and are consistent with the global principles being developed under the auspices of the World Nuclear Association.

The Australian Uranium Association is developing plans for working with other sectors to implement stewardship principles.

The Association's *Principles* are additional to the broader Australian minerals industry's commitment to sustainable development as outlined in the Minerals Council of Australia's *Enduring Value*; and to the Australian Uranium Association's *Charter* and *Code of Practice*.

Through the *Principles*, the Australian uranium industry aims to engage the public and earn trust for the exploration, mining and export of uranium.

Recognising that uranium stewardship is a responsibility shared by all players in every sector in the nuclear fuel cycle, the Australian uranium industry will work together in a spirit of cooperation with other sectors to give effect to these principles and commits to:

- 1. *The safe and peaceful use of nuclear technology***
- 2. *Continual improvement of our quality, health, safety, security and environmental performance to minimise the impacts of our activities on people and the environment***
- 3. *Contributing to social and economic development of the communities where we operate***
- 4. *Recognition of fundamental human rights***
- 5. *Open, honest and transparent communication***
- 6. *Operating ethically with sound corporate governance***
- 7. *Sharing knowledge to encourage widespread adoption of best practices***
- 8. *Acting responsibly in the areas that we manage and control, and share our concern in other sectors of the nuclear fuel cycle***
- 9. *Providing responsible sourcing, use and management of uranium and all its by-products***
- 10. *As an industry, regularly communicating progress on the implementation of the principles to our stakeholders and review and update them as necessary***



## THE GLOBAL NUCLEAR POWER INDUSTRY: KEY FACTS

### SUMMARY

- Nuclear power generates 15% of world electricity, 23% of the OECD nations' electricity and, on average, 25% of the electricity in the countries in which reactors operate.
- The strong future growth in nuclear power capacity is underpinned by growth in base load electricity demand, concerns about security of fuel supplies and environmental considerations, particularly the role nuclear power can play to reduce greenhouse gases.
- There are 439 nuclear power plants operating globally, 39 are under construction, over 100 are on order and 270 are proposed, with new construction centred in Asia
- The projected growth in global use of nuclear power over the next quarter century is between 50% and 100%
- The scientific evidence demonstrates that nuclear power is a source of very low greenhouse gas emissions, over its lifecycle, compared to fossil fuels; and is highly greenhouse competitive with renewables.

### THE ROLE OF NUCLEAR POWER IN THE GLOBAL ENERGY CONTEXT

As at December 2008, there were 439 civil nuclear power reactors operating in 31 countries and, combined, these generate 15% of world electricity, or 2,600 billion kilowatt-hours per year. The reactors have combined capacity of 374 gigawatts electric (GWe).

Nuclear power currently generates 15% of world electricity, 23% of the OECD nations' electricity and, on average, 25% of the electricity in the countries in which reactors operate.<sup>1</sup>

#### Outlook for world nuclear power generation

Various forecasts predict strong growth in nuclear capacity in the decades ahead, underpinned by factors including:

- the projected growth in base load electricity demand, particularly in large developing countries;
- the improving cost-competitiveness of new nuclear power plants (NPPs) and nuclear fuel compared to other energy sources;
- concerns about security of fuel supplies, particularly in North America and Europe; and
- environmental considerations, particularly the role that nuclear power can play in reducing GHG emissions and localised air pollution.

Evidence for the outlook for nuclear power globally is available from a variety of sources which examine different aspects of the nuclear outlook and reach different conclusions but all of which point in the same direction.

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<sup>1</sup> World Nuclear Association, *World Nuclear Power Reactors 2007-08 and Uranium Requirements* (as at 1 December 2008), viewed 12 December 2008, <<http://www.world-nuclear.org/info/reactors.html>>.

The World Nuclear Association compiles and publishes a summary of the world's nuclear power reactors<sup>2</sup>. That summary shows that existing nuclear power plants are clustered in Europe, the US and Japan.

39 nuclear power plants are currently under construction (as of December 2008), with new construction centred in the Asian region, notably China, India, Taiwan and South Korea.

Other countries currently building new nuclear power plants include Russia, Slovakia, France, Finland, Argentina and Canada.

In all, there were over 100 nuclear power plants in planning at December 2008; that is, approved, with funding or commitments in place and expected to operate within eight years. These planned plants represent the equivalent of over a quarter of existing capacity.

270 nuclear power plants are proposed as of December 2008; that is, there is a clear intention to proceed but there is not yet a firm commitment. Proposed plants represent the equivalent of about half the existing nuclear capacity.

The International Energy Agency's *World Energy Outlook 2007*<sup>3</sup> sets out an 'Alternative Policy Scenario' based on policies and measures that governments around the world are currently considering to address energy-security and climate-change concerns. The table below is based on that scenario.

#### World Primary Energy Demand in the Alternative Policy Scenario (Mtoe)

	<b>2005</b>	<b>2030</b>	<b>Change %</b>
Coal	2892	3700	27
Gas	4000	4911	22
Oil	2354	3447	46
<b>Nuclear</b>	<b>721</b>	<b>1080</b>	<b>49</b>
Hydro	251	465	85
Biomass	1149	1738	51
Other renewables	61	444	727
<b>Total</b>	<b>11429</b>	<b>15783</b>	<b>38</b>

Source: International Energy Agency, *World Energy Outlook 2007*

The table shows an increase of 49% in demand for primary energy from nuclear power under the Alternative Scenario compared to demand in 2005. Compared to the Reference Scenario<sup>4</sup>, demand for nuclear power increases by 27% while demand for fossil fuels is between 12% and 26% less than in the Reference Scenario.

<sup>2</sup> *ibid*, WNA

<sup>3</sup> International Energy Agency, *World Energy Outlook*, OECD/IEA 2007, p. 97

<sup>4</sup> *ibid*, p. 93

The third source of data presented is the Association's own data, drawn from research conducted for the Association by Deloitte – Insight Economics.<sup>5</sup>

That research shows that, under a scenario of *Climate Action* involving a global agreement on carbon emissions stabilisation at 550 parts per million, a US\$50 per tonne carbon price and a long term uranium contract price of US\$100/pound, total demand for nuclear power generation would be about 960 nuclear power reactors globally by 2030 and uranium supply of about 150,000 tonnes pa.

#### **In summary:**

- **Nations around the world are confirming, renewing or expanding their engagement with the nuclear fuel cycle as a result of their needs for base load electricity in the context of energy security and greenhouse gas mitigation**
- **That demand for nuclear power will increase by between 50% and 100% by 2030.**

#### **Nuclear power and greenhouse gas mitigation**

The greenhouse gas emissions avoided by the use of nuclear energy play a critical role in global GHG mitigation efforts.

Nuclear power is a carbon-free technology at the point of electricity generation and emits very small quantities of carbon dioxide (CO<sub>2</sub>) over its whole fuel cycle, which is described further below.<sup>6</sup>

Life cycle GHG emission analyses of power plants show that, over its whole life cycle, nuclear power emits between 3 and 40 grams of carbon dioxide-equivalent per kilowatt-hour (gCO<sub>2</sub>-eq/kWh) of electricity produced.<sup>7</sup> Life cycle analysis includes all carbon emissions across the power chain, from resource extraction to waste disposal, including uranium enrichment, reactor construction, de-commissioning and waste disposal.

In comparison, using current technology, coal emits between 1,085 and 834 gCO<sub>2</sub>-eq/kWh, while natural gas emits between 469 and 398 gCO<sub>2</sub>-eq/kWh. Thus, even if the most conservative case is assumed - that nuclear electricity is generated with fuel from older enrichment technology powered by fossil fuels - nuclear power's full life cycle emissions are 10 times less than that of gas and over 20 times less than coal.

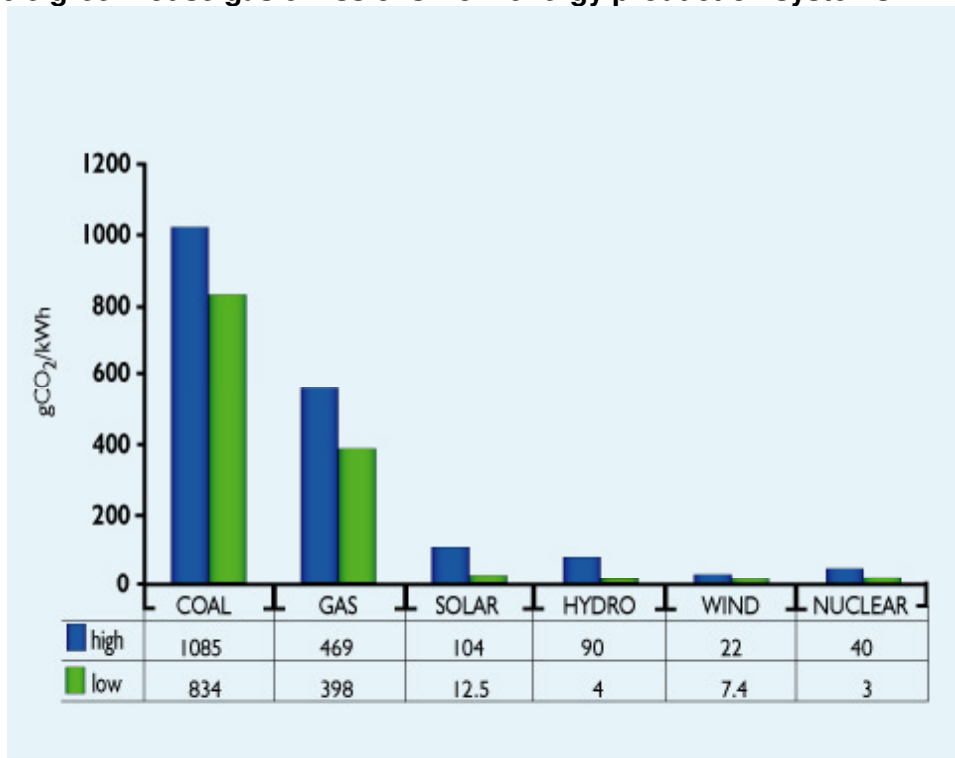
Full life cycle emissions for some renewable energy technologies are comparable to that of nuclear. Hydro emits 4 to 90 gCO<sub>2</sub>-eq/kWh and wind 7.4 to 22 gCO<sub>2</sub>-eq/kWh. Solar significantly exceeds nuclear, hydro and wind with a range of 12.5 to 104 gCO<sub>2</sub>-eq/kWh.

<sup>5</sup> Deloitte – Insight Economics, *Outlook for the Australian Uranium Industry: Evaluating the Economic Impact of the Industry to 2030*, March 2008 [www.auran.org.au/page.php?category=27&section=0](http://www.auran.org.au/page.php?category=27&section=0)

<sup>6</sup> The nuclear fuel cycle refers to the sequence of processes, from uranium mining through to final disposal of waste materials, associated with the production of electricity from nuclear fission.

<sup>7</sup> World Energy Council, *Comparison of Energy Systems Using Life Cycle Assessment*, WEC, 2004, viewed 3 January 2007, <<http://www.worldenergy.org/documents/lca2.pdf>>. See also: International Atomic Energy Agency, *Nuclear Power and Sustainable Development*, IAEA, 2006, p. 14, viewed 4 January 2008, [www.iaea.org/Publications/Booklets/Development/npsd0506.pdf](http://www.iaea.org/Publications/Booklets/Development/npsd0506.pdf).

### Full lifecycle greenhouse gas emissions from energy production systems



Source: World Energy Council, *Comparison of Energy Systems using Life Cycle Assessment*, 2004.

The chart above shows the results from one study. There are many studies showing similar results<sup>8</sup>.

<sup>8</sup> GHG mitigation benefits of nuclear power were examined by the University of Sydney for the Switkowski Report on *Uranium Mining, Processing and Nuclear Energy* (Commonwealth of Australia, November 2006). The researchers identified 39 studies that estimated the lifecycle greenhouse gas emissions from nuclear power, 37 of which put the emissions estimate at no more than 50 kg CO<sub>2</sub>-e/MWh; and only two that put the emissions estimate beyond that.

## **ATTACHMENT 3**

Mr Jerome Brown  
Secretary  
Joint Standing Committee on Treaties  
House of Representatives  
PO Box 6021  
Parliament House, Canberra ACT 2600

24 November 2008

Dear Mr Brown

### **Inquiry into Nuclear Non-Proliferation and Disarmament**

The Association believes the establishment of this Inquiry presents the opportunity to identify how to improve the global regulatory arrangements for non-proliferation and disarmament.

The Inquiry is taking place at the same time as the related initiative taken by the Prime Minister to establish the International Commission on Nuclear Non-Proliferation and Disarmament (ICNND).

In establishing that Commission, the Prime Minister said that serious thinking needed to be done about support for the Nuclear Non-Proliferation Treaty.

The Prime Minister's intention is to help pave the way for the NPT Review conference in 2010.

The Joint Standing Committee's Terms of Reference require it to examine how international treaties in this domain might be made more comprehensive and effective; and how inter-parliamentary action can assist in strengthening the non-proliferation and disarmament regime.

It is a sensible approach to policy to conduct such reviews at times of change to ensure that the arrangements needed for the future are fit-for-purpose.

This is a challenging task, examining a complex system built up over forty years.

The usual course followed by the JSCOT is to seek and receive submissions, to allow those making submissions a short period of time to speak to those submissions before the Committee and possibly to make supplementary submissions.

In our view, the usual process is not sufficient for this Inquiry. It is not sufficient because the subject matter is very complex and because much of the expertise for analysing it resides outside Australia.

We have strong doubts that the Committee will receive sufficient guidance in undertaking the task the Prime Minister commissioned it to do from submissions alone.

With that in mind, the Association urges the Committee to identify and meet with experts and policy makers who can provide it with insights on the issues it is being asked to examine. This expertise can be principally found overseas in organisations such as the International Atomic Energy Agency and others.

In our submission, the Committee should plan to visit North America, Europe and Asia to meet with those experts and policy makers. It can call on the Department of Foreign Affairs and Trade, on Australia's Ambassador to the IAEA and on the Australian Safeguards and Non-Proliferation Office for guidance on those most able to assist the Committee in its deliberations.

The Association is also able to identify a number of key figures with whom the Committee could meet.

The ICNND is meeting in Washington between 13 and 17 February 2009. That would be an appropriate time for the Committee to engage with US policy makers and with the new Obama Administration.

The Association submits that the Committee should meet at the earliest opportunity to consider the processes it will follow in the Inquiry and its evidential needs.

The Association will be making a further submission by 30 January 2009.

Yours sincerely

Michael Angwin  
Executive Director

## ATTACHMENT 3

### PROLIFERATION

*North Korea.* The DPRK is an example of safeguards succeeding in their aim of detecting a violation of safeguards obligations, which were subsequently brought to the attention of the international community through the UN Security Council.

The DPRK has been responsible for a number of illicit breaches of its NPT obligations since the mid-1980s, all of which have been detected by the IAEA and acted on the international community.

In the latest episode, in October 2006, the DPRK tested a nuclear weapon underground and the whole matter was referred to the UN Security Council.

This culminated in six-party talks involving China, Japan, Russia, South Korea and the USA. This eventually saw the Yongbyon reactor shut down and the cooling tower demolished. In the next phase, North Korea hands over fissile materials and weapons gear.

*Iran.* The Iran situation – development of enrichment facilities whose purposes the international community has concerns over – supports the idea of the international management of sensitive nuclear technology, such as enrichment and reprocessing.

*Iraq.* In 1990, the IAEA Board of Governors ruled that Iraq was in violation of its NPT and safeguards obligations effect. The UN Security Council then ordered the IAEA to remove, destroy or render harmless Iraq's nuclear weapons capability. This was done by mid 1998.

*South Africa.* Following the end of the apartheid regime in the late 1980s, South Africa acceded to the NPT, concluded a comprehensive safeguards agreement with the IAEA, and submitted a report on its nuclear material subject to safeguards. The IAEA was asked by South Africa to verify the conclusion of its weapons program.

In 1995 the IAEA was able to declare that it was satisfied all materials were accounted for and the weapons program had been terminated and dismantled.

*Israel.* Israel is one of three significant countries which have never been part of the NPT. It has no civil nuclear power program. Israel has never confirmed or denied that it has nuclear weapons.

*Syria.* From about 2001 to 2007 Syria constructed a graphite-moderated gas-cooled nuclear reactor at a remote site on the Euphrates River, near Al Kibar. It was damaged beyond repair by an Israeli air strike in September 2007 and the remains were demolished and buried soon after. The entire enterprise, apparently aimed at production of weapons plutonium, was clandestine and in breach of Syria's obligations under the NPT.

*Libya.* After several months of negotiations, Libya agreed in December 2003 to halt its development of nuclear weapons. For more than a decade it had been engaged in the





development of a uranium enrichment capability, based on importing natural uranium together with centrifuge and conversion equipment, and the construction of now-dismantled pilot-scale centrifuge facilities. Some of these activities should have been reported to the IAEA under Libya's Safeguards Agreement with the UN body, but were not.