

**SUBMISSION TO INQUIRY ON AUSTRALIA'S NON-FOSSIL  
FUEL ENERGY INDUSTRY**

**(Case Study: The Strategic Importance of  
Australia's Uranium Resources)**

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**SUMMARY OF POINTS**

- it is the view of the ANF that the world demand for Australia's low cost uranium will increase over the next few decades, but eventually this demand will be lessened by the introduction of fast breeder reactors reusing already mined uranium and by the utilisation of other higher cost sources of uranium.
- it is the view of the ANF that the processes described for the production of finished reactor fuel elements should be re-examined to determine if such commercial enterprises can be established in this country.
- the ANF believes that Australia might be an ideal location for at least a fuel enrichment plant under multinational safeguards control.
- the ANF believes that the wider use of nuclear power in the world supported by the export of Australian uranium will assist in the economic growth of the world economy consistent with greenhouse gas minimisation.

**1. INTRODUCTION**

The ANF is an association of individuals formed with the purpose of advancing peaceful aspects of nuclear science and technology that the members consider to be in the national interest. The ANF membership consists of a group of professionals with wide collective experience in nuclear science and technology. The ANF also has collaborative members worldwide. The ANF is not affiliated with any other organisation.

The ANF recognises the political difficulties in this country associated with objective discussion of nuclear power. This has little consequence to this country since it has more than enough coal reserves for domestic use and export and the consequent amount of greenhouse gases generated domestically cannot affect

the world's climate appreciably one way or the other. However, this country also has more easily won uranium resources than any other country and therefore is involved in the world's energy supply picture as well as the generation of greenhouse gases - whether we like it or not. The question then is how should this valuable resource be utilised to the best advantage of the country and the world.

## **2. COMMITTEE CONSIDERATIONS**

The points identified below have been identified by the Committee as being pertinent to this Inquiry. (Note that the two references used for the discussions below are ANF policy papers that have previously been published on the ANF website.)

### **2.1 Global demand for Australia's uranium resources and associated supply issues:**

The current world consumption of natural uranium is about 67,000 tonnes per year and about 8000 tonnes per year of this is supplied by Australia. The total world reserve up to \$80kgU is about 3.7MtU of which Australia has 31%. At the current rate of consumption this world reserve will last about 55 years, but it can be expected that more low cost and more higher cost reserves will be discovered as the price rises from diminishing supplies.

Beyond the current generation of reactors are the fast neutron breeder reactors (FBRs) that are approximately 60 times more efficient in extracting energy from uranium. It can be anticipated that such reactors will be able to reuse the uranium previously mined for the present reactors. Even further into the future are the prospects of recovering uranium from seawater (albeit at a greater price) and the utilisation of thorium as a reactor fuel (Australia also has large deposits).

The other side of the coin to the fuel supply situation is the demand for reactor fuel. The total power generating capacity of the current generation of reactors and hence their demand for fuel has remained relatively static for many years in part because countries have become more energy efficient and partly because of political opposition. However, as the fear of more "Chernobyls" recedes and it becomes clearer that fossil plants cannot be made sufficiently environmentally friendly and that the "alternative" methods of generating electricity prove to be incapable of meeting demand, there will be a swing back to the use of nuclear power. It is really too early to tell quantitatively the size and timing of this swing, but in our view it is inevitable.

Therefore, it is the view of the ANF that the world demand for Australia's low cost uranium will increase over the next few decades, but eventually this demand will be lessened by the

introduction of fast breeder reactors reusing already mined uranium and by the utilisation of other higher cost sources of uranium.

## **2.2 Strategic importance of Australia's uranium resources and any relevant industry developments:**

Australia does not have a monopoly of the world's uranium resources so it cannot realistically manipulate the market even if it wanted to. Instead the only real benefit to this country of having this resource is to sell it off to countries that have nuclear power as the market dictates. This provides some economic benefit to this country although by the current method of simply exporting the refined ore its value, in terms of the total value of reactor fuel produced worldwide, is only about 3%.

In the late 60s and 70s this country actively attempted to develop the industrial processes necessary to enhance the value of the uranium it exported. These processes include:  
(a) conversion of uranium oxide to uranium hexafluoride,  
(b) enrichment of the uranium to reactor grade concentrations of the isotope U235 and the (c) fabrication of reactor fuel. The work was carried out by the Australian Atomic Energy Commission and concentrated mainly on the enrichment process. Significant progress was achieved but the project was cancelled in 1982 and now most of the technology has been lost.

However, it is better late than never, and it is the view of the ANF that the processes described for the production of finished reactor fuel elements should be re-examined to determine if such commercial enterprises can be established in this country. This will probably mean that partnerships with overseas companies or countries that have the commercially proven technologies will be required.

Currently the Nuclear Non-proliferation Treaty is under review by the IAEA members and one of the mooted suggestions is to establish future fuel enrichment and reprocessing plants under multinational control. Assuming this means that the processes can still be operated commercially, but under strict international control as far as safeguards is concerned, then the ANF believes that Australia might be an ideal location for at least a fuel enrichment plant under multinational safeguards control.

## **2.3 Potential implications for global greenhouse gas emission reductions from the further development and export of Australia's uranium resources:**

Australia has the opportunity through the export of its uranium to assist in the use of nuclear power internationally. Since the processes used to build and operate nuclear power plants to generate electricity involve minimal greenhouse gas emissions, it

follows that Australia's uranium exports will result in fewer greenhouse gas emissions than if the power were to be supplied by fossil fuelled plants. Also, since the practicalities of renewable methods for generating electrical power appears to be limited, nuclear power seems to be the only method available to meet future electricity demands in a "greenhouse friendly" way. (The ANF believes this logic should also apply to this country but such comment has been placed out-of-bounds to this Inquiry.)

Expansion of "greenhouse friendly" nuclear power to the currently non-nuclear power countries could assist these countries in their economic development. In addition, if the proposed hydrogen economy is to become a reality, a large and reliable source of energy is needed - and nuclear is the only suitable option available.

Thus the ANF believes that the wider use of nuclear power in the world supported by the export of Australian uranium will assist in the economic growth of the world economy consistent with greenhouse gas minimisation.

**2.4 current structure and regulatory environment of the uranium mining sector (noting the work that has been undertaken by other inquiries and reviews on these issues):**

No Comment.

**3. REFERENCES**

1. "Australian Uranium Enhancement Industries," ANF Policy Paper, 2/5/05 (Copy Enclosed).

2: "Australian Uranium Mining," ANF Policy Paper 24/2/05 (Copy Enclosed).