Submission No. 64

PARLIAMENT OF AUSTRALIA – HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON INDUSTRY AN RESOURCES

INQUIRY – MAY 2005

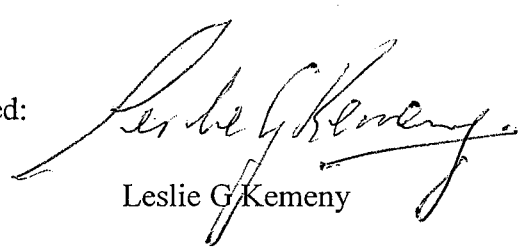
THE STRATEGIC IMPORTANCE of AUSTRALIA'S URANIUM RESOURCES

THIRD SUBMISSION

By

Leslie G Kemeny

THE INTERNATIONAL NUCLEAR FUEL CYCLE and AUSTRALIA'S SUSTAINABLE DEVELOPMENT

Signed: 

Leslie G Kemeny

Dated: 4th July 2005

ONE

URANIUM

and

GLOBAL ENERGY RESOURCES

TABLE 1. Sources of Global Energy – 2001

Oil	**42**
Natural Gas	**23**
Coal	**23**
Nuclear	**6**
TOTAL NON-RENEWABLE	**92**
Hydro	**7**
Other	**1**
TOTAL RENEWABLE	**8**

Source: US Energy information Administration
We should note here that these figures probably understate the amount of energy in the Third World coming from traditional resources of dung and firewood.

Comment One. . .

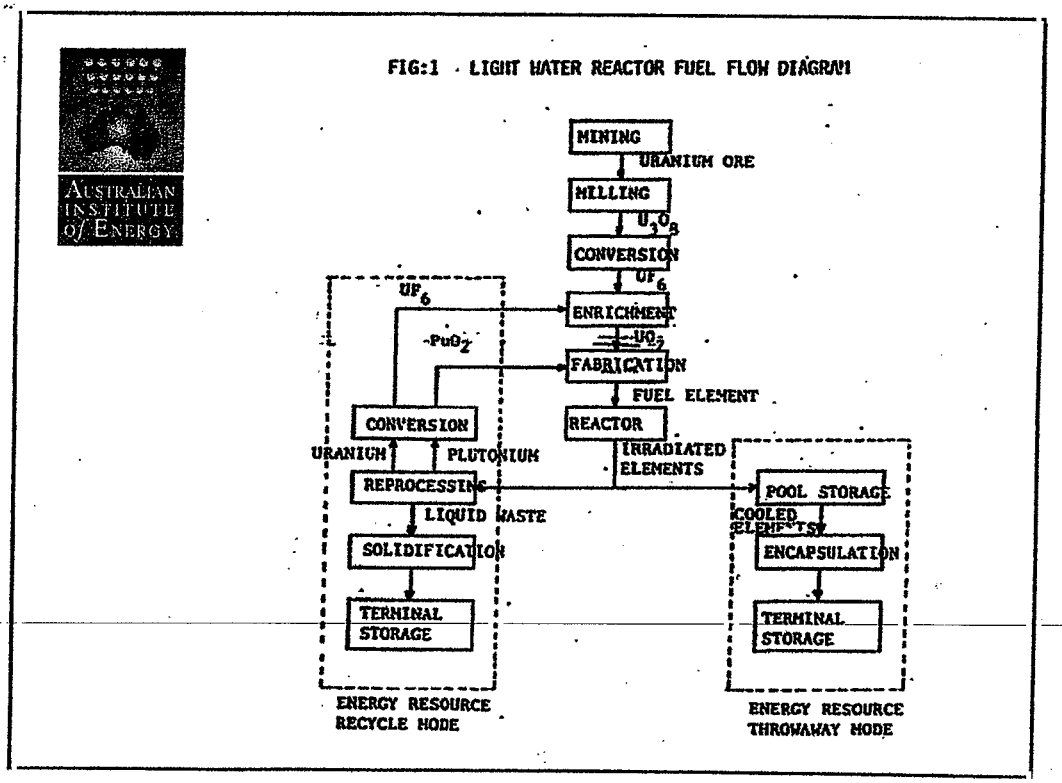
"There is a twenty to fifty year window of opportunity to arrest greenhouse gas emission and to substitute for depleting and price increasing hydrocarbon resources by moving toward a four-fold increase in nuclear power."

TWO

URANIUM

and

THE INTERNATIONAL NUCLEAR FUEL CYCLE



Comment Two. . .

"A dominant supplier of uranium – such as Australia-should capitalise on both the front and the rear end of the global fuel cycle by enriching the mined product, fabricating the fuel, leasing it to trading parties and disposing in suitable waste repositories. The return on the front and rear end processing costs of around $1500 (Aus) per kilo each can thereby be optimised and the proliferation and safe guards risks minimised."

THREE

URANIUM

and

EDUCATION

Higher Education

AUSTRALIAN INSTITUTE of ENERGY

A power too good to refuse

Australia must reverse its longstanding opposition to nuclear energy, argues **Leslie Kemeny**

Dilemma: Part of Australia's 'anti-nuclear' stance can be attributed to poor education

Comment Three . . .

"For any nuclear debate to be productive, sound education and informed realism are absolutely imperative. Vital decisions should not be based on pseudo-science, media hype or socio-political manipulation.

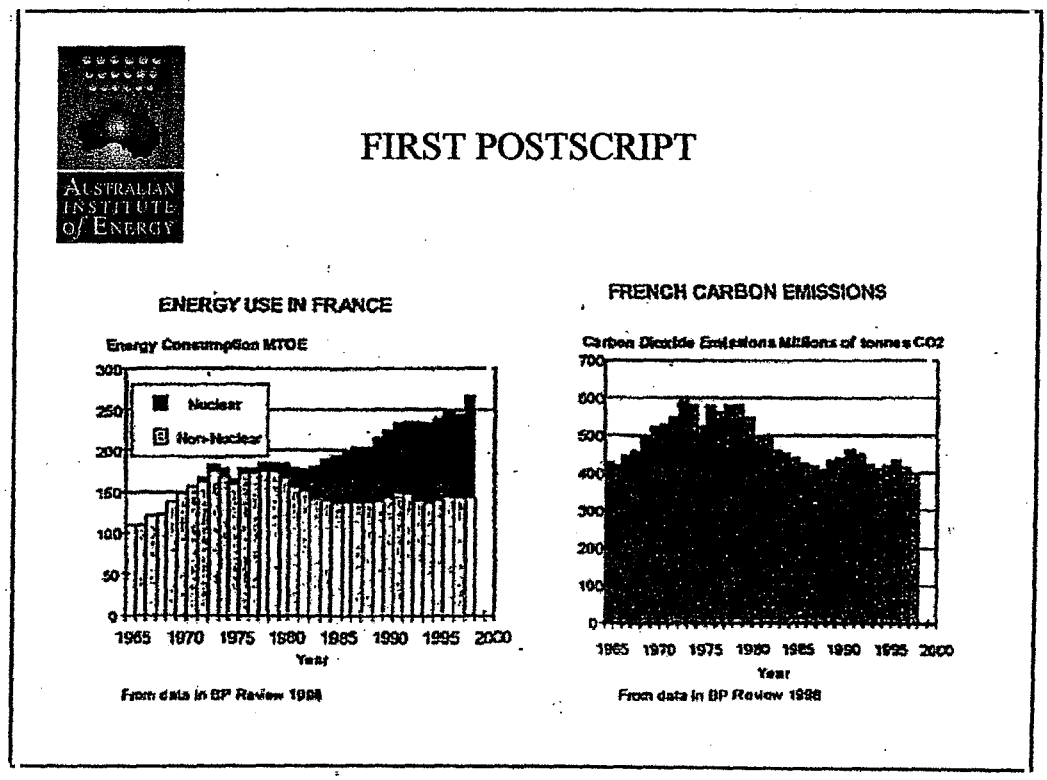
To meet the challenges of an emerging nuclear age, tertiary institutions to train nuclear scientists and engineers will need to be established."

FOUR

URANIUM

And

THE ENVIRONMENT



Comment Four . . .

"The use of nuclear power is one of the most important techniques for minimising greenhouse gas emissions as clearly demonstrated by France

Nuclear power is the only energy industry which takes full responsibility for all its wastes and costs them into the product. High-level wastes have been contained and managed safely for over fifty years, by which time radioactivity has decayed to 0.1 percent of the original level. High level waste takes around 1000 years for its activity to become similar to that of the original uranium orebody."

FIVE

URANIUM

And

SUSTAINABLE DEVELOPMENT

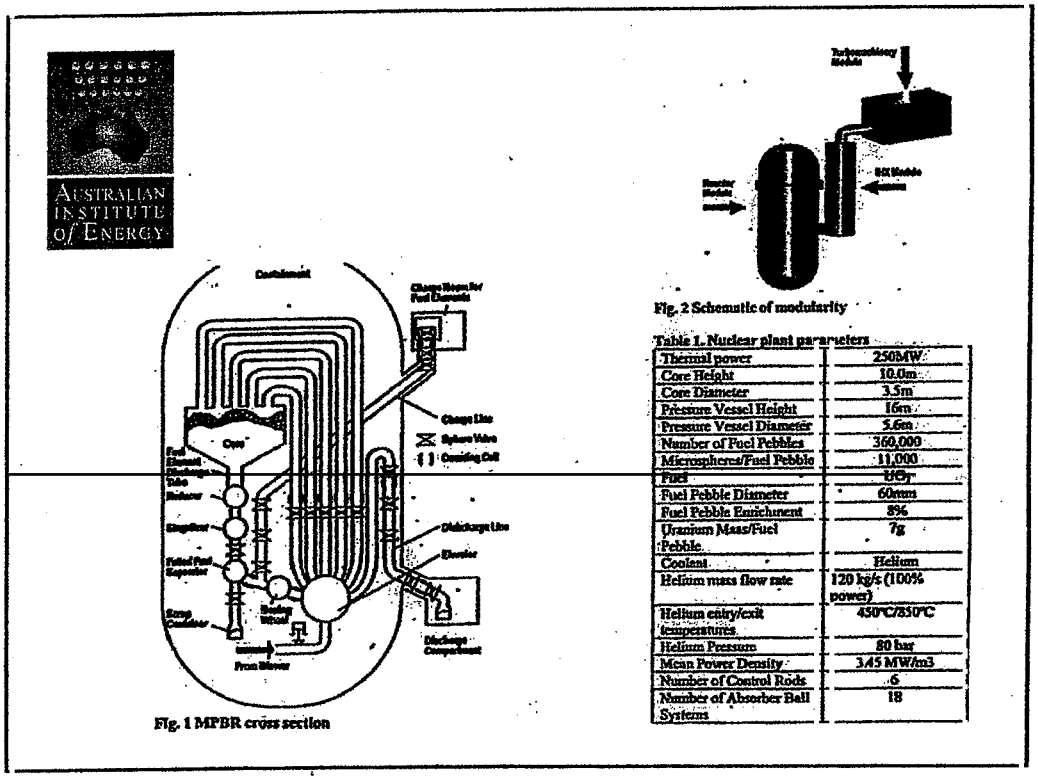


Fig. 1 MPBR cross section

Fig. 2 Schematic of modularity

Table 1. Nuclear plant parameters

Thermal power	250MW
Core Height	10.0m
Core Diameter	3.5m
Pressure Vessel Height	16m
Pressure Vessel Diameter	5.6m
Number of Fuel Pebbles	360,000
Microspheres/Fuel Pebble	11,000
Fuel	UO_2
Fuel Pebble Diameter	60mm
Fuel Pebble Enrichment	8%
Uranium Mass/Fuel Pebble	7g
Coolant	Helium
Helium mass flow rate	120 kg/s (100% power)
Helium entry/exit temperatures	450°C/850°C
Helium Pressure	80 bar
Mean Power Density	3.45 MW/m3
Number of Control Rods	6
Number of Absorber Ball Systems	18

Comment Five . . .

"Nuclear scientists and engineers are agreed that the new Generation Four High Temperature Gas Cooled melt-down and terrorism proofed pebble or prismatic bed, modular reactors are the optimal power sources for electricity, water and hydrogen production.

These factory assembly line produced units will be transported to site in modules of say 250 MW (th). They will have low capital and operating costs and will be ideal for the sustainable development of a nation such as Australia.