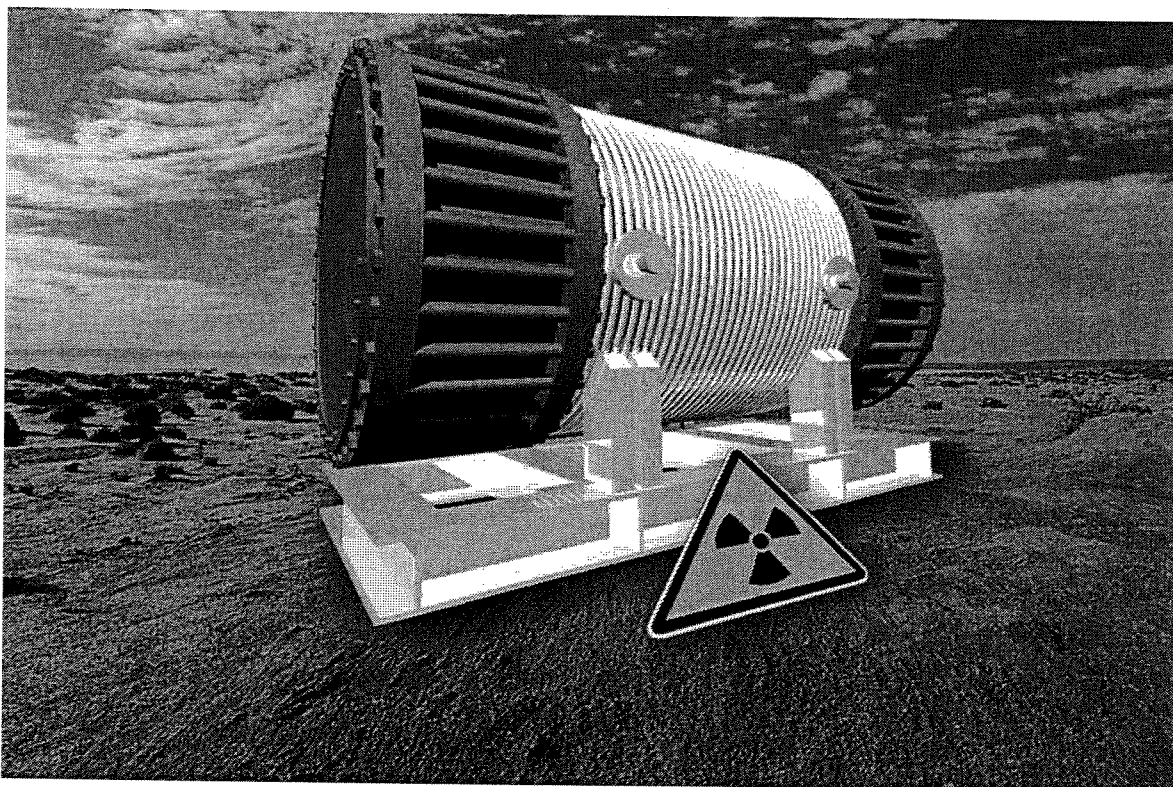


Submission To:

# Joint Select Committee into the Transportation and Storage of Nuclear Waste

NSW Parliamentary Inquiry

31<sup>st</sup> July 2003



## Overview

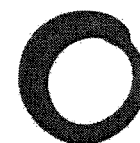
The production, transportation and disposal of radioactive waste presents a range of complex safety, health and social impacts. Decisions that are made today will have significant implications for the future.

The federal government is presently planning to dispose of low level and short-lived intermediate level radioactive waste in South Australia. The plan would involve road transportation across Australia and shallow burial of wastes near Woomera.

The federal government is also looking for other potential national storage sites for Australia's medium and higher-level radioactive wastes including sites in NSW.

These moves are part of the continuing push to build a controversial new nuclear reactor in Sydney. The current reactor is Australia's largest generator of radioactive waste and any new reactor would be the main source of all forms of radioactive waste for the next 40 years.

The present proposal is a crude and expedient attempt to solve a complex problem. This submission questions the need for the facility and presents an alternative approach for the safe management of Australia's radioactive waste.



**Friends of  
the Earth  
Australia**

## TERMS OF REFERENCE

That a joint select committee be appointed to consider and report upon proposals by the Commonwealth Government to transport nuclear waste through and potentially store nuclear waste within New South Wales, with specific reference to the following matters:

- (a) logistical arrangements associated with the proposals, including sourcing, transport and storage of waste
- (b) health and safety risks associated with the transportation and storage of nuclear waste within New South Wales
- (c) extent of possible resource implications associated with the transportation and storage of nuclear waste within New South Wales
- (d) any other relevant matter.

## ACRONYMS

AAEC	Australian Atomic Energy Commission
ACF	Australian Conservation Foundation
ANSTO	Australian Nuclear Science and Technology Organisation
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
DEST	Commonwealth Department of Education, Science and Training
EIS	Environmental Impact Statement
FOEA	Friends of the Earth, Australia
GBq	Gigabecquerels (unit of radioactivity, 1GBq = 10E9 Becquerels).
ILW	Intermediate-level waste
LLILW	Long-lived intermediate-level waste
LLW	Low-level waste

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**Term of Reference: (a) logistical arrangements associated with the proposals, including sourcing, transport and storage of waste**

**A1. SOURCES OF WASTE FOR THE NATIONAL DUMP**

**Source**

The Australian Nuclear Science and Technology Organisation (ANSTO) is Australia's single largest producer of radioactive waste destined both for the planned underground LLW/ILW dump at Woomera in South Australia and for the planned above-ground LLILW store.

Using figures provided in the federal government's own documentation (Supplement to the EIS Appendix C, page 5), ANSTO is responsible for 1320 cubic metres (m<sup>3</sup>) of 1690 m<sup>3</sup> of waste to be trucked to Woomera, i.e. 78%. (A further 2010 m<sup>3</sup> of CSIRO-origin soil is already stored at Woomera, but that accounts for just 0.3 Gigabecquerels of the national total of 6367 GBq, or 0.05%).

ANSTO will be responsible for 30 m<sup>3</sup> of the national total of 40 m<sup>3</sup> of annual LLW/ILW production according to the federal government. Assuming a lifespan of 50 years, ANSTO will be responsible for a further 1500 m<sup>3</sup> of a national total of 2000 m<sup>3</sup>.

Those figures do not include waste arising from dismantled nuclear reactor components from ANSTO. According to the federal government's EIS, the existing HIFAR reactor and the new reactor (under construction) will ultimately generate a total of 1000-5000 m<sup>3</sup> of waste by way of dismantled reactor components destined for the dump (the upper estimate exceeds the entire current national inventory of waste destined for the dump).

So, over the lifespan of the dump, ANSTO will be responsible for an initial 1320 m<sup>3</sup> (existing), plus 1500 m<sup>3</sup> (future), plus 1000-5000 m<sup>3</sup> (reactor components), giving a total of 3820 to 7820 m<sup>3</sup> of a national total of 1690 + 2000 + 1000-5000 = 4690-8690 m<sup>3</sup>.

**Using those figures, ANSTO will be responsible for 81-90% of the waste volume to be trucked to Woomera.**

It would be far preferable to discuss radioactivity rather than volume, but insufficient data is available to enable radioactivity calculations.

A further qualification must be made. In 1993 (ANSTO Research Reactor Review submission), ANSTO was predicting a four-fold increase in the production of waste categories destined for the Woomera dump between 1993-2025, but these predicted increases appear not to have been factored into the government's statements regarding future annual arisings (which are said to be static at 30 m<sup>3</sup> for Lucas Heights and 40 m<sup>3</sup> nationally).

**Waste inventory**

The federal government's figures on waste volumes and radioactivity must be treated with great caution since they have changed dramatically in recent years and may continue to change. For example, the total national inventory of waste destined for the dump provided in the Supplement to the EIS exceeds the figure given in the Draft EIS by 36% (6367 GBq compared to 4670 GBq). The amount attributed to New South Wales has increased by three orders of magnitude: 1350 GBq in the Supplement to the EIS compared to 1.37 GBq in the Draft EIS.

To give another example of major revisions by the federal government, in July 2001 the government said the HIFAR reactor would generate 500 m<sup>3</sup> of waste (in the form of dismantled reactor components) for the Woomera dump (Department of Industry, Science and Resources, July 2001, "Australia's radioactive waste: what it is"), whereas the figure is put at 500-2500 m<sup>3</sup> in the Supplement to the EIS (p.40).

Although the government has completed the EIS process, very little data has been made public about the type and source of Australia's LLW/ILW destined for the dump. For example, the Supplement to the EIS (Appendix C, page 5) has an entry called 'Defence (Vic/NSW/SA)' which amounts to 725 GBq (11.4% of the national total). All that the Department of Education, Science and Training (DEST) will say about this waste is that "Defence's inventory has been supplied to the Department of Education, Science and Training (DEST) on a confidential basis." (Correspondence from Dr Caroline Perkins, Director, Radioactive Waste Management Section, DEST, 13/5/03, to Jim Green.) There is no justifiable reason for that information to be kept confidential.

### **Reactor Waste**

**ANSTO needs to demonstrate progress with waste management in order to secure a reactor operating licence in the coming years. The plans for an underground LLW/ILW dump and a LLILW store are being driven by a perceived political need to reduce opposition to a new reactor by removing waste from Lucas Heights.**

In other words, the federal government's agenda is not to safely manage existing waste, but to facilitate the production of far more waste. A simple proof of that assertion is available: the government repeatedly claims that existing waste stores must be cleared out because they are unsafe, yet many of these stores will continue storing waste even if the dump goes ahead because of ongoing waste production and the fact that the dump would receive waste only once every 2-5 years. It is telling that the government is not acting to ensure the safety of these stores.

**The federal government repeatedly claims that nuclear medicine is the largest source of waste destined for the dump; to give just one example, federal science minister Peter McGauran said on ABC Radio National, Australia Talks Back, 5/2/02, that the waste destined for the national dump "is largely produced by nuclear medicine". No data has been supplied to justify the claim.**

The claim certainly cannot be true in relation to waste volume, since 54% of the volume of the existing inventory destined for the dump is non-medical CSIRO soil. A request to Science Minister Peter McGauran to justify his claims regarding the contribution of nuclear medicine to the national inventory yielded the following reply from Caroline Perkins (DEST):

In future years, ANSTO will generate about 30 cubic metres of the 40 cubic metres of low level and short-lived intermediate level waste which will be routinely generated in Australia on an annual basis. The Minister's comments reflect the fact that about two-thirds of the waste arising from ANSTO's activities comes from the production of radioisotopes for nuclear medicine." (Correspondence from Caroline Perkins to Jim Green, 13/5/03.)

Using those figures, about half of ANSTO's waste can be attributed to nuclear medicine (including medical isotope production), although the figure is certainly less since ANSTO's Radiopharmaceuticals and Industrials division also produces non-medical isotopes. Dr. Perkins ignores historical AAEC/ANSTO wastes (only a small fraction of which could be attributed to nuclear medicine), and she ignores non-ANSTO waste altogether (the Supplement to the EIS lists 2019 m3 from CSIRO, 210 m3 Defence, 151 m3 from the states/territories, and 1320 m3 from ANSTO.)

A very rough guesstimate would be as follows: say one quarter of ANSTO's waste is medical ( $1320/4=330\text{m}^3$ ), and one third of the state/territory waste is medical ( $151/3=50\text{ m}^3$ ), so overall perhaps ONE TENTH ( $380/3700\text{ m}^3$ ) of the national inventory is a by-product of medical isotope production and nuclear medicine - a far cry from the government's claim that a majority of the waste is a by-product of medical isotope production and nuclear medicine.

The government's references to nuclear medicine are made simply to 'sell' the dump to the Australian public. Moreover, the fact that some waste is a by-product of medical isotope production and nuclear medicine doesn't mean that a national dump is the best way to manage the waste, nor that a dump ought to be located in SA.

Further, the government's plan ignores the potential to dramatically reduce waste production by investing in accelerator and/or spallation technology instead of a new reactor. That offers a win-win solution: broadly equivalent medical and scientific benefits, perhaps as little as 1-5% of the low-level waste output and, better still, none of the spent nuclear fuel.

As for spent nuclear fuel and other reactor wastes (such as dismantled reactor components), only a small fraction of these wastes could be attributed to medical isotope production. According to ANSTO (1993 Research Reactor Review submission), just 10% of HIFAR's neutrons are used for medical isotope production.

**Term of Reference: (b) health and safety risks associated with the transportation and storage of nuclear waste within New South Wales**

**B1. STORAGE OF WASTE AT LUCAS HEIGHTS**

**Accidents**

Storage of waste at Lucas Heights has been punctuated by accidents and incidents. To give a few examples:

- In early 1998, it was revealed that "airtight" spent fuel storage canisters had been infiltrated by water - 90 litres in one case - and a number of rods had corroded as a result.
- When canisters were retrieved for closer inspection, three accidents took place (2/3/98, 13/8/98, 1/2/99), all of them involving the dropping of canisters containing spent fuel. The public may never have learnt about those accidents if not for the fact that an ANSTO whistleblower told the local press. One of those accidents (1/2/99) subjected four ANSTO staff members to radiation doses of up to 500 microsieverts (half the public dose limit).
- On October 17, 2001, Garnett said that claims "that security is wanting at [Sydney's] Lucas Heights Science and Technology Centre ... is far from the truth." (Australian Financial Review, letter.) Exactly two months later, several dozen Greenpeace protesters clambered over the spent fuel storage building and the reactor, while a paraglider enjoyed the scenery from ANSTO's 'secure' airspace.
- On March 15, 2002, an accident occurred during the cropping (cutting) of a spent fuel rod, releasing radioactivity to the spent fuel pond. Again, the public learnt about this accident only after an ANSTO whistleblower told the local press.

Solidification of ANSTO's 'moly' waste (from the separation of molybdenum from reactor-irradiated enriched uranium targets) has been extremely slow and the resulting solid waste will require secondary treatment some decades hence.

**Secrets**

A culture of secrecy undermines community confidence in ANSTO's waste management (and more generally). This culture has been the subject of frequent criticism, e.g.:

- the Senate Select Committee Inquiry into the Contract for a New Reactor at Lucas Heights, Final Report, May 2001, said: "The Committee is highly critical of ANSTO's approach to providing documents. Its attitude seems to stem from a culture of secrecy so embedded that it has lost sight of its responsibility to be accountable to the Parliament." Liberal and National Party senators on the Committee said "... that ANSTO could have been more helpful in providing certain less commercially sensitive information to the Committee and could have been more willing to seek a compromise when sensitive material was involved."
- nuclear engineer Tony Wood, former head of ANSTO's Divisions of Reactors and Engineering, said in evidence to the Senate Select Committee Reactor Inquiry in 2000: "If I had to sum up my concerns in one sentence, it would be that for the first time in my long association with the AAEC and ANSTO I do not feel comfortable with what the organisation (ANSTO) is telling the public and its own staff."
- Mr. Wood said in verbal evidence to the ARPANSA Public Forum on December 17, 2001: "I believe that it is very important that the public be told the truth even if the truth is unpalatable. I have cringed at some of ANSTO's public statements. Surely there is someone at ANSTO with a practical reactor background and the courage to flag when ANSTO is yet again, about to mislead the public."
- Ex-ANSTO scientist and now President of the Australian Nuclear Association, Dr. Clarence Hardy, complained about the "culture of secrecy" at ANSTO when giving evidence to a parliamentary Public Works Committee inquiry in 1999.
- In 2000, the Sydney Morning Herald and Greenpeace were told that to acquire two and 22 pages of information respectively under Freedom of Information requests, they would be charged \$7099 and \$6809.

### **No independent regulator**

Conflicts of interest are a further cause for concern. ANSTO is the largest single producer of waste destined for the LLW/ILW dump and the LLILW store yet ANSTO has for many years had a formal role advising the government on radioactive waste issues. Moreover, ANSTO's chief executive Helen Garnett was one of three people who sat on a panel which interviewed applicants for the position of CEO of ARPANSA; in other words, the independence of the 'independent' regulator was hopelessly compromised from the start by the federal government, and deliberately so.

Another cause for concern is ANSTO's immunity from NSW public health and environmental laws since the passage of the ANSTO Amendment Act 1992 by the then Labor government with Coalition support.

Problems with the management of radioactive waste at Lucas Heights do not necessarily support arguments for the removal of waste from Lucas Heights, particularly since the federal government's recent track record with radioactive waste management (i.e. the Maralinga 'clean-up') provide no reason for confidence with respect to the management of the planned national dump.

### **Recommendations**

Regardless of what happens with the existing stockpile of radioactive waste stored at Lucas Heights, a number of recommendations flow from the above comments:

- the culture of secrecy and the recurring pattern of cover-ups at ANSTO must be addressed;
- the regulatory agency must be made genuinely independent;
- ANSTO's formal role as an adviser to the federal government on radioactive waste management issues should be revoked; and
- ANSTO's immunity from NSW public health and environmental laws should be revoked.

## **B2. TRANSPORTATION RISKS**

### **Shipments**

The government intends to truck an initial 1690 m<sup>3</sup> of waste to Woomera (in addition to moving the 2010 m<sup>3</sup> of LLW/ILW already stored at Woomera to the dump). Of those 169 trucks (10 m<sup>3</sup> per truck), 132 will come from ANSTO. These 132 trucks would pass through numerous towns along the proposed transport corridor including Sydney's western suburbs, Katoomba, Bathurst, Orange, Dubbo and Broken Hill. An alternative route would see the trucks travelling through Wagga Wagga, Narrandera, and Hay among other locations. Both of the transportation routes pass through many communities and agricultural regions.

According to the federal government's EIS, dismantled HIFAR nuclear reactor components destined for the dump will amount to 500-2500 m<sup>3</sup> (100-250 trucks). The government's preferred option is to dismantle the HIFAR reactor in about 30 years time, but an alternative option under consideration is to dismantle HIFAR shortly after its permanent closure in 2005-2006. In addition, the new reactor under construction is expected to generate the same amount of waste some decades hence.

### **Accidents**

**According to the Draft EIS (Table 3, Section 7.6), there is a 23% risk of one truck accident shifting the existing national inventory to Woomera.** (Those calculations do not consider the risks associated with shifting the 2010 m<sup>3</sup> of CSIRO soil from the aircraft hangar at Woomera to the dump site east of Woomera, which is no great oversight since the distance is small and the soil is only lightly contaminated.) In the Draft EIS, the figure is presented as an 23% ANNUAL risk of one accident moving the existing inventory, which is a nonsense statement since it is a one-off event not an annual event. Correspondence with DEST has confirmed that the government's calculation is that there is a 23% risk of one truck accident shifting the existing national inventory to Woomera.



In the next 50 years, the government plans to move far more waste to Woomera:

- annual national arisings of 40 m3, amounting to 2000 m3 over 50 years
- 500-2500 m3 from dismantled HIFAR components
- this gives a total of 2500-4500 m3 in addition to the current inventory of 1690 m3 to be trucked to Woomera.
- in addition, the new reactor is expected to generate 500-2500 m3 of waste in the form of dismantled reactor components (though not in the next 50 years).

Clearly the government plans many more shipments of waste to Woomera over and above the existing national inventory, thereby adding to the transportation risks. The existing national inventory accounts for roughly one-third to one-fifth of the amount of waste the government intends to truck to Woomera in the coming years and decades.

For the transportation of existing waste from NSW (including the ACT) to Woomera, the Draft EIS (Table 3, Section 7.6) gives the following figures: 1355 m3 of waste, 136 truckloads, 1,580 kms (distance from Sydney to Woomera), and a 20.8% chance of one truck accident.

Such risks might be tolerated if they were in return for demonstrable benefits, but such benefits are hard to ascertain (as discussed below in section B3).

The Melbourne Age reported on 4/9/01 that fatal crashes involving heavy trucks had risen for three consecutive years, drawing on data from the Australian Transport Safety Bureau. The rise was attributed by various parties to an economic boom in NSW leading to more road freight; the GST, higher fuel costs and economic pressures more generally; worsening roads; and an increase in the number of trucks on the road. (Andrew Heasley, Fatal truck crashes on the rise, The Age, 4/9/01.)

The federal government has no obligation or intention to inform local governments or communities along the transport corridor of the details of planned shipments of waste to Woomera. Many communities have voiced their opposition in response to concerns about proposed transport of nuclear waste

- **16 NSW local councils have stated their opposition to the transport of nuclear waste through their communities including, Broken Hill, Narromine, Nyngan, Cobar, Dubbo, Carbone, Orange, Bathurst, Lithgow, Blue Mountains, Hay, Holroyd, Narrandera, Liverpool, Parramatta and Cambelltown.**
- **The 13 councils that make up the Western Division Group of the NSW Shires Association flagged their "extreme concern" in a letter to federal minerals and resources minister Ian McFarlane.**
- **NSW Shires Association 2002 -supports all Councils in their opposition to the transport of Nuclear Waste through their Local Government areas, with the exception of medical related items.**

Insurance against transportation accidents involving radioactive waste is not available. The only potential form of redress would be legal action against the federal government. The Supplement to the EIS (pp.55-56) confirms that in the event of an accident, "... redress would be sought under the relevant domestic laws dealing with pollution and liability for harm to the environment."

The government frequently claims that there are 30,000 packages of radioactive materials transported safely annually. This ignores accidents and incidents such as:

- a package containing radioactive material falling from a van in Sydney in September 1997;
- reports of spill/s when moving waste to Woomera in 1994 and again in 1995
- at least one significant accident moving spent fuel within the Lucas Heights site in the late 1990s (see section B1).

Moreover, those 30,000 packages (assuming the figure is accurate) would generally be far less radioactive (and hazardous) than the trucks containing 10 m3 of waste destined for Woomera. Moreover, many of the 30,000 packages would have a demonstrable benefit (not least packages of medical radioisotopes) to weigh against the hazards, whereas benefits associated with transportation of waste to the dump at Woomera are highly debatable (as discussed below in section B3).

### **Emergency Services**

The preparedness of emergency services to deal with radioactive waste transportation accidents has not been satisfactorily addressed. For example the Secretary of the United Firefighters Union (SA), Mr. Mick Doyle, has publicly complained about the lack of consultation from the federal government with emergency services organisations or with workers or their trade unions (public meeting, Norwood Town Hall, September 2002).

The President of the NSW Fire Brigades Employees' Union, Darryl Snow, has also expressed concerns about transportation: "The reality is, NSW Fire Brigades, doesn't know what to do. We just simply cannot deal with this stuff. The information we receive is scant and if we do receive it, we'll be no better off. We haven't received the equipment or the training. I don't want my members to find they're 6 hours to knocking off, and they're [sent] all along this route [to deal with a nuclear transport accident]. I don't want the members of our union being put through that."(17/5/2003, Blue Mountains community meeting.)

To give another example, the Broken Hill City Council noted in its EIS submission its concerns about the preparedness of fire services to manage accidents involving radioactive waste; about the capacity of volunteer firefighters in particular to manage accidents involving radioactive waste; and the Council also noted its concern about the long response times which could arise because of the distances involved. (See Supplement to the EIS, Appendix B - Summaries of Responses.)

Likewise, the Hay Shire Council questioned in its EIS submission the ability of regional emergency services to provide an adequate response in the event of an accident, and it said that it is little consolation can be gained from the presence of HAZMAT stations in Sydney, Newcastle and Wollongong. (Supplement to the EIS, Appendix B - Summaries of Responses.)

### **B3. ALTERNATIVES TO CENTRALISED MANAGEMENT AND SHALLOW BURIAL**

The 1995-96 Senate Select Committee on the Dangers of Radioactive Waste ('No Time to Waste') recommended against shallow burial of radioactive waste and argued for a national above-ground storage facility. The Committee also recommended that: "the national facility will be adequately engineered to withstand all possible climatic conditions, no matter how unlikely." The Federal government rejected the findings.

**In the current circumstances, the case for centralised management of Australia's radioactive waste is weak. The best - or least-worst - of the options is storage at the site of production in properly secured and monitored facilities.**

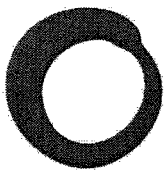
This option has three major advantages:

1. storage at the site of production avoids altogether the risks associated with transportation (see section B2).



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## **Summary**

Friends of the Earth, Australia (FoEA) opposes the federal government's plans for shallow burial of low-level radioactive waste (LLW) and intermediate-level waste (ILW), and for an above-ground national store for long-lived intermediate-level waste (LLILW).

The plan is a crude political attempt to solve a complex public health and environmental problem and is driven by a political agenda to shift some of the waste from the nuclear reactor at Lucas Heights in Sydney in order to reduce opposition to a new and unnecessary reactor.

The federal government's plan merely removes hazards from one community only to impose it on others (e.g. communities along the transport corridor between Lucas Heights and the proposed dump site near Woomera in South Australia).

It is recognised internationally that there is no way to dispose of radioactive waste; hopefully research will provide us with a solution to this environmental problem in the future. Until then in the interests of the health of people and the environment we must store this waste in the safest manner available to us.

Friends of the Earth argue that

- radioactive waste should be stored at the point of production, in properly secured, monitored, and regulated dry storage facilities.
- Australia should act to ensure that generation of radioactive waste is minimised, for this reason we oppose a new reactor at Lucas heights,
- the cancellation of the reactor project ought to be tied to expanded investment in non-reactor technologies (especially particle accelerators, including cyclotrons) and programs,
- siting criteria for a nuclear waste storage should include community acceptance.

The NSW Inquiry into the transport and storage of nuclear waste is a vital forum for representation of community concerns regarding this proposal.

The federal government is pushing ahead with plans for a national underground dump for LLW/ILW despite overwhelming opposition:

- numerous polls in SA in recent years have indicated opposition to the dump of 68-95% of the population.
- the South Australian Parliament legislated in March 2003 to ban the dump and the legislation banning the dump was indefinitely extended in July 2003.
- the United Trades and Labor Council of SA has established a ban on union labour building, or supplying services to, the dump, and the ACTU Executive passed a similar resolution in July 2003.
- sixteen local councils oppose the transportation of radioactive waste through their communities between Lucas Heights in Sydney and the planned dump site near Woomera.
- opposition from Indigenous groups such as the Kupa Piti Kungka Tjuta (senior Aboriginal women's council from northern SA) and the Kokatha has been ignored, and Native Title rights and interests were abolished with the compulsory seizure of land for the dump site by the federal government in July 2003.

If overseas reprocessing options become unavailable, ANSTO said in its Draft reactor EIS (p.10-18) that:

In the unlikely event that the overseas options should become unavailable, it would be possible at short notice to take advantage of off-the-shelf dry-storage casks for extended interim storage at the national storage facility, pending renewed arrangements being negotiated for reprocessing/conditioning of the fuel.

That contingency plan raises numerous issues and concerns, not least the fact that there is no national storage facility in existence.

The planned LLILW store is only an interim facility. According to the government, LLILW is destined for deep geological disposal. No progress has been made on final disposal of LLILW in Australia.

Recommended reading on spent fuel issues: ARPANSA's Nuclear Safety Committee, February 2002, "Report on the ANSTO application for a licence to construct a replacement research reactor", section addressing Spent Fuel and Radioactive Wastes, pp.65-102

## **D2. SPENT NUCLEAR FUEL**

This submission has focussed on the federal government's immediate plan to establish a LLW/LLILW dump at Woomera. However brief mention should be made of some of the problems associated with spent nuclear fuel management.

Australia's radioactive waste threatens the health and safety of the international community. We currently send spent nuclear fuel to France past many countries that have consistently opposed radioactive waste being shipped through their region.

In France the waste is reprocessed, a procedure that is illegal in Australia because it is such a dangerous polluting activity. The people in the area surrounding the reprocessing facility have been suffering serious health impacts as a result of the radioactivity that is released into the ocean and air during reprocessing.

In November, 1999, 360 spent fuel rods were shipped from Botany Bay to La Hague in France for reprocessing and in January, 2001, 308 spent fuel rods were shipped the same route. All 668 rods were the subject of legal cases in France because the nuclear company Cogema failed to secure the correct licences to reprocess them.

The Supplement to the EIS states: "The policy of successive Australian governments is that countries should expect to make their own arrangements to safely dispose of their radioactive waste." However, this policy has been breached with the shipping of spent fuel to the United States where it will remain permanently.

Reprocessing is legally prohibited in Australia (ARPANS Act), presumably for some combination of environmental, public health and/or proliferation reasons, so it is difficult to see how the reprocessing of Australian spent nuclear fuel overseas can be justified.

The federal environment department (Environment Australia) said in its Environmental Assessment Report on ANSTO's reactor EIS (1999) that:

The current timing is for the store to be in operation by the time the replacement reactor is commissioned in 2005. Clearly, any long-term planning depends on the establishment of such a facility.

There is no prospect whatsoever that a LLILW store will be established by the time ANSTO applies to ARPANSA for a licence to operate the new reactor (ANSTO expects to lodge the application in 2004 and hopes for a favourable outcome in 2005).

Further, reprocessing options are drying up for spent fuel rods. In May 2001, the European Parliament received a report from its Scientific and Technological Option Assessment (STOA) Program. The report found that gaseous discharges from the reprocessing plant at La Hague, France, are around 35,000 times higher than for a standard French reactor. Its liquid discharges are 1000 times higher. The report also says that alternative methods of managing spent nuclear fuel can be 20 times cheaper than reprocessing.

In June 2000, the Oslo Paris Commission (OSPAR) decided that nuclear waste reprocessing in Europe should be stopped. OSPAR is the organisation that regulates marine pollution in the north-east Atlantic Ocean.

If reprocessing is stopped, the Australian government will:

- have no alternative plan for managing spent nuclear fuel
- have to deal with its own radioactive waste problem at home, which they are reluctant to accept;
- leave a legacy of radioactive waste problems for future generations of Australians, whether reprocessing continues or is stopped

## **Terms of reference (d) any other relevant matter**

### **D1. REACTOR AND NON-REACTOR OPTIONS**

The plans for a national store for LLW/ILW dump and an above-ground LLILW store are being driven not by public health or environmental concerns but by the perceived 'need' to reduce opposition to a new reactor by moving some of the radioactive waste out of ANSTO's Lucas Heights facility. Yet there is no need for the new reactor.

#### Evidence:

- little or no disruption during the three-month reactor shut-down in 2000, e.g. Dr. Barry Elison, President of the Association of Physicians in Nuclear Medicine, did not know about the shut-down until informed by a journalist after the event. During the shut-down, in addition to the usual reliance on cyclotrons for about 20% of radioisotope supply, the proportion of imported radioisotopes was increased from the usual 10-20% to about 80%. Several overseas suppliers were used (some of which supply Australia even when HIFAR is operating).
- Dr. Alan Zimmet, cancer specialist: "I don't believe it will make much difference to patient treatment whether we have a new reactor or not." (The Australian, November 5, 2001.)
- Professor Barry Allen (former Chief Research Scientist at ANSTO, Fellow in the Department of Pharmacy at the University of Sydney, Head of Biomedical Physics Research at the St. George Cancer Care): "(The new) reactor will be a step into the past .... (It) will comprise mostly imported technology and it may well be the last of its kind ever built. Certainly the \$300 million reactor will have little impact on cancer prognosis, the major killer of Australians today." ('Search' science magazine, October 1997.) Numerous other comments from Professor Allen on the internet at [www.geocities.com/jimgreen3/quotes.html](http://www.geocities.com/jimgreen3/quotes.html).

*On non-reactor technologies (esp. cyclotrons) for isotope production, in particular the production of the most commonly-used isotope, technetium-99m, see Gregory Morris and Robert J. Budnitz, June 2001, "Alternatives to a 20 MW Nuclear Reactor for Australia", [www.geocities.com/jimgreen3/medicine5.html](http://www.geocities.com/jimgreen3/medicine5.html).*

There is no doubt that the real agenda behind the reactor is a foreign policy agenda:

- the Department of Foreign Affairs and Trade and the Australian Safeguards and Non-proliferation Office say that the Lucas Heights reactor "first and foremost" serves "national interest requirements" (i.e. foreign policy) (1998, Submission to Senate Economics References Committee, Inquiry into Lucas Heights Nuclear Reactor.)
- the federal Department of the Environment and Heritage says that foreign policy issues form the "cornerstone" of the alleged need for a new reactor (Environmental Assessment Report on ANSTO's reactor EIS, 1999.)

The foreign policy agenda is based on the contradictory premise that Australia can best pursue nuclear non-proliferation objectives internationally if it operates a domestic research reactor. History and common-sense suggest a need to rethink the premise, e.g. the use of small research reactors to produce plutonium for weapons in India and Israel. The foreign policy / national interest issues are addressed in Jean McSorley, 1998, "The New Reactor: National Interest and Nuclear Intrigues", Submission to Senate Economics References Committee, [www.geocities.com/jimgreen3/mcsorley.html](http://www.geocities.com/jimgreen3/mcsorley.html).

***Term of Reference: (c) extent of possible resource implications associated with the transportation and storage of nuclear waste within New South Wales***

**C1. RESOURCE IMPLICATIONS**

**Emergency Services**

The federal government has not adequately consulted with emergency services regarding the plant to transport nuclear waste across NSW. As stated in section B2 representatives of the NSW and SA Fire Brigade Unions have serious reservations about the preparedness of their members to respond in the event of an accident.

With a 23% chance of an accident of one of the 171 trucks involved in transporting the initial backlog of waste, communities have the right to question the ability of local emergency services to respond to an incident.

There remain serious concerns regarding the preparedness of emergency services, including:

- training of local emergency services on the transport route in how to respond to an accident that may involve a radiological release
- time delay in getting HAZMAT response team to isolated rural areas
- incorporation of response to an accident that involves radiological release into local emergency disaster plans

**Roads**

The federal government has selected the Great Western and Barrier Highways as the preferred route for transport of waste to the dump site, and the Sturt Highway as a second option.

The federal government's criterion for selecting the preferred transport route from Lucas Heights to Woomera is unclear.

The federal government's Supplement to the Draft EIS refers Chapter 7 p63 uses the incident record of uranium oxide travelling from Olympic Dam to Port Adelaide to illustrate safe transport of nuclear waste. However the flat straight road between Roxby and Port Adelaide cannot be compared to the Great Western Highway over the Blue Mountains.

Crash statistics available from the RTA's accident records database for the five years between 1996 and 2001 indicate that there are a total of 67 crashes within the study area of Woodford to Hazelbrook along the Great Western Highway well above the accepted standard of 32 crashes.

**NSW location for national nuclear waste**

Given the strong opposition and expected legal challenge by the South Australian government to the federal government's decision to locate the dump in their state, New South Wales may become the de-facto site for the low-level dump. The Olary site south of Broken Hill was the only other site to meet of the federal government's siting criteria for the dump.

The federal government is also looking for other potential national storage sites for Australia's medium and higher-level radioactive wastes including sites in NSW.



- Emergency planning arrangements are unresolved and are to be submitted to ARPANSA for approval.
- The EIS approval documentation lists a plethora of unresolved issues
  - repository design;
  - surface and groundwater modelling;
  - measures to assess the integrity of radioactive waste packages;
  - operational measures to safeguard the environment;
  - measures to limit radioactivity originating from the repository, including the implementation of Waste Acceptance Criteria;
  - protocols for handling and disposing of damaged radioactive waste packages;
  - monitoring of radiation levels;
  - management strategies to prevent damage to and interference with Aboriginal artefacts;
  - measures for consultation to review ongoing impacts and management measures to address those impacts; and
  - procedures for reporting incidents and accidents that affect the environment.

The government has said in relation to many of the above issues that they will be addressed by ARPANSA, or they will be addressed by the government with approval from ARPANSA. This raises two problems:

- ARPANSA's non-independence from the federal government and in particular from the federal government's nuclear agency ANSTO
- the fact that there is little legislative onus on ARPANSA to provide for meaningful public input into the resolution of the plethora of unresolved issues.

Some sobering comments and warnings from experienced nuclear engineer Alan Parkinson, who was the government's senior representative on the Maralinga project from 1993-98 and then advised the Maralinga Tjarutja from 1998-2000:

- "The clean-up was not the success the department claims. In fact the second phase of the project was an abject failure and the solution adopted for the disposal of plutonium contaminated debris would not be allowed in Britain, the source of the plutonium." (The Australian, letter, 22/5/01.)
- "From its inception, the nuclear industry has had problems with worker and public safety and with environmental degradation. Too often these problems have been caused by ineffective management, cost-cutting measures, or ineffective regulation. The Maralinga project reflects all three of these factors. The public servants responsible for the last years of the project had no background in radiation or project management, as is illustrated by several statements they made on the public record, asking, for example, what was meant by alpha radiation, or how to convert a milliSievert (a unit of radiation dose) to a picoCurie (a unit of radioactivity), or claiming that soda ash is neutralized by limestone." ("Maralinga: The Clean-Up of a Nuclear Test Site", Medicine and Global Survival, , Vol.7 No.2, Feb. 2002, pp.77-81. <www.ippnw.org/MGS>.)
- "The disposal of radioactive waste in Australia is ill-considered and irresponsible. Whether it is short-lived waste from Commonwealth facilities, long-lived plutonium waste from an atomic bomb test site on Aboriginal land, or reactor waste from Lucas Heights. The government applies double standards to suit its own agenda; there is no consistency, and little evidence of logic." ("Double standards with radioactive waste", Australasian Science, August 2002.)
- "Those with responsibility for the proposed national waste repository are the same people who have recently buried long-lived plutonium waste (half-life 24,000 years) in an unlined burial trench only 2-3 metres below ground [at Maralinga] - slightly deeper than we place human corpses. If accepted, this precedent should now allow the Commonwealth to place all radioactive waste in shallow, unlined burial trenches, with no regard for its longevity or toxicity, and no regard for the suitability of the site." (Canberra Times, letter, 24/7/00.)
- "The outcome of the Maralinga project is clear evidence that neither the Minister [former science minister Nick Minchin], his department, nor ARPANSA have any credibility in the management of radioactive waste ..." (Comments on DISR / National Store Advisory Committee, July 2001, "Safe Storage of Radioactive Waste".)

## **B6. UNRESOLVED ISSUES ASSOCIATED WITH PLANNED UNDERGROUND DUMP**

The Supplement to the EIS states that: "As the proponent, DEST is required to provide full details about the proposal ..." DEST has abjectly failed to meet that requirement.

- The Draft EIS gave nothing more than an "indicative design" and "preliminary design layout" of the planned dump, along with an "indicative borehole design". The Supplement to the EIS adds no detail whatsoever.
- The operating lifespan of the dump (i.e. how many years it will accept waste for) has been upgraded from "about 50 years" to "at least 50 years", i.e. indefinitely.
- Information on the waste inventory is scanty.
- Waste acceptance criteria have not been established.
- Information is scarce on the type of waste to be dumped at Woomera, e.g. the dump will accept "very small quantities" of LLILW with no definition of "very small quantities".
- No limit on the total radioactivity (or volume) of waste destined for the dump has been set.

The Supplement to the EIS (chapter 2, p.30) briefly acknowledges problems with overseas dumps: "Facilities established in the past were not always established under strict environmental guidelines and licensing. This has resulted in some facilities, for example three repositories in the US, being closed because of a lack of environmental control."

#### **Summary**

**The dump proposal must fail a risk-benefit analysis because there are essentially no benefits associated with the proposal. Any benefits of moving waste out of mostly urban/suburban stores around Australia must be small because of the relatively small amount of waste involved and such benefits must be weighed against the risks of transportation and the imposition of hazards on communities along the transport corridor and around the dump site.**

### **B5. SOCIAL ASPECTS OF RISK ANALYSIS**

The government's risk assessments have neglected social aspects, four of which are discussed below:

- **private-sector involvement in the dump**
- **secrecy surrounding the planned dump**
- **non-independence of the regulator ARPANSA**
- **the poor precedent established by the latest 'clean-up' of the Maralinga nuclear test site**

#### **Private-sector involvement**

John Pattison, lecturer in the School of Physics and Electronic Systems Engineering at the University of South Australia, expressed concern in his EIS submission that a private contractor would pressure the government of the day to up-grade the dump from low-level waste and short-lived intermediate-level waste to long-lived intermediate-level waste; to accept waste not just from Australia but also from overseas; and that a private contractor may not provide the necessary level of security.

#### **Secrecy**

- All 667 public submissions on the EIS have been kept secret.
- The Defence Department's risk assessment has been kept secret.
- The Final EIS was kept secret for a month (December 2002 to January 2003).
- The Australian Democrats initiated three Senate orders for all documents relating to the siting of the dump to be made public, but all three orders were refused by the government. (Senator Lyn Allison, media release, 11/4/03.)

#### **ARPANSA**

The non-independence of the regulator ARPANSA (see Section B1) can only add to the hazards associated with the dump and the transportation of radioactive waste to it. Apart from the obvious apparent bias arising from the involvement of the chief executive of ANSTO in the selection of the chief executive officer of ARPANSA, ARPANSA's track record leaves much to be desired.

ARPANSA CEO John Loy originally stated that reactor construction at Lucas Heights would not be authorised until "progress" was made towards the establishment of a LLILW store, he then approved reactor construction even though there has been no "progress" with the store.

#### **Poor precedents**

A number of the people and organisations involved in the planned dump were also involved in the latest 'clean-up' of Maralinga. These include federal minister/s, bureaucrats, adviser/s, at least one private contractor, and ARPANSA.

The Draft EIS (pp.21-22) further states that:

"The conclusion from these assessments is that the risks are very low, and within the risk target value, for all of the scenarios other than major climate changes and gross erosional events."

The only aspect of the dump proposal subjected to independent scrutiny during the EIS process was the plan to locate the dump adjacent to a missile/rocket testing range. Independent studies advised against the proposed location (see the Department of the Environment's report on the Final EIS). The entire assessment of the dump proposal (and associated issues such as transportation) ought to be subjected to independent assessment.

Since the government's "preferred" dump site next to the missile testing range was rejected by environment minister David Kemp, science minister Peter McGauran has been asserting that the two non-preferred sites east of Woomera are of "equal suitability" to the rejected site (media release, 15/4/03). Yet the Supplement to the EIS states that those two sites are inferior in terms of "access, security, biology and hydrology".

The Draft EIS identifies "operational hazards" associated with the dump but dismisses them with the assertion that: "Appropriate procedures would be developed to address these issues."

Government figures purporting to demonstrate a small and acceptable risk mask various assumptions:

- thorough risk analyses need to take account of social factors such as the demonstrated poor record of relevant government agencies with radioactive waste management (see section B5 below)
- the government's risk assessments are based on "generic assumptions at the present time and assumptions about future arisings" (Draft EIS), i.e. they are subject to a considerable degree of uncertainty.
- there remains a myriad of other details that have yet to be finalised (see section B6 below)
- the government's risk assessments ignore the risk that the underground dump will pave the way for higher-level waste, in particular the possibility that the government (or a future government) will revert to the original plan to 'co-locate' the above-ground LLILW store adjacent to the dump.
- scientific uncertainties regarding radiation/health debates, e.g. the European Committee on Radiation Risk made a recommendation earlier this year for a 10-fold reduction in the total maximum permissible dose to members of the public arising from anthropogenic sources (from 1.0 milliSieverts to 0.1mSv annually).
- various other scientific uncertainties, e.g. studies from Los Alamos and Nevada have revealed much faster radionuclide migration (specifically, plutonium isotopes) than previously believed.

### **Security**

The EIS invokes the threat of nuclear terrorism - and specifically mentions the September 11, 2001 terrorist attacks in the United States - to justify a centralised dump. However, no attempt has been made to weigh the relative risks of centralised management compared to storage at the site of production.

### **International Precedents**

The Draft EIS says: "Near-surface disposal has been practised since the 1940s and there are more than 100 near-surface repositories for low level and short-lived intermediate level radioactive waste either operating or being established in over 30 countries around the world." But the Draft EIS says nothing about the manifold problems associated with overseas dumps (see K. Saunders, ACF, May 2002, "Nuclear Waste Dumps: A Review of the United States Experience", <[www.acfonline.org.au/docs/publications/rpt0021.pdf](http://www.acfonline.org.au/docs/publications/rpt0021.pdf)>).

## **B4. RISKS ASSOCIATED WITH SHALLOW BURIAL OF NUCLEAR WASTE**

### **Categories of Waste**

The Federal Science Minister states that it proposes a 'low-level' waste dump but since the late 1990's the government's own literature reveals that the dump is for low and short-lived intermediate-level waste. Furthermore, the government also proposed to use the dump for long-lived intermediate-level waste (LLILW).

The Draft EIS said "Long-lived intermediate level waste would not be disposed of in the national repository" (page 4, Radiation Doses and Effects, Intermediate Level Waste). That commitment had been abandoned by the time the Supplement to the EIS was released. The Supplement says (chapter 5, pp.45-46)

"The total activity limits for radionuclides will be established for the repository from the safety assessment. This will include very small quantities of long-lived intermediate level waste to be disposed of in the facility. Such materials will have to meet the acceptance criteria such as the conditioning of the waste and their activity concentration limits derived from a detailed safety assessment of the final repository."

No definition is given for the term "very small quantities" of LLILW. It is no consolation that those acceptance criteria will be met since no such criteria have been established as yet.

**The dump is not just for short-lived radionuclides. It will take radionuclides such as radium-226, thorium-232, uranium-238 and americium-241 with half-lives ranging from hundreds to billions of years in addition to short-lived radionuclides ('key' radionuclides are listed in the Supplement to the EIS, Appendix C, page 5, but the table fails to provide the half lives of the radionuclides).**

Long-lived radionuclides ought not be sent to a dump, which will be monitored only for an "institutional period" of approximately 200 years. Relatively short-lived radionuclides such as cobalt-60 (half life 5.2 years, which accounts for almost 10% of the radioactivity of all the existing waste destined for the dump) need not go to the dump as they will decay to near-background levels in a relatively short space of time.

### **Dump Integrity and Longevity**

The risks associated with the dump (and these apply also to transportation risks) are proportional to the operating lifespan of the dump and amount of waste involved. Uncertainties remain on both counts:

- then science minister Nick Minchin said in a 24/1/01 media release that the dump would have "a 50 year working life", but the Supplement to the EIS says the dump would accept waste for "at least 50 years" with no justification for this open-ended upgrade.
- the government has said that a limit on the total radioactivity allowed in the dump will be set, but no such limit has been specified as yet (it will be left to ARPANSA to establish the limit).

The longevity of some of the radionuclides is of particular concern since the Draft EIS (pp.21-22) acknowledges that after the "institutional period" of 200 years,

"... when the repository site is no longer under institutional control and the waste form and waste packages have degraded, radioactivity could be released to the environment through a number of pathways."

2. storage at the site of production is by far the best (and perhaps the only) way to get radioactive waste producers to get serious about minimising waste production. Conversely, the provision of an out-of-sight-out-of-mind disposal option, as with the federal government's planned dump, is likely to lead to more profligate waste production.
3. the dump would only take waste every 2-5 years so waste producers would need proper on-site facilities even if the dump went ahead. Once they all have adequate facilities, the rationale for a dump is negated.

The government's answer to point three is to talk about the waste backlog "problem". According to the government (Final EIS, Appendix C), just 20 m<sup>3</sup> of low- and short-lived intermediate-level waste destined for the dump have been generated in South Australia. Elsewhere the government says this material is stored at 130 sites. So on average, institutions have a backlog of just one-sixth to one-seventh of a cubic metre - about a suitcase full - no real problem at all.

In some cases - e.g. disused buildings for which alternative uses are proposed - storage at the site of production is inappropriate. Alternatives can be found to deal with the tiny amount of waste that falls into that category.

The government claims that many existing waste stores would no longer exist once existing inventories are shifted to Woomera (as waste is no longer being produced at those sites). No data whatsoever has been provided to justify that claim. Certainly an overwhelming majority of waste is being stored by institutions that will continue to produce waste (ANSTO alone is responsible for 78% of the existing waste volume to be trucked to Woomera).

The government argues that it is problematic to have many different institutions managing radioactive waste, and so it is, but many different institutions will be managing waste whether or not the dump goes ahead because they continue to produce it. If they can't manage the waste they shouldn't be dealing with radioactive materials in the first place - especially since radioactive decay ensures that the waste is less hazardous than the radioactive materials which give rise to it.

Storage (as opposed to shallow trench dumping) facilitates monitoring and, where necessary, remediation of problems. Radioactive waste ought to be retrievable for remediation of problems and, potentially, for some waste categories, the application of new technologies to reduce public health, environmental and/or proliferation hazards (e.g. potential application of transmutation so some waste categories at some stage in the future).

The federal government says that disposal is preferable to storage, but the waste must be monitored for centuries to come regardless of the outcome of the current controversy regarding the dump. The distinction made by the government is a false one and reinforces the view that the government is adopting an out-of-sight-out-of-mind pseudo-solution.

The recent 'clean-up' of Maralinga is a good an example as any of the problem with shallow burial. The federal Labor Opposition (and the Democrats and Greens in the federal Senate) passed a resolution on August 21, 2002 which "urges the Government to exhume the [plutonium-contaminated] debris at Maralinga, sort it and use a safer, more long-lasting method of storing this material." That proposed exhumation has been made all the more difficult by the placement of the debris under five metres of soil (albeit the case that the soil cover has the obvious advantage of making the debris more difficult to access by would-be terrorists, souvenir-hunters etc.)