



Australian Radiation Protection and Nuclear Safety Agency

**ANSTO's Application
for a Facility Licence to Construct the
Replacement Research Reactor**

Public Consultation Report

RB-ASR-19-02

April 2002

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2 Introduction

Background

- 2.1 In September 1997, the Commonwealth Government decided to fund a proposal by Australian Nuclear Science and Technology Organisation (ANSTO) to replace the HIFAR (High Flux Australian Reactor) research reactor. The funding was subject to, among other things, approval of the site, the design, each major component of the plant, and an approval to operate by the Chief Executive Officer of Australian Radiation Protection and Nuclear Safety Agency (the CEO).
- 2.2 On 7 April 1999, the CEO received an application from ANSTO for a facility licence to prepare a site for the proposed Replacement Research Reactor (RRR). On 22 September 1999 the CEO issued a licence authorising ANSTO to prepare a site for the RRR. On 18 May 2001 ANSTO applied for a licence to build the RRR at the Lucas Heights Science and Technology Centre (LHSTC).
- 2.3 Under the *Australian Radiation Protection and Nuclear Safety Regulations* 1999, the CEO must advertise receipt of all applications for facility licences. Where the application relates to a nuclear installation, the CEO must invite public submissions on the application and take into account all submissions received on the application when making a decision on whether to issue the facility licence. Two rounds of public consultation submissions were invited on ANSTO's application and an ARPANSA Issues Paper respectively.

Aim of this Report

- 2.4 The aim of this report is to present to the CEO of ARPANSA the comments of ARPANSA staff on issues raised in the public submissions in order to assist the CEO to reach a decision on the application by ANSTO for a licence to construct the proposed RRR.

Submission Process - First Round

- 2.5 On 5 June 2001, the CEO invited public submissions on ANSTO's application. Advertisements were placed in *The Australian* and in the *Government Gazette*. Media releases were sent to all major newspapers and peak environmental groups and interested organisations. Full copies of ANSTO's application and all supporting documentation were made available for public reading. The documents included,
 - ANSTO's Application for a Facility Licence.
 - The Preliminary Safety Assessment Report (PSAR), including an appendix on the Probabilistic Safety Assessment (PSA).
 - An Acronyms and Glossary booklet.
- 2.6 The full documentation was made available at the following locations:
 - The National Library in Canberra and each of the State and Territory libraries.
 - The Sutherland Shire Council Library and its Engadine and Menai branch libraries in New South Wales (NSW).
 - The Liverpool City Central Library in NSW.
 - The ARPANSA Public Resource Room in Suite 9, 19-21 Central Road, Miranda, NSW.
 - The ARPANSA office in Lower Plenty Road, Yallambie, Victoria.
- 2.7 Summary copies of ANSTO's application and supporting documentation were placed on the ARPANSA website. In addition, free paper and CD-ROM copies of the summary documentation were available on request. More information was placed in the ARPANSA web site and sent by hard copy when available. These included,
 - Final Report of the International Atomic Energy Agency's (IAEA) Peer Review of the Preliminary Safety Analysis Report (PSAR) of the RRR (20 July 2001).
 - Questions asked by ARPANSA following the initial review of the application and the answers provided by ANSTO.

- 2.8 The first round public consultation process was from 5 June 2001 to 5 September 2001 but late submissions were accepted for about a month beyond that date.

Summary of Submissions – First Round

- 2.9 A total of 10,619 submissions were received by post, fax and e-mail. Of these 10,259 were form letters that ARPANSA labelled as “Form Letter A”(see **Attachment 1**). Every submission was logged into ARPANSA’s internal mail system to ensure a database of all respondents.
- 2.10 All submissions were analysed to identify the issues that they raised. A total of 176 issues were identified in the first round public submissions. The majority of the issues in the first round public submissions related to the following.
- Net Benefit: Some respondents felt that there is no need for the RRR as scientific research can be done overseas and radioisotopes can be imported or produced by other means.
 - Spent Fuel and Radioactive Waste: The capacity of French and Argentinian entities to reprocess spent fuel was questioned. The need for certainty in radioactive waste storage plans was stressed.
 - Site Characteristics: Issues included the effectiveness of the 1.6km buffer zone around the LHSTC and public exposure to discharge gases.
 - The Reactor: Respondents were concerned about power distribution in the core, reactor controls and shutdown systems and thermal and hydraulic design in relation to possible control plate withdrawal accidents.
 - Engineered Safety Features: Concerns included the effectiveness of the second shutdown system and the adequacy of the reactor containment systems.
 - Auxiliary Systems: Issues included design of the fuel storage and handling and fire protection systems. The heating, ventilation and air-conditioning systems were addressed in relation to Argon-41 emissions.
 - Operational Radiological Safety: Concerns included dose estimates for normal operations and reports of higher cancer rates among people living near nuclear reactors.
 - Conduct of Operations: Respondents were concerned about staff qualifications and training.
 - Environmental Assessment: Respondents claimed that ANSTO had not complied with all the conditions imposed when the Environmental Impact Statement (EIS) on the RRR was approved.
 - Safety Analysis: Issues included seismic activity levels, human error, loss of flow events and sabotage.
 - Probabilistic Safety Assessment: The adequacy of the PSA was questioned in relation to risks, that included those from internal fires, aircraft crash, vehicle bombs, earthquakes and human error.

Submission Process – Second Round

- 2.11 On 11 October 2001, the CEO invited public submissions on an ARPANSA Issues Paper that set out questions on major matters on the safety of the proposed RRR on which further public input was sought. The Issues Paper addressed the following:
- Accident analysis.
 - Seismic analysis and seismic design.
 - Spent fuel and radioactive wastes.
- 2.12 The availability of the Issues Paper and the invitation to comment were advertised in *The Australian* and the *Government Gazette*. Media releases were sent to all major newspapers and peak organisations. The Issues Paper was placed on the ARPANSA website. Hardcopies were made available on request from ARPANSA. The closing date for the second round public submissions was 21 December 2001 but submissions were accepted till 11 January 2002.

Summary of Submissions – Second Round

- 2.13 A total of 60 submissions were received by 11 January 2002. Of these 23 were form letters labelled Form Letter “B” or “C” (See **Attachments 2 and 3**). Another 202 submissions, all of them form letters, were received on 18 January 2002. These submissions raised no new issue apart from those that were already raised in the 60

submissions that were received within the consultation period. The 202 late submissions were noted but not registered as second round submissions.

- 2.14 The 60 submissions received by 11 January 2002 were analysed and 106 issues pertaining to the 10 questions in the Issues Paper were recorded. Below is a summary of the questions, the number of issues recorded under each question and the main points that were raised.

Accident Analysis

- The adequacy of the PSAR, in particular whether a loss of coolant accident had been designed out. **(23 issues)**
 - Reference Accident is irrelevant and inadequate in the light of security issues.
 - Consider loss of coolant accident in relation to reactor safety and design considerations.
 - Analyse full range of accidents that can have off-site consequences and estimate dispersion of radioactivity outside the reactor in the event of a full core meltdown.
 - Need to present a full fire analysis and re-examine adequacy of second shut down system.
 - Publicly review compliance with conditions imposed in the EIS.
 - Need for ANSTO to demonstrate capacity to respond to emergencies.
- Whether the Probabilistic Safety Assessment (PSA) sufficiently demonstrated a balanced design. **(9 issues)**
 - The risk analyses does not take account of the wide variation in possible disasters.
 - ANSTO is overly optimistic that there could be no accident that could produce large-scale off-site consequences.
 - Include fire, large aircraft crash, and human error in the PSA.
 - Re-evaluate the accuracy of the core damage frequency and investigate the possibility of a full core meltdown as one of the accident scenarios in the PSA.
 - Need for independent evaluation to test reliability levels in PSA.
- Critical points during construction when design details and assumptions in the accident analysis must be verified. **(6 issues)**
 - Detailed design information is required before construction approval is granted.
 - The Final Safety Analysis Report (FSAR) should be produced before construction of the reactor.
- Information and assurances needed to satisfy public concerns on terrorism and sabotage threats while keeping security arrangements confidential. **(24 issues)**
 - Consider the consequences of a deliberate suicide attack with a large passenger jet and not just the likelihood and consequences of an accidental crash of an aircraft the size of a Cessna.
 - The ability of Greenpeace to breach the security of the Lucas Heights site raises serious questions on the security of the site.
 - Re-evaluate the siting licence decision in the light of the September 11 incidents. The siting of the reactor should be used as a defence in depth with respect to sabotage.
 - An independent body or independent persons to undertake the security review.
 - Need for public forums across the Sydney with opportunities for the public to question ARPANSA about protective security against terrorism and sabotage.
- The need for more analysis of the joint operation of HIFAR and the replacement reactor, should the full commissioning of the latter be delayed. **(3 issues)**
 - State how long ARPANSA is prepared to extend HIFAR licence without an upgrade should the commissioning of the proposed RRR be delayed.
 - There should be no further analysis of the joint operation of HIFAR and the proposed replacement reactor. The 1993 McKinnon Report stated that HIFAR should not be continued beyond 2003.

Seismic Analysis

- Whether ANSTO’s analysis has taken account of various Lucas heights seismic siting studies and seismic hazard estimates and whether the studies and estimates are conservative and consistent with world’s best practice. **(10 issues)**
 - What was the original safety factor built into the HIFAR? What standards were used in granting the HIFAR licence?
 - The design should be based on the largest values of seismic parameters.
 - Key issues include pool integrity and beam tube integrity and it is unclear if the safety margin for pool integrity with respect to earthquakes is sufficiently conservative.
 - The revised Institute of Geological Nuclear Sciences (IGNS) report should be used. It is of concern that ANSTO is changing the damping factors cited in that study.

Spent Fuel and Waste Management

- Whether ANSTO has demonstrated that molybdenum fuel will soon be available or that silicide spent fuel will be able to be managed. **(4 issues)**
 - No evidence to conclude that the first silicide fuel will be processed given that fuel from HIFAR has yet to be dealt with.
 - Need for a clearer demonstration of the route for the management of any type of spent fuel.
- Whether there should be an option for the handling of spent fuel entirely within Australia. **(8 issues)**
 - Under no condition should a high or medium level waste dump be built in Australia, as it will pose an unacceptable health and security risk.
 - Re-processing in Australia is illegal. ARPANSA Act prohibits it.
 - Impose a condition that ANSTO does not carry out spent fuel conditioning anywhere in Australia.
 - There is a moral obligation on Australia to handle our wastes at home.
- The degree of progress with the national waste repository and national waste store before construction and operating licences may be granted. **(13 issues)**
 - The location of the proposed store/repository must be finalised and the EIS must be completed.
 - The site must first be constructed.
 - Both High Level Waste (HLW) and Long-Lived Intermediate Level Waste (LLILW) require deep geological repository for ultimate disposal but there is no plan for such a facility in Australia and there is no such facility anywhere in the world.
 - All radioactive waste must be stored on-site in above ground dry storage facilities.
- Adequacy of strategies to monitor and control radioactive discharges to ensure that radiation doses to the public would be as low as reasonably achievable, social and economic factors taken into account. **(6 issues)**
 - Evaluate a full core meltdown and major containment failure as the basis for emergency planning.
 - The criteria should be “as low as technically achievable” and not “as low as reasonably achievable” (ALARA).
 - Unless there is no emission or discharge the reactor should not go ahead.

ARPANSA Public Forum

2.15 ARPANSA organised a Public Forum on 14 and 17 December 2001. The Forum was to enable organisations and individuals that made substantial first round written submissions to make oral submissions. In addition Commonwealth agencies involved in the safe storage of nuclear waste and the protection of nuclear fuel and the applicant, ANSTO, were also invited to make submissions. The participants were:

- ANSTO;
- Australian Safeguards and Non-Proliferation Office;
- Department of Industry, Tourism and Resources;
- Australian Conservation Foundation;

- Australian Nuclear Association;
 - Friends of the Earth;
 - Greenpeace Australia Pacific;
 - Sutherland Shire Council;
 - Sutherland Shire Environment Centre;
 - Sydney People Against a New Nuclear Reactor;
 - Mr Tony Wood.
- 2.16 The Forum was chaired by the CEO of ARPANSA, who was assisted by a three-person panel of experts, namely,
- Dr Robert Budnitz, a US physicist prominent in the field of nuclear regulatory assessment, including probabilistic risk assessment.
 - Mr Gary Schwarz, Director of the Personnel Qualification Assessment Division of the Canadian Nuclear Safety Commission, who is experienced in the safety review, licensing and inspection of power reactors.
 - Dr Bill Williams, Deputy International Councillor of the Medical Association for Prevention of War, Australia.
- 2.17 The panel questioned every participant in detail before an audience of about 100 members of the public. Each of the three members of the panel provided reports to the CEO on key issues for the CEO to consider. These reports have been made public through the ARPANSA website and are not considered further in this document.

Structure of this Public Consultation Report

- 2.18 **Chapters 3 to 7** list issues raised in the first round public submissions under each topic or chapter of ANSTO's Application, the PSAR, PSA and supporting documentation. **Chapter 8** lists issues raised in the first round public submissions that did not fall under one of the headings in ANSTO's Application, the PSAR or the PSA. **Chapter 9** contains the issues identified from the second round of public submissions.
- 2.19 Each issue is followed by comments by ARPANSA staff. The comments are meant to assist the CEO to reach his decision on ANSTO's application. Where the issue is technical the comment is a cross reference to the appropriate section of ARPANSA's Regulatory Assessment Report (RAR).
- 2.20 **Chapter 10** provides an explanation of acronyms used in this report.
- 2.21 **Chapters 11 to 13** provide a copy of Form Letters "A", "B" and "C" respectively.

3 ANSTO's Application

Section 1 – Purpose of the Reactor Facility

Issue I-1 *Alternative sources (solar, wind) of energy has to be found.*

Comment This comment relates to electricity generation from nuclear power reactors. ANSTO's application is for a licence to construct a research reactor and not a power reactor.

Issue I-2 *The national interest claim will put Australia in the nuclear race. It is not true that the reactor is required for research. Much of this research can be done overseas. Australia should follow New Zealand and Ireland's examples.*

Issue I-3 *More than 20% of Australia's isotopes are produced in cyclotrons powered by electricity – it is cheaper, safer, and cleaner. 95% of Australia's medical isotope needs can be met using non-reactor technologies, such as accelerators, cyclotrons and synchrotrons, and through importation. Development of new accelerator-based technologies for isotope production could result in Australia exporting such technology and generating revenue.*

Issue I-4 *ANSTO's claim that jobs will be lost if the RRR is not built is wrong. Investing in alternative technologies will provide just as many jobs.*

Issue I-5 *Not building a new reactor would save Australia hundreds of millions of dollars. This money could be spent on safeguards and non-proliferation through diplomacy and international law and boost Australia's status as a leader in disarmament.*

Issue I-6 *Nuclear medicine has a very good chance of creating serious health problems for a whole host of other people while supposedly providing some "cures" for a very few. In all probability, when viewed from the standpoint of systems thinking, nuclear medicine could very well be part of a dysfunctional and vicious circle. I do not consider that the need for this reactor has been proven.*

Comment See comment at the end of this section.

Issue I-7 *The Australian Nuclear Association (ANA) has consistently supported the need for the design, construction and operation of a Replacement Research Reactor (RRR) for the current HIFAR research reactor at Lucas heights.*

Comment Noted.

Issue I-8 *We regularly import Tc-99m from overseas, which happens to be cheaper and of a better quality than that which ANSTO produces. The US has found that the Tc-99m can be produced from a cyclotron. This isotope being the most important isotope used in 75% of medical procedures. The 1% of isotopes that cannot be produced unless we have a reactor we can easily use alternatives. Consider importing Mo-99 (Tc-99m) from South Africa – four flights a week – good quality, cheap and extremely reliable.*

Issue I-9 *A consultancy firm commissioned by the Sutherland Shire Council could find "no real reason" for Australia to build a reactor. The Senate drew the same conclusions. Australia is not going to benefit from a \$500 million reactor. The money could be spent on health and education.*

Issue I-10 *HIFAR should be closed down and not be replaced. Australia can meet all its medical isotope needs by, relying on domestic cyclotron production of radioisotopes, relying on imported isotopes, relying on alternative radioisotopes and medical procedures, which do not involve radioisotopes (such as alternative diagnostic imaging modalities such as computerised tomography and magnetic resonance imaging) and developing and implementing production using accelerators (several exist in Australia) or spallation sources.*

Issue I-11 *A cost-benefit analysis must be done. The CBA should compare costs and benefits of a nuclear reactor against non-reactor technologies to meet Australia's medical needs.*

Issue I-12 *ANSTO must formally address the question of future demand to support their proposal. This analysis must concentrate on the ability of Australian science and medicine to use the RRR rather than the ability of the RRR to perform. While some of the cost/benefits may be intangible, they must be quantified to answer the basic question of whether the returns exceed the cost*

Comment The comments to issues I-2 to I-6 and issues I-8 and I-12 are as follows:

- (a) The need for the research reactor, including the cost of the reactor, national interest issues and alternative technologies are issues, on which the Government had decided before agreeing to fund the proposed replacement research reactor to meet Australia's future needs in relation to health and nuclear medicine, nuclear research

for science and industry, education, industrial applications of nuclear technology, and the national interest. These arguments were covered in the EIS process.

- (b) The Environment Assessment Report (EAR) concluded that based on the information available, and taking into account the conclusions of the *Reactor Review Report* 1993, the national interest objective is a prime consideration in the need and justification for the proposal and one best defined by Government. The EAR concluded that the proposed RRR meets this objective, and that the ability of alternatives to satisfy this objective is unclear¹. The viability of alternative technologies was also considered in the EAR, which stated that ANSTO had demonstrated (in both the Draft EIS and the Supplementary EIS) that even a combination of alternatives would not provide a certain or cost-effective substitute.²
- (c) The Australian Safeguards and Non-Proliferation Office (ASNO), stated in its submission to the EAR, that that a replacement reactor would assist Australia to effectively and independently support safeguards and non-proliferation policies.³
- (d) Costs and benefits of the proposed reactor were examined in the Draft Environmental Impact Statement (DEIS) in terms of the capital and ongoing costs and wider benefits and costs to the community and the economy. The qualitative assessment of benefits in the DEIS took an 'opportunity cost' approach, that is, it assessed the economic benefits that would be lost in the absence of ANSTO's contributions to the health, mining and other sectors.⁴

¹ *Environment Assessment Report, Proposed Replacement Nuclear Research Reactor at Lucas Heights*, Environment Australia, March 1999, p. 43

² *Environment Assessment Report, Proposed Replacement Nuclear Research Reactor at Lucas Heights*, Environment Australia, March 1999, p. 43

³ *Environment Assessment Report, Proposed Replacement Nuclear Research Reactor at Lucas Heights*, Environment Australia, March 1999, p. 31

⁴ *Environment Assessment Report, Proposed Replacement Nuclear Research Reactor at Lucas Heights*, Environment Australia, March 1999, p. 32

Section 2 – Description of the Facility and its Site

No submission was received on this section of ANSTO's Application.

Section 3 – Management of the Facility

Issue I-13 *Simply stating that the contractor will act as agent for ANSTO does not clarify whether ANSTO has ensured adequate checks and balances during construction.*

Comment See RAR section 2.4(a).

Issue I-14 *The specified certification standard, which is ISO 9001:1994, may be 12 years out of date by the time the reactor's final safety report is presented.*

Comment See sub-section on 'Quality System' in RAR section 2.4.

Section 4 – Specific ARPANSA Requirements for Construction of a Controlled Facility

Issue I-15 *The design is neither a copy nor an upgrade of an existing reactor designed and built by INVAP. It is a new design and is different from the previous reactor of a similar power level built by INVAP in Egypt. ARPANSA must be satisfied that INVAP has produced a safe and sound design, is capable of producing detailed engineering drawings, can construct the equipment to the required standards and can exercise, with ANSTO, a high level of management and quality assurance.*

Comment See RAR sections 2.4(a), 2.5 and 2.6.

Issue I-16 *The PSAR does not show the final design. ARPANSA needs to review the completed document before it can consider issuing a licence.*

Comment See RAR section 1.

Issue I-17 *Insufficient to say the initial fuel will be Uranium Silicide which is “well established, being in use in many reactors around the world”. Need to establish the fuel is fully qualified before commissioning occurs. This is especially so for the proposed replacement fuel of Uranium Molybdenum, which has not been qualified anywhere in the world.*

Comment See RAR section 3.4.10. See also section 2.7 of the RAR.

Issue I-18 *Why are the preferred fuel rods not utilised in the initial commissioning of the reactor if development and certification are expected by 2005? Does the proposed reactor design require any modifications for change in fuel ? at what costs? – both in \$ and down time ?*

Comment ANSTO's strategy for fuel is outlined in Appendix 3 of its Application. Issues concerning Uranium Molybdenum fuel is discussed in RAR section 2.7.

Issue I-19 *Is the expected storage space for spent fuel rods adequate to accommodate original fuel rods if the proposed revised fuel with reduced waste impact is not realised ?*

Comment See RAR section 2.4(g) under 'Condition 17'.

Issue I-20 *Will ANSTO's proposal that the intermediate level waste be stored in the national waste store be accepted? Is a guarantee obtainable that the existing arrangements will definitely be extended to the RRR?*

Comment See RAR section 2.7.

Issue I-21 *There is a need to consider the benefits of including an independent expert opinion for acceptance testing validation by ANSTO staff and INVAP?*

Comment Noted.

Sections 5 to 7 – Compliance, References and Definitions

No submission was received on these sections of ANSTO's Application.

Attachment 1 – Project Schedule

Issue I-22 *In the light of deficiencies in safety and waste management issues identified elsewhere in submission 1517, it is requested that stepwise, conditional approval be available to any proposed reactor design and waste management steps such that the project does not proceed to the next stage unless fully adequate demonstration of compliance and completion of earlier stages occurs.*

Comment ARPANSA's regulatory approach is one of stepwise conditional approval. (see RAR section 1.

Attachment 2 – Outline of Test and Inspection Process

No submission was received on this section of ANSTO's Application.

Appendix 1 – Report on Response and Actions to Address Conditions of Facility Licence

No submission was received on this section of ANSTO's Application.

Appendix 2 – Compliance of the Design with the Reference Design and Reference Accident Assumptions

No submission was received on this section of ANSTO's Application.

Appendix 3 – Spent Fuel Management Strategy

Issue I-23 COGEMA does not have authorisations or qualified process to reprocess spent Uranium Molybdenum fuel. COGEMA contract does not cover the first fuel load from the RRR. No contractual commitment from COGEMA to reprocess Uranium Silicide fuel. COGEMA only provided an “in-principle” indication.

Comment See RAR Section 2.7.

Issue I-24 INVAP cannot provide conditioning services for spent fuel. Argentina has neither licences nor facilities to condition waste. Importation of spent fuel is unconstitutional in Argentina.

Comment See RAR Section 2.7.

Issue I-25 The Oslo Paris Commission (OSPAR) has called for an end to reprocessing. European reprocessing industry is under pressure to close down. Cannot expect reprocessing licenses to be granted in Europe. Reprocessing does not meet pollution regulations.

Comment According to ANSTO's submission at the ARPANSA Public Forum last year, France has said that by 2020 it will meet certain emission levels under the OSPAR Convention but the Convention will not affect its reprocessing facilities.⁵

Issue I-26 Conditioning spent fuel in Australia is one of ANSTO's options but no details are available.

Comment ANSTO has not considered this as an option. See RAR Section 2.7.

Issue I-27 INVAP and ANSTO must clarify the 3rd country (apparently Russia) that might process spent fuel and whether this would involve return of reprocessed waste to Australia.

Comment See RAR Section 2.7.

Issue I-28 ARPANSA, ANSTO and INVAP must publicly substantiate their claim that “spent nuclear fuel is not radioactive waste”

Comment Radioactive waste is defined in the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management as radioactive material that has “no further use”. Spent fuel is defined in the Joint Convention as “nuclear fuel that has been irradiated in and permanently removed from a reactor core”.

Issue I-29 Construction should not be authorised until arrangements to manage spent fuel rods are demonstrated to the satisfaction of the Minister for the Environment and Heritage.

Comment See RAR section 2.4(g).

Issue I-30 The site for an intermediate radioactive waste store will be decided in late 2002. It cannot be established without proper EIS and licences, potentially in 2003. Three states (WA, NSW and SA) have legislation that impedes the storage and disposal of nuclear waste in their territory. 93% of SA residents do not want a nuclear dumpsite and majority of Australians do not want a reactor built until the waste issue is resolved. Issuing a construction licence would pre-empt a satisfactory outcome of these outstanding issues.

Comment See RAR Section 2.7.

Issue I-31 Transportation of spent fuel poses unacceptable risks. Mainly due to the possibility of accidents on land and at sea during transit. Handling of spent fuel rods places maritime workers at risk, especially in salvage situations. There is no real contingency plan to deal with a radioactive spill.

Comment The transport of radioactive material is regulated by an ARPANSA Code of Practice on the *Safe Transport of Radioactive Material* 2001, which is based on the International Atomic Energy Agency's *Regulations for the Safe Transport of Radioactive Material* 1996 Edition (Revised).

Issue I-32 In the Site Licence documentation, ARPANSA stated that “clear and definite means must be available for the ultimate disposal of spent fuel and radioactive waste” before the new reactor could be licensed. ARPANSA must now state how the PSAR and ANSTO's application demonstrate this requirement. ARPANSA must provide a clear definition of “disposal” and “ultimate disposal”.

Comment See RAR section 2.7.

⁵ ARPANSA Public Forum , 17 December 2001, Transcript, p.154.

Issue I-33 *Based on the time frame in other countries in establishing disposal, the costs of such projects, public acceptance issues, the small inventory of Australian intermediate level waste, and the fact that storage of waste is safe and practical, it appears prudent for Australia to store its intermediate level waste and await further progress and developments overseas before embarking on the process of planning and siting a geological repository.*

Comment Noted.

Issue I-34 *The Australian government has made sufficient progress in establishing a repository for low level radioactive waste arising from the RRR after 2005, and in starting the search for a site for an intermediate level radioactive store for wastes arising after 2010 from decommissioning of parts of HIFAR and from the return of waste from the processing of RRR spent fuel overseas after 2015. This issue should not affect the granting of a construction licence if all other factors are acceptable.*

Comment Noted.

Issue I-35 *There are uncertainties regarding the management of spent fuel, notably the problems regarding silicide fuel reprocessing and the absence of Molybdenum-based alternative fuel. Choice of fuel matrix and cladding are important in the context of the availability and cost of reprocessing, feasibility of long term storage and the interim fate of spent fuel following years in the reactor.*

Comment See RAR section 2.7.

Issue I-36 *Proposal to ship fuels (if destination is available) every five years and possibly up to 10 years after retrieval from the reactor, subverts government assurances that storage on site will be for operational purposes only.*

Comment In its application ANSTO stated that existing storage facilities for HIFAR spent fuel will not be used for RRR spent fuel and no other away-from-reactor storage will be required for the spent fuel. The duration of storage of spent fuel prior to shipment overseas is determined by the time required to accumulate a practicable size shipment, the minimum cooling time required for the youngest elements in a shipment, to satisfy the shipping cask regulatory criteria and the benefit for radiological safety of minimising the number of such shipments. On the basis of around 20 to 30 spent fuel elements arising per year, ANSTO anticipates that there will be one overseas shipment of spent fuel every 5 or 6 years and the first such shipment would be about 8 years after the commencement of RRR operation based on a minimum cooling period of 3 years.⁶

Issue I-37 *No contingency arrangement for removal of spent fuel from the site in the event that overseas reprocessing or processing is not available.*

Comment See RAR section 2.7.

Issue I-38 *Discharge of LHSTC radioactive residues into the sewers will result directly in discharge to local waterways in times of sewer surcharge (rain) and also compromises the recycling of sewer water for industrial and open space watering purposes.*

Comment ANSTO has a Trade Waste Agreement with Sydney Water under which it is required to limit radioactive pollutants in the effluent it discharges into Sydney Water's sewer system. This agreement requires compliance at the Cronulla Sewage Treatment Plant with World Health Organisation drinking water standards for radioactivity.

⁶ ANSTO Application to ARPANSA for a Facility Licence Construction Authorisation for the Replacement Research Reactor Facility, 18 May 2001, Appendix 3, p.3/8

4 Preliminary Safety Analysis Report

Chapter 1 – Introduction and General Description

Issue I-39 *It is impossible for a technology with such destructive capability to be as safe as you claim. You can only offer a “best guess” based on a balance of probabilities on as good a technological mix as can be afforded.*

Comment See RAR section 2.4 and section 3.

Issue I-40 *PSAR Summary Vol 1, p.1.2 – More emphasis should be placed on health needs of population than needs of medical profession.*

Comment Noted.

Issue I-41 *PSAR Summary Vol 1, p. 1.2 – Does “no habitation” refer to human habitation?*

Comment Yes.

Issue I-42 *PSAR Summary Vol 1, p. 1.3 – Is the expression “radiological view point” the most accurate description. What risks are being expressed here – health or environmental ?*

Comment Both radiological health and environment protection.

Issue I-43 *PSAR Summary Vol 1, p. 1.10 – What is the contextual relevance of the statement regarding total number of operating years to the proposed replacement reactor?*

Comment The number of research reactor operating years is a measure of the maturity of the technology.

Chapter 2 – Safety Objectives

Issue I-44 PSAR Summary Vol 1, p. 2.7 – There is a need to include the bush fire hazard.

Issue I-45 PSAR Summary Vol 1, p. 2.8 - This section should also include external fire protection.

Comment See RAR section 3.2.6.1.4.

Chapter 3 – Site Characteristics

Issue I-46 *Misleading to refer to 1.6 km exclusion zone around the reactor. No such zone exists as the military is within the zone and it is an area over which ANSTO has no control.*

Issue I-47 *PSAR Summary Vol 1, p.3.2 – Can you cite references to validate the adequacy of the buffer zone?*

Comment In the PSAR, ANSTO said it “maintains” the 1.6km buffer zone. This is confirmed by a statement in the EAR that the buffer zone “*is Commonwealth land administered by ANSTO*”⁷. The IAEA Peer Review team said “*the site for the proposed reactor has no negative characteristics which would make it unacceptable from a nuclear or radiological safety point of view*” and “*the 1.6km exclusion zone around the reactor is a favourable feature which does not exist for a majority of research reactors or nuclear power plants in the world*”⁸.

Issue I-48 *PSAR Summary Vol 1, p.3.2 – What is the expected time frame of these leases? Are the leases guaranteed?*

Comment This issue is irrelevant to the matters to be decided under the current Application.

Issue I-49 *PSAR Summary Vol 1, p. 3.2 – Has the NSW Department of Planning been consulted on the safety of the urban development proposal for the land immediately to the north of the ANSTO buffer zone. If so, the statement should include those details.*

Comment According to the NSW Government Agencies’ submission to the DEIS, adequate consideration had been given in the DEIS to the relevant planning legislation; that a decision to proceed with the proposal would not appear to affect or alter the current metropolitan, regional or local planning framework or directions set out in various strategic planning documents; and siting of the replacement reactor immediately west of HIFAR would not require adjustment to the existing buffer zone⁹.

Issue I-50 *PSAR Summary Vol 1, pp 3.12 to 3.13 – The stated dose survey/public limits should be referenced back to the standards to which they are being compared to using suitable reference citations.*

Comment The relevant radiation dose standards are given in Regulations 47, 48, 58, 59, 60, and 62.

Issue I-51 *Need to reduce risk of public exposure to radioactive gases by heating discharge gases from the RRR stack to promote a vigorous plume rise condition.*

Issue I-52 *Special conditions in the Woronora Valley require the need to limit the concentration of radioactive gases in the discharged plume from the RRR stack in the night-time.*

Issue I-53 *Need to consider the services of a consultant to model the night-time air flow, the formation of the inversion layer and the dawn fumigation of the Woronora valley to realistically assess the radiological exposure of the population and workers AND improve the quality of the dispersion model parameters to ensure a good fit between predicted and experimental concentrations and doses around the Lucas Heights site*

Comment ARPANSA’s airborne radioactive discharge authorisation to ANSTO is to ensure that public doses are ALARA, social and economic factors taken into account.

Issue I-54 *The distribution of the “public” outside the 1.6 km boundary is described in PSAR Summary Vol 1, Table 3.1. This is the only area in which the public is assumed to be exposed to on-site releases from BDBAs. However, there are other members of the public present at the Lucas Heights site during normal working hours. Table 3.2 of PSAR Summary Vol 1 shows that some 30% of people present are not employees of ANSTO, CSIRO, APS or AINSEE. In addition most of the employees of these are not classed as radiation workers and thus could also be regarded members of the public. Shouldn't the analysis of any accident that releases radioactive materials on-site also consider exposures to the on-site members of the public.*

Comment All people at the LHSTC site come under the control of ANSTO for any emergency directions during accidents. For purposes of accident consequence analysis it is the usual practice to estimate doses to “members of the public” for whom on-site emergency services do not have control.

⁷ *Environment Assessment Report, Proposed Replacement Nuclear Research Reactor at Lucas Heights*, Environment Australia, March 1999, p. 48

⁸ *IAEA Experts Mission to Review the PSAR of the RRR for ARPANSA, Final Report to the Government of Australia*, IAEA Department of Nuclear Safety, 10 July 2001, p.4.

⁹ *Environment Assessment Report, Proposed Replacement Nuclear Research Reactor at Lucas Heights*, Environment Australia, March 1999, p. 50

Chapter 4 – Buildings and Structures

Issue I-55 *Need to avoid embedding components in concrete, unless there is no other solution. Prefer to see, where possible, removable shielding, to facilitate future repairs.*

Comment Noted.

Issue I-56 *Section 4.5: Reactor Building Internal Structures and Systems: The IAEA Expert review identifies that the long-term integrity of the geomembrane covering the outer surface of the pool wall is a concern. Information about its capacity to remain intact for 40 years is required or a statement that it will be subject to periodic inspection and that it can be replaced if necessary. The method of leak detection should be stated. The impacts of leaks on continued full-power operation should be assessed as well as methods of repair.*

Comment This is not a safety issue affecting construction licence but an operational matter for ANSTO.

Chapter 5 – The Reactor

Issue I-57 *The power distribution in the core would be difficult to calculate given the use of thin cadmium wires as burnable poison (PSAR Summary Vol 2, fig 5.3). Cadmium stays black to thermal neutrons until it has nearly burned through when it quickly becomes transparent. This would make the three dimensional power distributions vary in a complicated manner over the lifetime of a core. How accurately has the vendor been able to predict the power distribution in such cores before?*

Comment See RAR section 3.5.3.

Issue I-58 *This reactor has no in-core instrumentation (PSAR 5.7.5.2.1), thus, unlike HIFAR, it is not possible to monitor the core power distribution during operation, but only by occasional foil measurements made at low power (PSAR 5.7.5.2.2). How then is it possible to verify that local power and flow limits are not violated during operation?*

Comment See RAR section 3.5.3.

Issue I-59 *Section 5.5 - Reactivity Control and Shutdown Systems: The Secondary Shutdown System employs reflector dump to shut down the reactor. This is achieved by opening trigger valves to the dump tank. There are six trigger valves and five must work to meet design specifications. The vendor identifies the possibility of common mode failure with such an arrangement but says operability is assured by testing during shutdowns. However, it still remains that only one out of the six valves may fail. Shouldn't this valving arrangement be replaced with one of more reliability?*

Comment See RAR section 3.6.2.9.

Issue I-60 *Section 5.8 - Thermal and Hydraulic Design - Control Plate Withdrawal Accidents: The control plate withdrawal accidents include only full power and low power cases. Is there an intermediate power where the results are worse? It is not clear if the low power case starts at critical at 1W or subcritical at 1W. Further it is not obvious which case would be worse. The power distribution used in the cases is not described or justified.*

Comment The worse case is the 'low power case'. See RAR 3.6.1.5.

Issue I-61 *Section 5.8 - Thermal and Hydraulic Design - Control Plate Withdrawal Accidents: PSAR Summary Vol 2, para 5.6 says that the DNB ratio is 2 or more during normal operation. During the transient from 1W with SSS shutdown 2.9 times the normal power is reached so DNB is approached. The results for this case should say the minimum DNBR reached and what then is the probability of reaching DNB considering the uncertainty in the DNB correlation and other determining heat transfer factors such as the PPF.*

Comment See RAR 3.6.1.5.

Issue I-62 *The PSAR states that corrosion of the reflector vessel and its components is negligible due to the water purification circuit. I presume this refers to both general surface and localised pitting corrosion. The latter can become a serious problem and the occurrence of such an effect must be virtually zero over the life of the plant.*

Comment Noted.

Issue I-63 *Are the ion chambers monitoring core flux and power levels located on only one or both sides of the core? If only on one side how can any asymmetric neutron flux levels be determined?*

Comment ANSTO has stated that the ion chambers are located on two adjacent sides of the core.

Issue I-64 *The PSAR states that corrosion of the reflector vessel and its components is negligible due to the water purification circuit. I presume this refers to both general surface and localised pitting corrosion. An assessment is needed of the probability of maloperation of the water purification circuit and its consequences. Regular assessments of test coupons as well as duplicated on-line analytical measurements are essential.*

Comment Noted.

Issue I-65 *The intrinsic safety of the claimed negative power coefficient of reactivity should be explained more fully and the claimed coefficient compared with that of other research reactors. It should then be referenced to the physics calculations in the PSAR and its influence on reactor control should be explained.*

Comment This issue will be discussed in more detail at a later stage if a construction licence is issued.

Issue I-66 *Section 5.5 - Reactivity Control and Shutdown Systems: The water seals between the tank and the operating equipment could be a problem. If the seal gaskets were to expand and become tighter, the gravity operated rods might stick under a shutdown emergency. If they are not tight enough they could leak. Compressed air assistance is mentioned but a common mode air failure is not. Regular testing should therefore be mandatory.*

Comment Testing of such a system is expected as part of any operating licence.

- Issue I-67** *Section 5.5 - Reactivity Control and Shutdown Systems: The control and safety mechanisms are explained briefly in the summary reports but a simple diagram would assist in understanding better the method of actuation.*
- Comment** Such drawings or diagrams are expected to be available at the detailed design stage if a construction licence is issued.
- Issue I-68** *Ordinarily as a design objective, care is taken to provide full separation between the reactivity control function and the reactivity protection function. This separation does not exist in the design in so far as the same five control rods all provide both a control function and a protection function.*
- Comment** Normally only the central control rod is used for reactivity control. Redundancy in protection is provided between the first and second shutdown systems.
- Issue I-69** *Section 5.3 – Fuel Assemblies: Need to set an import licence specification on the maximum leak rate of Uranium and fission products from a fuel plate and the maximum surface contamination of Uranium and fission products on a fuel plate.*
- Comment** The specifications for uranium surface contamination for new fuel plates given in the PSAR supporting documents are consistent with international practice.
- Issue I-70** *Section 5.8 - Thermal and Hydraulic Design: Fully support the IAEA Expert review recommendation that an instrumented fuel element be available to measure fuel and fuel clad temperatures during commissioning and to validate codes and calculated values. A further question concerns the provision of a capability to initially and periodically measure the fast and thermal flux levels in each core position. If there is no provision, how does INVAP propose to determine the thermal contribution of each fuel element to the total core power and the margin in each assembly from various safe heat transfer criteria?*
- Comment** See RAR sections 3.3.2 and 3.4.5.
- Issue I-71** *Section 5.8 - Thermal and Hydraulic Design: The IAEA Expert review mentions the problem of parallel channel flow instability and its relationship to the onset of nucleate boiling. The flow effects in long thin channels can be a problem and I would like to see test results showing that the flow distribution throughout the whole core is acceptable and the minimum flow in each channel, particularly at the edges, is achieved to maintain heat transfer safety margins. During commissioning how does INVAP propose to demonstrate that each fuel assembly is receiving its minimum required share of the total core cooling water flow?*
- Comment** See RAR section 3.3.2 and 3.4.5.

Chapter 6 – Reactor Coolant Systems

Issue I-72 *Although there is a large body of coolant in the reactor pool, the ever-safe power or time should be estimated for a completely uncooled core. Once this power or time has been reached, there is no danger of the cladding melting and the situation then has important implications for emergency actions, etc., which can be undertaken with the reassurance that fission product release from the fuel will be very unlikely. The shutdown heat from the fuel elements will take some time to heat the water in the tank if no forced cooling is available (failure or emergency systems) but there is no mention of the maximum temperature likely to be reached or the time it would take to cool down. (Days?)*

Comment See RAR section 3.6.2.11.2.

Issue I-73 *Plate type heat exchangers have useful characteristics but if all the plates are identical one or more plates may be assembled in the reverse configuration leading to mixing of the primary and secondary fluids. Is INVAP aware of this possibility and has it made arrangements to provide any feature to avoid cross contamination of the primary and secondary fluids? If so, these should be clearly stated.*

Comment This is a quality control matter for the manufacturer of the heat exchangers.

Issue I-74 *Section 6.5 - Reactor Pool Hot Water Layer System and Purification System: The precautionary principle, when applied to the occupational and public dose to Argon-41, is to eliminate the raw material producing Argon-41. Consider modifying the design by including a steam stripping plant at the reactor pool site to reduce the generation of Argon-41 by a factor of 1000 AND removing the poor design procedure in the RRR of the intentional release of Argon-41 from the reactor pool surface into the working environment.*

Comment The Regulatory Branch assessment is that the design properly addresses occupational and public doses so that they conform to the ALARA principle. It is not certain that the cost of removing the trace quantities of natural argon dissolved in the pool water justifies the expected reduction in the already small dose.

Chapter 7 – Engineered Safety Features

Issue I-75 Section 7.4 – Second Shutdown System: This involves dumping portion of the reflector D₂O. Dumping under gravity is a slow process. What is the maximum permitted time for dumping to be an effective component of the protection system? It also reduces the volume of coolant in the reflector vessel.

Comment See RAR section 3.6.2.

Issue I-76 Section 7.8 – Reactor Containment Systems: How was the 3% permitted leakage figure arrived at and how does INVAP propose to test that this number can be achieved initially and periodically during the lifetime of the plant? All possible leakage paths need to be identified, particularly any, which have the potential to bypass the filtration system.

Comment See RAR sections 3.6.2.11.5 and 3.4.6.

Issue I-77 Section 7.8 – Reactor Containment Systems: The containment contains a number of different materials, such as, concrete walls, doors and hatches, glass window in the main Control Room and various service penetrations. Their integrity under normal and accident conditions needs to be demonstrated. The walls are to be treated to seal the pores. The long-term integrity of this material needs to be ensured.

Comment See RAR sections 3.6.2.11.5 and 3.4.6.

Issue I-78 Section 7.8 – Reactor Containment Systems: Need to consider the shielding of activated charcoal filters in the ventilation discharge system. A relatively small radioactive release on one of the reactors in the UK rendered their charcoal filters unapproachable for some time when a high-powered fuel element's cladding failed due to overheating.

Comment See RAR sections 3.6.2.11.5 and 3.4.6.

Issue I-79 Section 7.8 - Reactor Containment System: The PSAR and PSA do not appear to include discussion of containment energy removal, containment pressure, vacuum relief and filtered vent issues. The reliability of these systems and functions should be discussed in the PSAR or PSA.

Comment See RAR sections 3.6.2.11.5 and 3.4.6.

Chapter 8 – Instrumentation and Control

Issue I-80 *Are zero emissions from such a small, insignificant reactor possible from an engineering point of view? The answer should ignore the ALARA principle. Who decides whether the ALARA qualifying mention of "taking the economics into consideration, ANSTO or ARPANSA? If zero emission is feasible but costly, does the nearby community deserve to have it included as part of the design?*

Comment The ALARA principle represents international best practice for radiation protection.

Issue I-81 *Section 8.2 - Reactor Protection System: ANSTO's answer to ARPANSA's question 8.36 refers. The answer dismisses the event as BDBA. Who takes the blame if the unlikely event occurs? The operator, the management or the supplier of the licence?*

Comment See RAR section 3.6.2.8.

Chapter 9 – Electric Power

No submission was received on this section of the PSAR.

Chapter 10 – Auxiliary Systems

Issue I-82 Section 10.1 – Fuel Storage and Handling Systems: Unless significant advances have taken place in in-situ fission product detention from clad failures, the design proposal should be closely examined and location of a defective fuel element substantiated by tests. Experience with HIFAR in the late 1960s indicated that one fuel element with clad failure could not be identified positively particularly where the core outlet flow mixed.

Comment Noted.

Issue I-83 Section 10.2 – Fire Protection: The likelihood of bush fires in the Sutherland Shire area and the lack of escape routes should be enough reason on its own to prevent the new reactor going ahead.

Comment Noted.

Issue I-84 Section 10.4 – Heating, Ventilation and Air Conditioning Systems: Need to set ANSTO the target of designing the venting capacity of the fan in the reactor building at $100,000\text{m}^3\text{h}^{-1}$, to maintain adequate ventilation and lower the reactor building concentration of Argon-41.

Comment See RAR section 3.3.6.

Issue I-85 Section 10.4 – Heating, Ventilation and Air Conditioning Systems: The maximum concentration and activity of Argon-41 will be immediately above the reactor pool surface. Operators on an overhead bridge above the reactor pool may be exposed to the maximum Argon-41 concentration. Need to address safety considerations.

Comment See RAR section 3.3.6.

Issue I-86 Section 10.4 – Heating, Ventilation and Air Conditioning Systems: Need to consider a transparent hood immediately above the reactor pool surface to collect Argon-41 emissions and channel those emissions directly to the ventilation system. This would block the principle occupational pathway and bring the RRR design into line with normal plant design in the chemical industries.

Comment See RAR section 3.3.6.

Chapter 11 – Reactor Utilisation

Issue I-87 Section 11.4 – Irradiation Facilities: From a brief look it appears that the INVAP proposals appear sound and cover the important areas. However, the detailed proposals should be examined carefully, especially those that relate to the detection of overheated irradiation targets and their cans, damaged cans, unwanted release of can contents and the capacity to recover from these situations.

Response Noted.

Chapter 12 – Operational Radiological Safety

- Issue I-88** *As the lifetime of the RRR may be 40 years, ARPANSA needs to take into consideration further (possible) reductions in occupational dose limits. Consider setting occupational dose limit at 10mSv averaged over a year in 2010, when the RRR is fully operational.*
- Comment** The relevant radiation dose standards are given in ARPANS Regulations 47, 48, 58, 59, 60, and 62.
- Issue I-89** *Need to set a target for ANSTO, to be achieved during the first year of the RRR operation, that the maximum occupational dose to any person on the Lucas Heights site is 5 mSv averaged over a year.*
- Comment** The relevant radiation dose standards are given in ARPANS Regulations 47, 48, 58, 59, 60, and 62.
- Issue I-90** *Section 12.5 - Dose Estimates for Normal Operation: Need to impose targets on ANSTO for Argon-41 emissions from the RRR stack of 4.2 GBq averaged over a year, with a peak limitation of 200 kBq averaged over a 15-minute period.*
- Comment** ARPANSA's airborne discharge authorisation to ANSTO is to ensure that discharges are ALARA.
- Issue I-91** *There is evidence of higher than average levels of leukaemia, infant mortality and birth defects around nuclear reactors.*
- Comment** Noted, but adverse health effects have not been conclusively established.
- Issue I-92** *Air emissions from the ANSTO site should be regulated to the achievable doses (in order to minimise human exposures and confirm ALARA) rather than an arbitrary 0.3 mSv/yr currently applied. Public dose limits have been set without reference to health data from the surrounding communities.*
- Comment** PSAR Section 12.1.2 states that for members of the public the dose constraint will be 0.3 mSv per year, for the site as a whole, and 0.1 mSv per year, for the reactor facility. For airborne emissions the ALARA objective is 0.01 mSv per year, for the site as a whole, with a design objective of 0.005 mSv per year for the reactor. See RAR section 3.3.6.
- Issue I-93** *PSAR Summary Vol 2, p. 12.3 – 12.1.6 - What are the techniques and equipment that are being referred to for measuring internal contamination of the personnel?*
- Comment** This is an operational detail which will be addressed at any 'licensing to operate' stage.
- Issue I-94** *PSAR Summary Vol 2, p.12.3 – 12.1.6 - What is the shutdown response time when unsuitable emission levels are detected, and is this within the required safety limits ?*
- Comment** Upon detection of higher than normal radioactivity in the stack, the first shutdown system is designed to trip the reactor within one second.
- Issue I-95** *PSAR Summary Vol 2, p. 12.3 – 12.1.7 - This section could include a structured risk management plan.*
- Comment** Noted.
- Issue I-96** *PSAR Summary Vol 2, p. 12.4 - 12.2.1 – Does the zone planning incorporate significant signage to include radiation safety plus OH&S.*
- Comment** This is an operational detail which will be addressed at any 'licensing to operate' stage.
- Issue I-97** *PSAR Summary Vol 2, 12.4 – 12.2.2 – Do the features identified incorporate adequate staff education, information/procedural documentation for the operation, inspection and maintenance activities specified.*
- Comment** This is an operational detail which will be addressed at any 'licensing to operate' stage.
- Issue I-98** *PSAR Summary Vol 2, p. 12.8 – 12.6.1 – Does the information presented represent best, worst or average case scenario estimates when compared to current HIFAR data, EIS calculations or other relevant data source.*
- Comment** Both worst and average case scenario estimates are represented.
- Issue I-99** *The design objectives of 2 mSv/yr to a worker and 0.005 mSv/yr to a member of the public, for normal operations will be confirmed by tests during commissioning and will be monitored during operations. Although these low levels will be difficult to monitor, these objectives provide substantial margins below the dose limits of 20 mSv/yr for workers (averaged over a 5-year period, with a maximum of 50 mSv in any one year) and 1 mSv/yr for members of the public.*

Comment Noted.

Issue I-100 *The estimated dose to any member of the public from a DBA must be less than 5 mSv. Under ARPANSA's safety criteria the frequency of a 5 mSv accidental dose to the most highly exposed member of the public must be less than one in ten per year and must be as low as one in a thousand per year if this is reasonably achievable. The PSAR estimates the frequency of DBAs as less than one in ten thousand per year and this is a reasonable assurance that the (frequency of) DBAs comply with the safety criteria by a large margin.*

Comment Noted.

Issue I-101 *The NSW Department of Urban Affairs and Planning requires fatality risk to be not more than one in a million per person per year. Based on information provided and the risk coefficient recommended by the ICRP, the estimated risk from all DBAs together is less than about 10^{-7} per person per year. The real risk from DBAs would almost certainly be lower than this estimate and might be zero as there is no scientific evidence that a dose of 5 mSv causes a risk. Individual doses in excess of 200 mSv to member of the public would be of greater concern as there is statistical evidence that the risk of cancer in an exposed population causes a fatal cancer risk of the order of one in a hundred. To comply with ARPANSA's requirements the frequency of maximum public doses in the range of 100 to 1000 mSv must be less than 10^{-3} per year and should be as low as 10^{-5} per year, if this is reasonably achievable. No accident capable of causing a dose of 200 mSv is analysed in the PSAR but it can be shown from the information provided that the frequency of equipment failures or damage with the potential to cause such a high dose is less than 10^{-5} per year. Even if the release was very large, the weather conditions (atmospheric inversion and wind direction) that would exist for doses above 200 mSv to be incurred outside the reactor are improbable. It would also be highly unlikely that no countermeasures, such as temporary evacuation) would be undertaken to avert the higher dose levels. Hence, although the relationship between high (>200 mSv) doses and the likelihood of being exposed to them is not known accurately, it appears that there is a large safety margin of compliance with the safety criteria of ARPANSA and the NSW Government.*

Comment Noted.

Issue I-102 *Section 12.5 - Dose Estimates for Normal Operation: The dose of radiation to the operators during transfer of the stored spent fuel elements from the storage pool to the transport vehicles for off-site transport and processing overseas should be estimated and placed in context to the dose limits to workers.*

Comment This is an operational detail which will be addressed in any application for a licence to operate.

Chapter 13 – Conduct of Operations

Issue I-103 *HIFAR is a very stable reactor with well known feedback characteristics but the characteristics of a highly rated pool reactor will be different and staff needs training. The operators will have to become familiar with different conditions in a pool type reactor than in a tank. A portion of the reactor pool should be for training only.*

Comment Noted.

Issue I-104 *Section 13.3 – Staff Qualification and Training: We are satisfied that ANSTO has the necessary level of expertise to operate the proposed RRR efficiently and safely after commissioning, if the design is sound and the materials and construction meet the required high level of quality assurance.*

Comment Noted.

Issue I-105 *The Reactor Manager must have academic knowledge to understand the SAR, plant experience, special training to understand unique technology, management experience, and must be required to submit to a formal set of ethics. The PSAR specifies the qualifications and training for the first and third attributes only. Even so, the academic requirements are too broad, even if the Reactor Manager is to be supported by external specialist advice. Thus, the section on the Manager's qualifications and training should cover all five aspects outlined above. Tertiary qualifications must be in engineering and physics degrees only.*

Comment Noted.

Issue I-106 *This sections says that "engineering expertise" will be available to the reactor operator during certain operations. Formal engineering advice to the reactor operator must only be given by qualified professional engineers.*

Comment Noted.

Issue I-107 *PSAR Summary Vol 2, Section 13.4 – Examine the benefits of Continuing Professional Education. Examine the potential benefits of expert instruction from local or overseas professionals with experience at other sites during the pre-commissioning stage.*

Comment Noted.

Issue I-108 *PSAR Summary Vol 2, Section 13.6 – Consider the benefits of electronic documentation accessible to all relevant staff on-line at their workstation (with archives of previous versions of all material for reference).*

Comment Noted.

Chapter 14 – Environmental Assessment

Issue I-109 *Section 14.1 – Introduction:* ARPANSA must carry out a proper assessment of the reactor design and PSAR in terms of the relevant principles of ESD including the principles of intergenerational equity and the precautionary principle.

Comment The Application was assessed against ARPANSA’s Regulatory Assessment Principles and criteria in the ARPANSA Design Guideline, which were derived from international best practice in radiation and nuclear safety such as IAEA standards and requirements.

Issue I-110 *Need to take into account the NSW Government’s 3-year Cleaner Production Program (June 2001), which focuses on environmental compliance, best environmental practice and state of the art production processes.*

Comment See Comment on I-109.

Issue I-111 *Nuclear waste stockpiles in Australia and other parts of the world are major threats to the environment. The environmental problems related to uranium mining and the high mobility of oxidised uranium far outweigh any benefit. The broader environmental implications must be considered.*

Comment Environmental implications have already been considered in the draft and supplementary EIS and the EAR.

Issue I-112 *The EIS on the reactor was approved subject to conditions, which included additional analysis of seismic hazards, investigation of the groundwater and direction flow rate and a review of the topography and food production farming within 15km of the site. None of these has been completed. Therefore the application should be rejected.*

Comment See RAR section 2.4(g).

Issue I-113 *The reactor will violate all four-system conditions in the Natural Step Methodology (www.naturalstep.com). These are:*

- *Nuclear reactors require the mining of Uranium and this activity inherently infringes System Condition One, which is that “substances taken from the lithosphere must not systematically increase in the ecosphere”.*
- *Waste from nuclear reactors clearly infringe the System Condition Two, which is that “substances produced by society must not systematically increase in the ecosphere”. Another nation accepting the waste is no solution as the problem is not eradicated – just shifted – and this adds the risk of spill during transportation.*
- *Nuclear reactors can potentially violate System Condition Three, which states that “the physical basis for the productivity and diversity of nature must not be systematically deteriorated”. The Chernobyl incident, which was followed by live stock slaughter and loss of production from fertile land is an example.*
- *An accident at Lucas heights will clearly violate System Condition Four, which advocates “fair and efficient use of resources with respect to meeting human needs”. This will be especially true for residents in nearby suburbs.*

Comment Noted. See Comment on I-109.

Issue I-114 *There is no safe level of radiation. HIFAR emits radiation into the air and low level waste is flushed into Cronulla Beach.*

Comment ANSTO’s airborne discharges are subject to an authorisation by ARPANSA and effluent discharge into Sydney Water sewer system is subject to a Trade Waste Agreement with Sydney Water.

Issue I-115 *A number of studies and actions required by the Commonwealth Minister for Environment and Heritage’s Conditions of Consent have not been fulfilled at the time of the submission of the PSAR. The licensing process is deficient while consideration of a licence is being undertaken in the absence of these important pieces of information. Public assessment of the PSAR is incomplete without provision of the specified information. The conditions relate to the conclusions and recommendations in the EIS on the RRR. These include conditions 9 to 11, 22 to 24, 26, 5.7(a) to 5.7(d), 5.7(h) and 5.10(g)*

Comment See RAR section 2.4(g).

Issue I-116 *Insufficient information is provided of the engineering and administrative control measures for liquid effluent discharge from the proposed RRR and associated activities.*

Comment Liquid effluent discharges will be subject to authorisations under any licence to operate.

Issue I-117 *PSAR Summary Vol 2, Section 14.3.2 – Are there any potential seismic risks associated with the excavation phase ?*

Comment No. It is a very small scale excavation.

Issue I-118 *PSAR Summary Vol 2, Section 14.3.2.1 – Night time construction details appear to have been overlooked here.*

Comment Noted. The construction activities, including a noise management control plan, are subject to the satisfaction of the Minister for Environment and Heritage under Condition 2 of the EAR.

Issue I-119 *PSAR Summary Vol 2, Section 14.3.2.8 – No mention is made of the containment structure to be used for storage of inflammable goods and which safety standards will apply.*

Comment See RAR section 3.2.6.

Chapter 15 – Commissioning

Issue I-120 *PSAR Summary Vol 2, Section 15.3 – Should all construction inspection and commissioning programs include an independent witness with expert knowledge who has not participated in the design, development, construction, planning etc.?*

Comment As part of the regulation of any construction, ARPANSA intends to use independent experts for inspection and verification during the construction, testing or commissioning of selected safety significant items.

Issue I-121 *Section 15.3 – Implementation of the Commissioning Program: ANSTO's answer to ARPANSA's question 15.10 refers. What evidence does ARPANSA have that two reactors could be operated safely for an unknown running-in period ?*

Comment This issue will be assessed if and when an application for a licence to operate is made.

Chapter 16 – Safety Analysis

Issue I-122 Sutherland Shire Council study and independent commentary shows the seismic risk level in the Reference Accident is questionable. ANSTO has submitted a design based on an underestimated seismic analysis. A previous study estimated the earthquake risk as double what previously thought but this has been ignored in the licence application. Studies which indicate the greatest level of activity should be taken into account. The precautionary principle should be practised and the decision should be based on the worst possible case. The Reference Accident must be redone with appropriate seismic risk assumptions. Seismic activity has been recorded in the Lucas heights area and an EIS has not included this.

Comment See RAR Section 3.2.9.

Issue I-123 The reference accident is extremely unrealistic, unreliable and incomplete. For example, wind speeds are assumed to be zero.

Comment See RAR section 3.8

Issue I-124 The reactor design must allow for human error, an accident involving loss of coolant, a damaging power overload or failure of the reactor containment structure. Otherwise construction approval should not be given.

Comment See RAR section 3.3.4.

Issue I-125 Section 16.9 – Analysis of Loss of Flow Events: The use of non-fuelled plates on the outer sides of the fuel box could have advantages in avoiding damage during transfer operations possibly at the cost of lower flux. Note IAEA Expert review remarks here about possible outer plate damage during handling. Could such damage reduce the flow passage or impede the action of the control absorbers?

Comment See RAR section 3.6.1.7.

Issue I-126 It is not clear how each fuel assembly is locked in position at the lower grid plate or supported at the top to avoid flow induced vibration effects due to the high flow velocities necessary to safely remove the fission heat in these very high thermally rated fuel assemblies. The PSAR states that vibration is not a problem. I would like to see that contention demonstrated in a test tank.

Comment See RAR section 3.6.1.7.

Issue I-127 Appendix VI of the IAEA Expert review (on Chapter 16, Table 16.19/3-1) pointed out that the 30% partition fraction for the release of iodine and cesium from melted fuel to the pool water is very low compared to the 80% observed during the partial meltdown of 6 fuel plates in SILOE in 1967. This matter must be resolved. The effectiveness of the scrubbing action of the pool water should not be seriously considered as an effective barrier to the retention or release of mixed fission products.

Response See RAR Section 3.8.

Issue I-128 There have been fatal accidents overseas with research reactors and there have been at least 8 small accidents in the past at Lucas Heights. ANSTO has not factored these into their design.

Comment Noted.

Issue I-129 PSAR Summary Vol 2, Section 16.1 – Does “conservative” represent “best”, “worst” or “average” case scenario estimates ?

Comment Conservative means worst consequences.

Issue I-130 PSAR Summary Vol 2, Section 16.2 and 16.20 – Is a structured disaster management plan / response unit (including annual practical application of skills/procedures) required here?

Comment See RAR sections 2.4(f) and 3.8.

Issue I-131 Section 16.17 – External Events: The integrity of the pool can be threatened by sabotage by a small group of trained terrorists. Neither the ANSTO application nor the PSAR contains details of security arrangements against terrorist attacks. The need to maintain secrecy of security arrangements is acknowledged. However, is ARPANSA satisfied that ANSTO’s security arrangements are sufficient? There is a need for transparency. The public must at least be told of possible sabotage scenarios and the likely consequences of successful attacks.

Comment See RAR section 2.4(e), and 3.8.

Issue I-132 Section 16.17 – External Events: The question of sabotage is not amenable to probabilistic treatment because it would involve deliberate actions not random events. A significant release of radioactive material would require the failure of, or damage to, the same three barriers as for an accidental release, viz: process plant, protective systems

and containment. It is not considered likely that saboteurs could gain sufficient access within the plant to cause damage simultaneously to all three barriers without the knowledge of the operating staff and local security and countermeasures being taken.

Comment Noted.

Issue I-133 Section 16.18 – Human Error: ANSTO has not accounted for the possibility of human error even though every major nuclear accident to-date has involved human error. ANSTO's answer to ARPANSA's question 8.9 refers. Most accidents in engineered plants are caused by human error. ANSTO's operators, however clear the information might be, are human and therefore subject to errors. Does ARPANSA accept the answer or will it press for a better response?

Comment See RAR section 3.3.4.

Issue I-134 Section 16.19 – Beyond Design Basis Accidents: One of the BDBAs assumes that three fuel plates melt. How is it justified that the melting of three plates would not lead to the melting of adjacent plates, possibly leading to the melting of a whole assembly?

Comment See RAR section 3.7.1.

Chapter 17 – Operational Limits and Conditions

Issue I-135 *Is it proposed to operate the reactor at full or intermediate power levels on automatic control? If so, how will the operating staff interact with this feature? If computer control and monitoring is the general arrangement proposed throughout the plant, I would like to see certain key parameters such as fuel temperature, etc, hard-wired in parallel, so that any failure of the computer system leaves the operators with key data enabling them to make considered and correct decisions about continued reactor operation. There will be occasions when operation at full power may not be possible due to plant failures or other unforeseen circumstances. INVAP's designers should state clearly the minimum plant configurations for ANSTO to be able to continue producing neutrons at various associated power levels.*

Comment These details are more properly addressed in any application for a licence to operate which would include a full list of operational limits and conditions based upon the required monitoring of key data such as core and coolant temperature. Generally, in a normal operating cycle, it is expected that there will be a short period of low power (400 kW) operation.

Chapter 18 – Quality Assurance

Issue I-136 PSAR Summary Vol 2, Section 18.1 – QA activities associated with design, construction, commissioning, certification, audit etc are specified here. Is it appropriate to include plans for routine QA programs and ongoing quality improvement programs?

Comment See RAR section 2.4 under ‘Quality Systems’.

Chapter 19 – Decommissioning

Issue I-137 What is the cost of decommissioning? Who will pay for the decommissioning?

Comment Funds for decommissioning will be addressed in the Decommissioning Plan to be prepared by ANSTO at the end of the facility life.¹⁰

¹⁰ ANSTO's answers to ARPANSA's questions on Chapter 19 of the PSAR, "Decommissioning", 18 July 2001, p.4

Chapter 20 – Emergency Planning and Preparedness

Issue I-138 *In case of an accident the State SES has no emergency plan for off site emergency. With the usual western-southern winds blowing in Sydney on a daily basis, the SES won't be able to cope and the entire Sydney population will be at risk.*

Comment Section 3.5 of ANSTO's Application refers to the LHSTC Emergency Plan, the ANSTO Emergency Plan and for accidents and emergencies with off-site consequences the Sutherland Shire Local Disaster Plan, the Georges River District Disaster Plan and the NSW State Disaster Plan. The emergency planning and preparedness activities for the LHSTC and ANSTO emergency plans have been reviewed in the review of ANSTO's General Plans and Arrangements as documented in RB-STD-27-00. See also RAR section 2.4(f).

Issue I-139 *The guaranteed mission time for emergency equipment such as cooling, electrical power, ventilation and monitoring instrumentation should be clearly stated and demonstrated during commissioning.*

Response See RAR section 3.7.2.

Issue I-140 *Meetings of the LEMC have revealed that there was no specific plan to deal with an accident that involved radiation off site. It is being examined by an external consultant at the moment. While ARPANSA may have confidence in ANSTO's on-site emergency plans, it should be fully aware that the emergency agencies do not have plans specific to a nuclear accident with off-site consequences. Does ARPANSA consider off-site requirements? How can ARPANSA grant a licence without checking the safety plans of at each school or childcare centre? Need to consider evacuation problems due to a lack of escape routes through current road network.*

Comment The LHSTC and ANSTO Emergency Plans have been reviewed in the review of ANSTO's General Plans and Arrangements as documented in RB-STD-27-00. See also RAR section 2.4(f).

5 Probabilistic Safety Assessment

Issue I-141 No fire analysis to assess if internal fires pose a major risk. Unable to assess severity and frequency of core damage from an internal fire.

Comment See RAR section 3.2.6.

Issue I-142 Need to estimate offsite property-damage contamination for the most likely of accident scenarios.

Comment The reference accident assessed by ARPANSA before the licence to prepare a site was issued included estimates of ground contamination.

Issue I-143 Need comprehensive review on every external initiating event. Guidance is available from on the US NRC's "PRA Procedures Guide". Only selected external hazards were analysed in the PSA. A study on accident scenarios at a 95th percentile frequency of 10^{-6} per year or greater needs more rigorous assessment. External hazards missing are all internal fires, external fires affecting offsite power, vehicle impact accidents, and detailed information on aircraft crash.

Comment See RAR sections 2.4(e), 3.2.6.1.4 and 3.6.1.3

Issue I-144 The USNRC Standard Review Plan methodology to calculate aircraft crash frequency yields potentially non-conservative results. Recent USNRC crash assessments used USDOE methodology instead. No consideration of military flight activity.

Comment See RAR sections 2.4(e) and 2.6.2.

Issue I-145 Fault trees assume that active components have larger contribution to system failure probabilities than passive components. However, the reactor design relies on passive features, for which, such an assumption is not valid.

Comment Passive components are generally simpler and with no moving parts. Consequently they are more reliable with significant strength and corrosion safety margins.

Issue I-146 The uncertainty bands around the mean value for CDF seems to be unrealistically narrow – only a factor of about plus or minus three to four. The actual uncertainties are likely to be larger. Need a more realistic estimate of the numerical uncertainties in the bottom-line CDF.

Comment See RAR section 3.2.4.

Issue I-147 The asserted seismic CDF from loss of offsite power and non-seismic failure of the diesels is surprisingly low and needs to be reconsidered. ANSTO's response to IAEA's seismic hazard questions provided a seismic spectrum and not a probabilistic seismic hazard. What is ANSTO's estimate for seismic hazard at the site? What is the PGA value consistent with the 95th percentile uncertainty value at 10^{-6} per year? What is the RRR's response (including offsite power) to this PGA? The fire-water supply will be designed only to withstand SL-1 earthquake and not SL-2 earthquake. It is a weakness that could be remedied at almost no extra cost.

Comment There is no regulatory criterion for a safety objective of 10^{-6} per year core damage frequency at the 95th percentile estimate. See also RAR section 3.2.4.

Issue I-148 The PSA should have analysed the possible LOCAs through beam tubes. In the PSAR this is considered BDBA (16.11.3.6). In the PSA (3.1.2) it is discussed only qualitatively.

Comment See RAR section 3.7.1.

Issue I-149 The HRA did not assess the potential for low probability human errors with potentially significant safety consequences.

Response See RAR section 3.3.4.

Issue I-150 No modelling of CCFs due to procedures inadequacy because of the preliminary engineering stage of the project. The treatment of CCFs is extremely limited. Difficult to understand how maintenance, test, calibration, and inspection errors bound CCFs due to such causes as abnormal environmental stresses, manufacturing errors, construction errors and so on.

Comment See RAR section 3.2.4

Issue I-151 Questionable whether the PSA's treatment of human error potential is adequate. Important questions are what steps were taken to try to identify such operator actions?, what methods were used to identify the actions?, how do these methods adequately account for the status of plant engineering design?; how do these methods adequately account

for the self-imposed PSA target of identifying all sequences with a frequency of 10^{-6} or greater at the 95th percent confidence level?

Comment See RAR section 3.3.4.

Issue I-152 Some initiating events were excluded from the PSA based on faulty logic. Unless included, some events may turn out to be dominant contributors to CDF. No satisfactory rationale to exclude an initiating event. Unreasonable to assume that the estimate Type D CCF probability includes failure probability due to manufacturing and installation defects. Such defects occur under quite different conditions than design errors and there is no a priori reason to assume that the probability of such errors is encompassed by a calculation of the design probability error. The calculation of common cause maintenance failure is similarly fraught with inconsistencies and unwarranted assumptions.

Comment See RAR section 3.2.4.

Issue I-153 Seismically initiated loss of offsite power is generally considered in PSAs to be unrecoverable in a period of a few days. There is no way for a 2-day period that one can get a failure probability for two diesels in the range of one in 100,000. The seismic CDF value is extremely optimistic. (The seismic response of structures and components attached to the reactor structure should be checked, such as the control rod drives and seals.

Comment See RAR section 3.2.9.

Issue I-154 Difficult to accept without more information the asserted low frequency of failure of the seals on the control rod drives located at the bottom of the pool, which would drain pool inventory into a compartment. Important questions are:

- How frequently are the seals checked for condition and integrity?
- Are the seals subjected to neutron exposure, which could change their characteristics over time?
- How is the operability of the leak detection system components, which monitor the space between the seals checked and how often is this done?
- Is failure of the leak detection circuit alarmed in the control room?
- Is there leak detection in the compartment into which the pool water would drain if the seals fail?
- Has the pool water hydraulic head been calculated (12.6m deep) and compared with the bushing design to ascertain whether the bushing could indeed hold the pool water if the seals fail (as claimed in the PSA)?
- What is the reliability of the watertight door (CRD room safety door) in the compartment into which the pool would drain?
- Does the CRD room have a sump pump system? If so, will it operate automatically and what is its pumping rate? Is actuation of the sump pump system in the CRD room alarmed in the control room?

Comment See RAR section 3.6.1.7.

Issue I-155 PSA merely asserts that a probabilistic evaluation showed that the frequency of a projectile striking the RRR site is less than 10^{-7} per year. The probabilistic analysis in full should be included. If this is not done, the re-evaluation should consider not just the accidental firing of a live round at the RRR but also a deliberate act (and the adequacy and effectiveness of the precautions against such an act). Methods for such analysis are available from the US DOE and US department of Defence.

Comment ANSTO's revised estimates demonstrate the probability of a projectile from nearby military practices striking the building remains less than 10^{-7} per year. Deliberate acts of missile attack or sabotage are not amenable to the same probabilistic analysis.

Issue I-156 No consideration of the issue of vehicle bombs in the PSA. ANSTO could obtain this information from USNRC on a non-disclosure basis if NRC was acquainted with the circumstances of the RRR case.

Comment see RAR section 2.4(e) and RAR section 3.6.1.3.

Issue I-157 ARPANSA should subject the RRR PSA to an in-depth peer review by a team of experienced professionals to completely identify the shortcomings of the study before any attempt by INVAP to revise the PSA.

Comment Noted.

6 Compliance Report on Siting and Environment Conditions

No submission was received on this document submitted by ANSTO.

7 Compliance Report on RAPs and Guidelines

Issue I-158 ARPANSA's draft RAP 5.50 states that the "validity of the initial siting assessment must be checked against the detailed design when it is finalised using the PSAR". ARPANSA must now make public the initial siting assessment of the RRR so that it can be checked against the reactor design using the PSAR.

Comment See RAR section 3.8.1

Issue I-159 ARPANSA is evaluating the PSAR against the draft RAPs without taking into account the public submissions on the draft RAPs from February 2001.

Comment The regulatory assessment was done against revised versions of the RAPs and Design Guideline following the analysis of comments received from the public consultation of these two documents.

8 Other Issues not Specifically related to the Application or the PSAR

Precautionary Principle

Issue I-160 Section 391 of the Environmental Protection and Biodiversity Conservation Act 1999 (on the precautionary principle) needs to be applied to the RRR design. The PSAR must include the precautionary principle.

Comment The assessment of ANSTO's application was undertaken in accordance with ARPANSA's Regulatory Assessment Principles and Design Guidelines, which include the ALARA principle.

Property Values

Issue I-161 Residents around Lucas Heights invested in properties based on the promise that HIFAR would be decommissioned in 40 years (from the fifties). Residents are concerned that pollution will continue for another 40 years.

Comment Noted.

Insurance

Issue I-162 ARPANSA will have no valid insurance for damage caused locally and globally by any form of nuclear waste, accident or "normal" activity.

Issue I-163 Inability to insure the risks is a major concern. The Government's Deed of Indemnity is worthless and does not fall within ARPANSA's badly written legislation. No one has responded to the effects of the social disruption in the event of an accident.

Comment These issues are beyond the scope of ARPANSA's role under the ARPANS Act 1998.

Legal Liability

Issue I-164 The reactor will be build by people who do not live in Australia. Do we have extradition treaties with Argentina? How could we prosecute the builders for negligence?

Comment The ARPANS Act applies within and outside Australia. The Act applies to Commonwealth entities and Commonwealth contractors.

Design Manual

Issue I-165 ANSTO and ARPANSA must ensure that the designers of all items for the reactor and associated plant clearly state the reasons for the decisions they make in arriving at the final configurations. This is important for future plant modifications as INVAP may not be around forever and original designers may be dead or retired.

Comment Noted.

Public Hearing

Issue I-166 Sutherland Shire Council requests a public hearing to test relevant technical information important to safety and waste management.

Response ARPANSA organised a public forum on 14 and 17 December 2001. The public was invited to witness an international panel of experts and the ARPANSA CEO test the arguments of interest groups and individuals who made substantial submissions on the ANSTO Application, PSAR and PSA. A transcript of the proceedings and the reports of the members of the expert panel were made available on the ARPANSA website.

Issue I-167 ACF calls on ARPANSA to provide such judicial public hearings or immediately publicly explain its failure to do so.

Comment There is no legal framework under the ARPANS Act that would enable a judicial public hearing of record.

Nuclear Weapons

Issue I-168 Research at the proposed RRR may lead to production of nuclear weapons or development of expertise for the production of nuclear weapons. Australia should not promote nuclear weapons in this way and no nuclear reactor should be built.

Other Issues not Specifically related to the Application or the PSAR

Comment Australia is a signatory to the Nuclear Non-Proliferation Treaty.

ARPANSA

Issue I-169 *The abilities of ARPANSA and ANSTO to monitor the components that may be obtained for the construction of the reactor is questionable. ARPANSA, ANSTO and INVAP may be out of their depth in this whole matter.*

Comment Noted.

Select and Senate Committees' Findings

Issue I-170 *ARPANSA must state publicly how the PSAR addresses the recommendations of the Select Committee Inquiry into the Contract for a New Reactor and the Senate Economic Reference Committee Report on a New Reactor at Lucas Heights.*

Comment The PSAR is a technical document that was assessed against criteria established by ARPANSA. The recommendations of the Select Committee Inquiry into the Contract for a New Reactor and the Senate Economic Reference Committee Report on a New Reactor at Lucas Heights are not part of this criteria.

ANSTO's Response to ARPANSA's Questions

Issue I-171 *In question 8.6, what is the sensitivity of the active liquids monitor (ALMO) in the PCS? In other words, what is the smallest clad failure this monitor will detect? What tests have been done and what experience has INVAP accumulated?*

Comment ARPANSA expects this matter to be fully determined during the detailed design and be described in any application for a licence to operate.

Issue I-172 *In question 8.33 the RPS software verification and validation process is raised. My concern here is INVAP developing new software or are they basing it on previously tested and proven software? In the final analysis how confident can ANSTO be that all "bugs" have been eliminated? How secure is the software and all computer equipment from hacking or unauthorised access, both internal and external?*

Comment See RAR section 3.3.2.

Issue I-173 *Response to question 8.46 states that monitors in the ventilation stack for particulate, iodine and noble gas activity actuates the CIS when stack isolation set points are reached. It also states that "There is no reactor trip associated with the detection of high activity in the stack". INVAP and ANSTO must provide justification for this position. I strongly believe that both ANSTO and ARPANSA must clearly show that at all times undetected releases and ventilation by-passing cannot take place and can be readily detected.*

Comment See RAR section 3.6.2.11.6.

Issue I-174 *The response to question 8.49 states that the containment is kept below atmospheric pressure presumably at all times fuel is in the core and storage pool. Has INVAP provided monitors and alarms to warn the operations staff that the pressure difference has become positive rather than negative? If this situation occurs during normal operations, for example, from plant failure, what action is proposed for the operators to take?*

Comment See RAR section 3.6.2.11.5.

International Best Practice

Issue I-175 *IBP is ambiguous and misleading. It requires projects to be "safer" not safe. This is not best practice, only better practice. Standards against which the procedures and processes will be assessed is not well defined. Approval for the project should be denied until such time as this issue is resolved to the satisfaction of a public inquiry.*

Comment Noted.

INVAP Contract

Issue I-176 *ARPANSA must publicly release the INVAP contract and all reactor siting documentation by the Commonwealth and its agencies.*

Comment All documentation related to ANSTO's application for a licence to construct the proposed RRR that can be released to the public have been done so.

9 ARPANSA's Issues Paper for Second Round Public Submissions

Accident Analysis

Question 1: Does the Preliminary Safety Analysis Report confirm the safety analysis of the Reference Accident, on which ANSTO obtained the licence to prepare the site for the replacement reactor? In particular, does ANSTO's analysis and the design provide confidence that a Loss of Coolant Accident that could drain the reactor core has been effectively designed out?

II-1 ANSTO and INVAP have failed to resolve important questions on safety and design, notably problems with the human factors analysis and key questions put to ANSTO/INVAP during the ARPANSA Nuclear Safety Committee Working Party process by the Accident Working Group.

Comment See RAR sections 3.2 and 3.3.4.

II-2 The Reference Accident appears no longer to be valid, based upon the failure to consider it in the PSAR. Sutherland Shire Council requires that, consistent with earlier Commonwealth Minister for Environment conditions accepted by the Minister for Science and by ARPANSA, that the Reference Accident be referred to the Minister for Environment.

Comment See RAR section 3.8.

II-3 The issue of potential fuel melting without pool water coverage or only partial water coverage is not conservatively addressed in the PSAR. There appears to be no consideration of the potential for explosive force or high-energy disruption to the core as part of the accident scenarios considered. This leads to a direct underestimate of potential offsite consequences.

Comment See RAR sections 2.4(e) and 3.7.

II-4 At the ARPANSA Public Forum Dr Budnitz recommended an analysis of potential radioactivity dispersion beyond the Lucas Heights site on public record to clarify the facts and to provide a basis for further analysis and emergency planning. Council received an assurance from the CEO of ARPANSA that this information would be made publicly available prior to the construction licence determination. Council makes a formal request to the CEO to provide source term information, generic modelling information and meteorological information to Dr Budnitz to provide initial estimates of dispersion of radioactivity outside the reactor, given a full core melt. A high energy disruption of the core due to, for example, sabotage should be included in estimates. These matters are also relevant with respect to the issue of sabotage and other major accident scenarios. Questionable BDBA included in the PSAR lead to lower quality design of reactor defence from sabotage and how emergency responses should be framed because appropriate BDBA's are not considered significant. In other words, the reactor is under-protected with respect to potential serious accidents.

Comment See RAR sections 2.4(e), 3.7 and 3.8.

II-5 Sabotage concerns have made the Reference Accident redundant and make a Loss of Coolant accident relevant to reactor safety and design considerations. The CEO of ARPANSA noted this link between sabotage and the reference accident and the site licence in his summation of Day 1 of the ARPANSA Public Forum.

Response See RAR sections 2.4(e), 3.7 and 3.8.

II-6 The potential impacts of beyond design basis accidents and sabotage, both with respect to offsite dispersion of radioactivity and the disruption energy of the core, will affect radioactivity dispersion. It is requested that these issues be taken into account and documented in the analysis of potential major accidents.

Comment See RAR sections 2.4(e), 3.7 and 3.8.

II-7 Siting reference accident is no longer valid when linked to security issues and Lucas heights site must be re-assessed by ARPANSA and the Reactor EIS conditions of approval by the Minister for Environment must also be reviewed publicly before the licence can be issued.

Comment See RAR section 3.8.

II-8 The Canadian member in the expert panel of ARPANSA Public Forum stated that there can be no significant question over Shut Down Systems at the construction licence stage. His concerns were that the 2nd Shut Down System is not fully independent of the 1st Shut Down System (as per Canadian requirements), whether the dump rate of the 2nd System is fast enough and the inability to test the dump values of the 2nd system in reactor operations (possible only in shut down mode). These factors will now have to be fully addressed in the PSAR.

Comment See RAR section 3.6.2.9.

II-9 *The ANSTO intention to properly address reactor safety issues consequent to human reliability analysis including human errors of commission at the FSAR stage is unacceptable and must be demonstrated in the PSAR.*

Comment See RAR section 3.3.4.

II-10 *The member from the US in the ARPANSA expert panel at its Public Forum stated that he could not have confidence until a fire analysis and an earthquake induced fire analysis was done. The ANSTO reply was that this was not considered necessary but that INVAP was conducting an "internal analysis". This does not provide confidence in ANSTO or INVAP, who must now be directed to provide a full PSAR fire analysis and to demonstrate that this can be retrofitted to the existing PSAR design and operations parameters or to change as necessary.*

Comment See RAR section 3.2.6.

II-11 *Prior to a construction licence decision, there must be a demonstrated capacity for real time projection of distribution of potential releases under prevailing conditions, and demonstrated response capability including plans for timely provision of potassium iodine tablets, for shelter and for evacuation, with informed support of health workers.*

Comment See RAR section 3.8.

II-12 *No. A direct consequence of the "prototype" nature of the design is a large degree of experimentation between a working reality and the hypothetical properties of the various assemblies and mechanisms. The proposed design is untried. Reactor components are to be constructed piecemeal and this presents uncertainty regarding the final integration of parts. The ANA's presentation at the Public Forum highlighted these uncertainties. As such we cannot state with certainty that we can rule out a LOCA.*

Comment See RAR Section 3.7.

II-13 *ARPANSA's request to ANSTO to review potential terrorist attacks uses the word "successful", which suggests total destruction of the reactor. This means that LOCA cannot be ruled out. It would be irresponsible not to require ANSTO to investigate this scenario in the PSAR. ARPANSA should commission an independent study of radiological effects in case of a worst case scenario LOCA prior to deliberations regarding a construction licence.*

Comment See RAR Sections 2.4(e) and 3.7.

II-14 *There remains considerable doubt that the second shut down system of the proposed replacement reactor is adequate. Particularly in relation to its independence and the number of trip parameters, which are less than in the first system.*

Comment See RAR section 3.6.2.9.

II-15 *At no time does ANSTO discuss the real possibility of an accident with offsite consequences, such as a terrorist attack, which would result in a loss of coolant accident with potential grave offsite consequences. Therefore ANSTO's accident analysis remains invalid.*

Comment Refer to issues II-5, II-6, II-7, II-11 and II-13 with respect to sabotage.

II-16 *ARPANSA's Regulatory Assessment Criteria 54 refers to the feasibility of emergency response in relation to safety criteria of the design. Current emergency procedures of ANSTO, the Commonwealth government and State agencies are inadequate and not sufficient for a construction licence approval.*

Comment See RAR section 3.8.

II-17 *ANSTO has failed to meet the criteria in the ARPANSA Expectations Guidelines that state in 7.1.3 that "the emergency plans have specified how the responsibilities for the management of interventions will be discharged on the site, off the site and across state and national boundaries, as appropriate, in separate but interconnecting plans".*

Comment See RAR section 3.8.

II-18 *The emergency plan should also demonstrate that procedures are in place to ensure that the Sydney public is notified within half an hour of an accident occurring to stay indoors until further notice; that potassium iodine pills be available to the public prior to any accident occurrence; and advice regarding the uptake dose of these pills be available to the public. Credible public evacuation plans should be in place.*

Comment See RAR section 3.8.

II-19 *There has never been a satisfactory explanation why a reactor meltdown cannot occur and why a chain reaction is impossible. As described in the issues paper, water cooling including that from backup systems in the case of*

accident is required to stop the reactor melting. However if the configuration of the reactor is totally destroyed by a suicide aeroplane, then it is reasonable to expect that the ability of water to intervene between adjoining reactor rods would be lost, the rods would melt down and being the heaviest component of the reactor would pond at the lowest point and could conceivably build up a critical mass to sustain a chain reaction. An earth quake may also result in catastrophic loss of cooling water and of the backup systems with a similar outcome.

Comment See RAR sections 2.4(e), 3.2.9 and 3.7.

II-20 Only average accident scenarios have been used. Need for realistic assessment of accident scenarios and terrorist risks. The criterion "as low as reasonably achievable" has to be defined.

Comment Noted.

II-21 Overseas experience has shown that accident response scenarios on so-called "reference accidents" may underestimate the severity of actual accidents.

Comment Noted.

II-22 Need for absolute safety and not relative safety tied to ALARA principle.

Comment ALARA is the internationally accepted best practice for radiation protection.

II-23 Need to evaluate a full core meltdown accompanied by a major containment failure as the basis of emergency planning. The emergency plan must be in a single document, which gives confidence that, above all, public exposure to iodine 131 will be held to a minimum through the prompt implementation of effective countermeasures.

Comment See RAR section 3.8.

Question 2: The Probabilistic Safety Assessment included with the ANSTO application has been substantially criticised. Even if the degree of uncertainty for the estimated core damage frequency were increased, it would still appear to be well below the ARPANSA assessment criteria. Does the Probabilistic Safety Analysis at this stage sufficiently demonstrate a balanced design (not dominated by a single accident sequence)? How might it be further developed?

II-24 The parameters within which the risk analysis were formulated are far too narrow and do not take into account the wide variation in disasters we have seen so graphically demonstrated in the last few months.

Comment See RAR sections 2.4(e) and 3.2.4.

II-25 ANSTO has used the PSA calculation results of the BDBA to form its policy that countermeasures be based only on the public remaining indoors. I am not alone in objecting to this. At the ARPANSA Public Forum Dr Budnitz's pointed out that acts of omission could be accommodated in a PSA but acts of commission were much more difficult. Terrorist events are the ultimate acts of commission as, unlike stressed or confused operators, terrorists use their ingenuity to bypass and overcome safety barriers. The statement in the PSAR that sabotage does not lend itself to quantitative assessment was demonstrated by the ability of Greenpeace to easily breach Lucas heights security on 17 December 2001.

Comment See RAR sections 2.4(e), 3.2.4, 3.3.4 and 3.6.1.3..

II-26 The PSA is dominated by ANSTO's blind optimism regarding anything that could produce large-scale off-site consequences. Where this is the case, we can hardly be dealing with a balanced design.

Comment Noted.

II-27 Potential serious accidents have been underestimated because ANSTO considers the PSA as "preliminary". There are serious deficiencies in the PSA despite its use to justify certain deterministic designs as safe, leading to underestimation of risk leads and a lowering of safety designs for the overall proposal. In particular, internal fire and large aircraft crash on or adjacent to the reactor are poorly dealt with in the reactor.

Comment See RAR sections 3.2.4, 3.2.6 and 3.6.1.4.

II-28 Mr Schwarz, in commenting on the PSA at the ARPANSA Public Forum, noted concerns with respect to initiating event categorisation in the PSA, with a possible impact on the CDF of two orders of magnitude. He noted that this precluded certain possible important accidents from design basis considerations. Council views this failure to take appropriate accidents into account with alarm. Mr Schwarz also noted that a number of results in the PSA were not consistent with Canadian experience with respect to probabilities, but were more optimistic than Canadian results.

Comment See RAR section 3.2.4.

II-29 A fire PSA should be included. The site of the proposed reactor has a large area of bushland surrounding it and this could be a very real factor in an accident scenario at the site.

Comment See RAR section 3.2.6

II-30 The accuracy of core damage frequency in the PSA is questionable, it is lower than one would think is required for maximum safety. ANSTO should investigate the possibility of a full core meltdown as one of the accident scenarios in the PSA.

Comment See RAR section 3.2.4.

II-31 Quoted uncertainties of errors of commission are too small in the PSA. In order to comply with ARPANSA's RAPs 5.5, ANSTO should include human factor analysis in the probabilistic risk assessment as human factors were significant in Chernobyl and Windscale.

Comment See RAR section 3.2.4 and 3.3.4.

II-32 An independent validation of PSA should be required of ANSTO by ARPANSA. It is important to recognise by this exercise that design expertise is different from operators expertise. The whole of the PSA could be wrongly based on inaccurate reliability levels. The reliability levels of the PSA need to be proven or tested by such an exercise.

Comment Noted.

Question 3: The accident analysis necessarily relies to some degree on models and assumptions from the design. Regulation 54 of the ARPANS Regulations 1999 requires approvals to be sought for the construction of items important for safety as part of the construction of a controlled facility. If ARPANSA were to agree to the construction of the replacement reactor, what are the critical points during the construction process that need examination to verify that the design details and assumptions made in the accident analysis remain valid?

II-33 At the ARPANSA Public Forum Gary Schwarz stated that "detailed design information is required before construction approval is granted in my country (Canada)". Dr Bob Bunditz from the US supported this statement. Both noted that this is what is happening in industry these days. It seems clear that detailed reactor design should be provided before a construction licence is granted. This will be in line with established practice in the US and Canada.

Comment See RAR section 1.

II-34 Many of the questions ARPANSA asked ANSTO after the 1st round submissions have been answered by ANSTO as "will be confirmed/clarified in the Final SAR". This may be a practice condoned in the nuclear industry but it is not acceptable for the FSAR to be produced only after the reactor is built.

Comment See RAR section 1.

II-35 The timing of the ARPANSA analysis of construction licence issues in the public realm is very important. It is important that the public have an opportunity to consider information and the decision-making process by ARPANSA before a final decision is made, rather than when the decision is made.

Response Noted.

II-36 The proposal by ANSTO to defer many matters to a later "detailed design stage" subsequent to construction licensing is in contrast to earlier ARPANSA siting licence statements, which indicated that a detailed design stage was appropriate for construction licensing.

Comment See RAR section 1.

II-37 It was noted at the ARPANSA Public Forum that drive systems are being constructed in Argentina for the proposed reactor. Council protests at the initiation of construction work by ANSTO and INVAP in direct contradiction to the requirement of ARPANSA and the ARPANS Act that no construction activities be undertaken prior to determination of the construction licence.

Comment The reference at the Public Forum on 17 December 2001¹¹ to construction activity in Argentina was to "a complete mock-up of the controller drive mechanism" for a full test program.

II-38 A working model of the proposed reactor should be available for study. All systems should be verified before construction could begin. This is essential for both safety and economic reasons.

Comment Noted.

¹¹ at page 109 of the transcript.

Question 4: Noting the CEO's intention to issue a statement on the approach to protective security against terrorism and sabotage, what additional public information and assurances may be required to satisfy public concerns while still maintaining the necessary confidentiality of such security arrangements?

II-39 Need to acknowledge that the risk that the proposed reactor poses is to an area covered by an 80 km radius around the reactor (as suggested by David Hirsch). The risk is exemplified by the fact that there have been three separate incidents of threats of sabotage/terrorist attack on the existing Lucas Heights reactor in 1983, 1984 and just prior to the Sydney Olympics Games.

Comment See RAR section 3.8.

II-40 The replacement reactor is designed to take the impact of a Cessna – this is inadequate in the light of the Sep 11 events that showed that it is a credible accident scenario to consider a suicide attack on the reactor with a large passenger jet.

Comment See RAR Section 2.4(e).

II-41 Security issues regarding reactor, especially those that concern possible aircraft crashes on reactors are technical issues for expert opinion and not for lobbyists with little or no technical expertise.

Comment Noted.

II-42 The ability of Greenpeace to breach Lucas Heights security on 17 December 2001 raises serious questions on the security of the Lucas height site.

Comment Noted.

II-43 No matter how well containment may be against accidents, it cannot be effective protection against terrorists. There is no information or assurance that will satisfy public concerns on the immunity of Lucas Heights from sabotage or attack.

Comment Noted.

II-44 For a genuine assessment of sabotage and terrorist attack risks ARPANSA should return to the site/location of the reactor.

Comment Noted.

II-45 ANSTO's assessment is that a direct hit from a large aircraft is unlikely because the reactor is so small and mainly underground. However, this assessment related to a direct accidental hit. There is a need for an independent assessment of security measures for the Lucas Height site. Asking ANSTO to review adequacy of security measures is insufficient.

Comment See RAR section 2.4(e).

II-46 ARPANSA had asked ANSTO why it considered the aircraft protective grillage governed the designed as it was a much less frequent event than the OBE and SSE seismic events. In the light of the September 11 events, does ARPANSA still consider the aircraft attack as a less frequent event?

Comment See RAR section 2.4(e).

II-47 ARPANSA has asked ANSTO for a rationale for reliance on the protective grillage to absorb the impact of an aircraft crash at the expense of a stronger containment building. Will ARPANSA obtain detailed answers from ANSTO before granting a licence? Will ARPANSA get independent advice on this issue? Will ARPANSA re-examine the grill design to see if it would withstand the force of a large passenger aircraft deliberately flown into the building? Will the "20-minute fire" following an aircraft crash that ANSTO refers to in its reply to ARPANSA, apply to a large plane that might have just taken off from Mascot?

Comment See RAR Section 2.4(e).

II-48 ARPANSA should not issue a licence to construct the reactor unless it can state the reasons why it considers that sabotage is no longer possible, how and why the design of the plant on site would withstand the effects of such an attack and how such an event would affect the society in the vicinity of Lucas Heights, even if the radiation releases are perceived by ARPANSA to be not (very) harmful to health. If it cannot do these, then Dr Loy should report to the Minister that, on reflection following the September 11 attacks, Lucas Heights is not an appropriate site for a new reactor and a full and transparent site selection process be initiated.

Comment See RAR Section 2.4(e) and RAR section 3.8.

ARPANSA's Issues Paper for Second Round Public Submissions

- II-49** *The process of public information is not complete. Frustrating attempts have been made to obtain a report titled, "Part C Replacement Research Reactor, Design and Methodology" on the aircraft protective grillage with no success.*
- Comment** The respondent who raised this issue had said in his submission that ASNO had told him that this document is under a "security embargo".
- II-50** *Sabotage was not a serious consideration in any Australian reactor PSA to date, and was not given detailed analysis at the site licensing stage. Council requires the CEO of ARPANSA to revisit the site licence with respect to sabotage, including potential reactor accident above the level of the reference accident. Siting of the proposed reactor has not been used as a defence in depth with respect to sabotage. Potential sabotage threats include internal threats such as direct access to the pool, and external threats including potential large aircraft explosion and fire in or adjacent to the reactor and potential missile use from Illawarra Road. Council requires that the CEO ARPANSA return to the siting licence and re-assess it in the light of the re-assessment of design basis threat and reference accident with respect to sabotage.*
- Comment** See RAR Section 2.4(e) and RAR section 3.8.
- II-51** *On the distinction between unclassified and classified information on reactor sabotage, Council requires in the public interest that a clear demonstration be provided that accident analysis, reactor design and security practices are best practice approaches and are implemented. This is different from classified information on potential targets and methods of physical threat.*
- Comment** See RAR Section 2.4(e) and RAR section 3.8.
- II-52** *A pool reactor is intrinsically more vulnerable than a power reactor with respect to direct access to the reactor core for high energy disruption. This must be taken into account with respect to internal threat and external threat from missiles and aircraft.*
- Comment** See RAR Section 2.4(e) and RAR section 3.8.
- II-53** *ASNO at the ARPANSA Forum referred to INFCIRC225. It should be noted that this IAEA document requires consideration of emergency planning issues, presumably including siting issues as well as state of the art physical protection. Sutherland Shire Council expects these considerations to be fully implemented in the sabotage analysis and subsequent design processes.*
- Comment** Noted.
- II-54** *Council notes that the CEO of ARPANSA indicated that he would clarify the timeline with respect to sabotage analysis and design response. Council understands that this will be prior to the construction licence consideration and announcement, and will allow public comment as part of the public consultation undertaken as part of the ARPANSA Act.*
- Comment** Noted.
- II-55** *ANSTO's evidence at the Public Forum denied serious public exposure consequences. This implies that its analysis has not been thorough and is not in response to potential design basis threat considerations. Council expects the CEO of ARPANSA to set clear criteria for consideration of these threats and to make consequence results publicly available prior to the construction licence consideration.*
- Comment** Noted.
- II-56** *A public review of a radiological consequences analysis of a loss of coolant accident due to security breach or other combined factors.*
- Comment** See RAR section 2.4(e), 3.7 and 3.8.
- II-57** *A responsible approach to defend the facility from such threats as large jets would be to site it such that there is at least half an hour of flight time between the reactor and any regular flight path. This would barely allow sufficient time for countermeasures to be undertaken. Serious defence thinking would entail a "shoot first" strategy. This could result in the loss of innocent lives. I do not think the Australian public would accept this level of security and we feel certain they would question the use of a facility that would require such draconian defence.*
- Comment** Noted
- II-58** *The public release of information about the installation (the fact of, not the position) of ground to air missile coverage and or the proscription of air space with the above-mentioned consequences would not pose a realistic threat to national security. Moving the site to a more easily defended site would be a more sincere consideration in the light*

of the September 11 events. Not marking the site on the Sydney street directory and other such navigational aids would be an important first step in assuring the public of the seriousness of your inquiry.

Comment Noted

II-59 *The explanation for the soft response to the Green Peace incursion into the ANSTO site was that the demonstrators were not armed. If the reactor were attacked by terrorists then we can therefore expect our suburbs to be come a battleground. ANSTO have claimed that the reactor would be a small target for aerial attack. Therefore if the target is missed then we can expect a suicide plane may crash on adjoining suburbs. The reality that Lucas Heights is a credible target was proven by New Zealand police uncovering a plot against the Lucas Heights reactor. There seems to be no acceptance or adoption of the precautionary principle in ANSTO's proposal to site the new larger and inherently hazardous reactor so close to residential areas.*

Comment Noted

II-60 *ARPANSA should hold public forums across the Sydney Basin in major areas. These should outline not only ARPANSA's approach to protective security against terrorism and sabotage, they should include question time where citizens are allowed to ask ARPANSA questions on the current HIFAR Reactor, the proposed RRR and emergency plans in case of a major accident.*

Comment A two-day public forum was organised for a panel of experts on nuclear safety and radiation health to test the submissions of key stakeholders, other Commonwealth government agencies and ANSTO. The transcript of proceedings of the public forum and the reports of the panel of experts have been placed on the ARPANSA website. In addition ARPANSA has organised a series of public information nights. All citizens were encouraged to attend and ask the CEO and ARPANSA staff questions on current and proposed ANSTO facilities and emergency plans. The information sessions in the Sutherland Shire were well attended but a session at Bankstown, although well advertised, was very poorly attended.

II-61 *In relation to the CEO's statement and the events of September 11, a concern for PND is that the site selection process for the proposed Replacement Reactor should be revisited prior to construction licence considerations. It is of concern that the proposed location is within Australia's largest city, potentially putting the lives of four million plus people at risk. The suggested security review recommended by ARPANSA in this document should be completed. The security review should be undertaken by an independent expert, not by departments with a vested interest in the new reactor (eg ANSTO and ASNO).*

Comment See RAR sections 2.4(e) and 3.8.

II-62 *In response to the September 11 attacks the US NRC has started to supply potassium iodide pills to people at risk of radiation exposure. Potassium iodide pills are available to the public in France, Germany, Poland, Russia, Armenia, Ireland, Norway and many other countries. These pills should immediately be made available to the public by ARPANSA.*

Comment The use of potassium iodide is only for exposure to radioactive iodine for which the potential accidental release from the proposed research reactor is significantly less than for a power reactor.

Question 5: In the light of possible delays to the full commissioning of the replacement reactor, should it proceed, should there be more analysis undertaken of the joint operation of HIFAR and the replacement reactor?

II-63 *If a new reactor is built by INVAP and it is not working satisfactorily after four years (described in your press release as being neither unprecedented nor surprising), does ANSTO have enough competent staff to operate HIFAR and a recalcitrant one? How long would you extend the licence of HIFAR without an upgrade to bring it up to 20th century standards? (NOTE: This question in the submission is preceded by a lengthy discussions on the state of the Argentinian economy and the ability of INVAP to deliver)*

Comment The issues raised here will be addressed as part of any application for an operating licence for the proposed RRR and any application for an extension of HIFAR operating licence.

II-64 *Absolutely. Two rounds of public submissions is barely adequate.*

Comment This comment is irrelevant to Question 5.

II-65 *There should not be any further analysis of the joint operation of HIFAR and the replacement reactor. The 1993 McKinnon Report stated that HIFAR should not continue to operate past 2003. ARPANSA have also stated that at*

no time does HIFAR meet modern standards. It would be unwise, dangerous and compromising of public safety to operate the reactors jointly.

Comment Noted.

Seismic Analysis and Seismic Design

Question 6: Has ANSTO yet sufficiently demonstrated that the seismic analysis and design take account of the various Lucas Heights seismic siting studies and seismic hazards estimates, and are both conservative and consistent with world's best practice?

II-66 *The credibility of the seismic analysis is questionable. The analysis fails to deal with the different types of destructive waves associated with seismic events.*

Comment See RAR sections 2.6.2 and 3.2.9.

II-67 *The PGA was updated from its original 2.3g to 4.1g and then subsequently reduced by 10% to 3.7g. But my question in the first round submission remains answered. What is the usual engineering safety factor that is built into a nuclear reactor that is situated near a growing urban population? Dr Budnitz assured me at the ARPANSA Public Forum that the engineering would take into consideration whatever seismic requirement was decided on by an appropriate factor. If that is the case, why the fuss about the difference in estimates?*

Comment See RAR sections 2.6.2 and 3.2.9.

II-68 *What was the original safety factor built into HIFAR including any subsequent upgrades. Dr Budnitz confirmed that in the 1950s not much notice was taken of earthquakes when designing reactors. So how does HIFAR get a licence to operate in the 21st century? What standards are used in assessing its licence?*

Comment Noted. Not pertinent to deciding on a construction licence. HIFAR and supporting buildings have had seismic upgrades since the 1980s. The upgrades were based on the best information available at the time. With the new IGNS information the HIFAR licence includes conditions to review the HIFAR safety analysis in light of this additional information.

II-69 *As far as we are aware, these issues have not been tackled by ANSTO in respect of the latest studies. We would refer ARPANSA and other interested parties to our previous submission regarding our lack of confidence in the less than rigorous standards which currently masquerade alternatively as 'world's best practice' and 'international best practice'.*

Comment See RAR sections 2.6.2 and 3.2.9.

II-70 *The seismic analysis and design basis in the ANSTO application underestimates the seismic risk. The design should be based on the largest values of seismic parameters calculated. ANSTO's revision of this seismic risk remains conservative and therefore inaccurate. It is in ANSTO's commercial interests to be so conservative. As ANSTO have failed to include the largest values of seismic parameters calculated, a construction licence should not be issued.*

Comment See RAR sections 2.6.2 and 3.2.9.

II-71 *Key issues for seismic safety include pool integrity and beam tube integrity. It is not clear that the margin of safety for pool integrity, particularly related to earthquake, is adequately conservative. This was also raised by the ARPANSA Public Forum expert panel.*

Comment See RAR sections 2.6.2 and 3.2.9.

II-72 *The revised IGNS Report is clearly a best practice study and should be the seminal study for design purposes. Council notes that the CEO of ARPANSA has required that ANSTO design to the parameters of that report. Council is concerned that ANSTO is changing the damping factors in that study, which is against the direction of the CEO ARPANSA.*

Comment See RAR sections 2.6.2 and 3.2.9.

II-73 *Council requires that any uncertainties with respect to seismic issues be reflected in a conservative approach to design in order to protect the local community.*

Comment See RAR sections 2.6.2 and 3.2.9.

II-74 *Dr Budnitz at the ARPANSA Public Forum noted that, with respect to seismic risk, a question remained over how far safety margins of the pool are above the design basis. He noted that it is important that a large margin of potential safety occurs above estimates.*

Comment See RAR sections 2.6.2 and 3.2.9.

II-75 *Dr Budnitz at the ARPANSA Public Forum noted that it was appropriate for the proponent to defend to ARPANSA the contention that no accidents could arise after shutdown. Council requests that this analysis and justification be provided to CEO ARPANSA and made publicly available prior to construction licence consideration.*

Comment Noted.

Spent Fuel and Radioactive Wastes

Question 7: ANSTO's application is based upon use of silicide fuel with the intention of moving to molybdenum fuels as soon as they are proven. It is argued that the route for the management of silicide spent fuel is not sufficiently assured. Does ARPANSA need a clearer demonstration that molybdenum fuels will soon be available or that silicide spent fuel will more clearly be able to be managed?

II-76 *Use of silicide fuel is of concern as it is experimental.*

Comment Incorrect. It is the use of molybdenum fuel that is under development.

II-77 *Sutherland Shire Council is concerned that Lucas Heights will remain the de facto nuclear repository in light of potential difficulties with the COGEMA contract, notably legal challenges and a potential reliance on a continued use of silicide fuel. Council notes that recent pilot studies with molybdenum fuel are encountering some fuel defect at certain burn-up rates.*

II-78 *We have not been given any reason to think that the first silicide fuel will be processed, given that the fuel from HIFAR has yet to be dealt with by the projected contractor. Any reliance upon the alleged ability of COGEMA to process any Australian reactor material should be tempered with due caution until it is seen that this is a legitimate assumption with a concrete foundation in fact.*

II-79 *The route for the management of any type of reactor spent fuel is not sufficiently assured. As it is not, there should be no issuing of a construction licence for the proposed RRR. It would be irresponsible of ARPANSA to issue a licence in terms of its duties under the ARPANS Act with this issue outstanding.*

Comment See RAR section 2.7

Question 8: Given the lengthy timescales involved in the handling of spent fuel and the international pressures on reprocessing and transport, should ARPANSA require there be an option developed for the handling of spent fuel entirely within Australia? If so, to what extent should this option be developed before a construction licence is determined?

II-80 *Under no condition should Australia build a high/medium level waste dump in Australia as it will pose an unacceptable health and security risk and would also attract waste from other parts of the world to Australia.*

Comment The decision to build radioactive waste store/repository is for the Government. ARPANSA's role is purely regulatory role after the decision is made.

II-81 *Federal legislation prohibits the option of allowing ANSTO to develop a means to handle spent fuel entirely within Australia because of the high environmental and public risks associated with such an option. The development of re-processing facilities within Australia is not a credible alternative.*

II-82 *Re-processing is illegal in Australia under the ARPANS Act.*

Comment Section 10(1)(d) of the ARPANS Act 1998 prohibits the CEO from issuing a licence to construct or operate a re-processing facility.

II-83 *Sutherland Shire Council is concerned that a third option for spent fuel management in Australia would be to condition fuel at an unspecified site. Council asks the CEO of ARPANSA to make as a requirement on the project, that conditioning of spent fuel not occur at Lucas Heights. Other communities in Australia may wish to be similarly considered.*

II-84 *Council notes that the CEO ARPANSA at the ARPANSA Public Forum queried the ANSTO position on a distinction between re-processing and conditioning. ANSTO did not answer this issue at the Forum, simply implying that with respect to the possibility of conditioning in Australia, it was not part of the ANSTO "business". This is confirmation that Australian communities including those at Lucas Heights are not protected from spent fuel conditioning in Australia. The CEO ARPANSA must provide conditions in any construction licence consideration to the effect that ANSTO have indicated that spent fuel conditioning in Australia is not proposed and will not be allowed.*

Comment See RAR section 2.7.

II-85 *The recommendation (Chapter 11, p.230) of the Senate Select Committee for an Inquiry into the Contract for a New Reactor at Lucas Heights (May 2001) should be fully complied with, including public assessment of the required conditioning and disposal sites. ACF considers that this option must be at least equally as stringently required as that of any proposed overseas spent fuel pathway and of the proposed National store.*

Comment Noted.

II-86 *Given the very real concerns around the issues of transporting hazardous materials, we would see that a moral obligation exists for our wastes to be handled at home. We would want this to be firmly assessed and the issue brought before a public inquiry before the go ahead for the construction of the facility is given.*

Comment See RAR section 2.7.

II-87 *ANSTO has commented that "The Government has specifically ruled out domestic conditioning of spent fuel at Lucas Heights or anywhere else in Australia. (See Question 43 of ANSTO Answers to ARPANSA Questions of 22nd August 2001 on Spent Fuel and Radioactive Wastes). It is the opinion of PND that those that produce radioactive waste should deal with it. If Australia does not have the will to reprocess or condition our spent fuel then it is logical to conclude that it is irresponsible to produce it in the first place. Therefore no construction licence should be issued for the proposed RRR.*

Comment See RAR Section 2.7.

Question 9: Given that the issue of radioactive waste storage and waste repositories will always be controversial, what degree of progress with the national waste repository and the national waste store is needed for the construction and (if proceeded with) the operating licence for the replacement reactor?

II-88 *Approval to construct the replacement reactor should not be given until the EIS for the low level and intermediate level waste dumps have been completed.*

II-89 *There should be no reactor unless there is a safe and economically viable disposal plan that is constitutional in all countries. In addition, the construction of the new reactor should not begin until the disposal site is constructed.*

II-90 *ARPANSA should require that the approval process for the waste store should be fully completed to the satisfaction of the public and the affected State government/s before deciding whether to issue a construction licence.*

Comment See RAR section 2.7

II-91 *ANSTO has said that the waste returning to Australia and certain wastes from operation and isotope production will be classified as Long Lived Intermediate Level Waste (LLILW). The only significant difference between LLILW and High Level Waste (HLW) is that HLW is heat generating. LLILW contains many of the same isotopes as HLW, with both types at present meant for the same final disposal, that is, deep geological repository (burial) but Australia has no plan for any such facility and no such facility is operational at present anywhere in the world. All radioactive waste must be stored in on-site above ground dry storage facilities.*

Comment Decisions on radioactive waste store/repository are for the Government. ARPANSA has a purely regulatory role after the decision is made. See also RAR section 2.7.

II-92 *Condition 26 in the EIS for the new reactor states that "construction should not be authorised until arrangements for the management of spent fuel rods from the replacement reactor have been demonstrated to the satisfaction of ARPANSA and the Minister for the Environment and Heritage." The CEO of ARPANSA has stated that "in order to issue subsequent licences for the reactor, there would need to be a reasonable assured way of dealing with spent fuel and associated wastes.". ARPANSA Expectations Guidelines (4.1) states that "The Applicant is also responsible for ensuring that appropriate plans and arrangements are in place for the safe handling, treatment, transport, storage and transfer or ultimate disposal of any such waste." All these criteria have not been satisfied. In addition due to uncertainties in overseas re-processing options and growing opposition in many countries to re-processing, ARPANSA should not issue a licence and should instead recommend a public inquiry on alternative technologies for production of medical isotopes that do not produce long lived intermediate waste.*

Comment On EIS 'Condition 26' see RAR section 2.4(g). On spent fuel and radioactive wastes see RAR section 2.7.

II-93 *ARPANSA should comply with the McKinnon Report (1993) recommendation, (which was also endorsed by the Senate Economic References Committee (Sep 99) and the Senate Select Committee (May 2001)) that "a high level waste site be firmly identified and work started on proving its suitability before there can be any positive decision in regard to a new reactor. The Government's claim that no "high" level waste exists in Australia is not credible. It is the same waste regardless of classification. Both HLW and LLILW require the same level of long term and final disposal management.*

Comment see RAR section 2.7.

II-94 *The location of the proposed National store must be finalised. A public environment assessment must be carried out for reprocessed wastes, direct transfer of spent fuel from the new reactor. The assessment must establish the store as scientifically defensible and publicly acceptable and in compliance with State legislation, before ARPANSA can credibly consider granting a licence to construct.*

Comment see RAR section 2.7.

II-95 *ARPANSA should require Department of Industry, Tourism and Resources to demonstrate public, local authority and State government acceptance of the proposed National store and consequent issues. ACF request ARPANSA to make public the "Strategy Paper", which DITR say they produced for ARPANSA on long term management of radioactive wastes.*

Comment The DEST, which is responsible for the national store project, does not come under the purview of ARPANSA. The "Strategy Paper" referred to was provided in the binder of submissions that participants received at the Public Forum and, as such, the ACF has a copy of the paper.

II-96 *A proposed National Repository should have undergone site finalisation and public environment assessment and be established as scientifically defensible and publicly acceptable and in compliance with State legislation, before ARPANSA can credibly consider granting a licence to construct.*

Comment see RAR section 2.7.

II-97 *Following the ARPANSA Public Forum, a major question mark exists over the ability of INVAP to fulfil its proposed Australian reactor spent fuel conditioning commitment. Notwithstanding even the constitutional and legal issues, it appears from evidence provided by ANSTO at the Forum that Argentina currently only has storage facilities for spent fuel, not functioning conditioning facilities, and that indeed, Argentinian spent fuel is merely stored at this point in time. The CEO of ARPANSA is requested to require documented evidence of the status of this proposal prior to constructing licensing.*

Comment see RAR section 2.7.

II-98 *Sutherland Shire Council notes the evidence of the ACF that indigenous owners in SA have rejected the importation of radioactive waste onto indigenous land. This is an important consideration with respect to the confidence level that reactor waste management is sufficiently confirmed.*

Comment Noted. See also RAR section 2.7.

II-99 *Sutherland Shire Council supports the comments of Bill Williams, Expert Panellist at the ARPANSA Public Forum, that Australia needs a good inventory of waste generated in Australia for confidence in reactor waste management processes.*

Comment Noted.

II-100 *Council notes evidence from the Dept of Industry, Resources & Tourism that only 50 years interim planning has been considered for the LLILW Store. Council endorses the concerns raised by Dr Budnitz and other panellists at the Public Forum that clear criteria for waste return to Australia, and for waste repository design for both LLW and LLILW, are not evident in the current PSAR and government nuclear waste management proposals.*

Comment Noted.

Question 10: Are the proposed strategies for monitoring and controlling radioactive discharges arising from reactor operations sufficient to ensure that any discharges and consequent radiation doses to the public would be as low as reasonably achievable, social and economic factors taken into account?

II-101 *Unless there is no emission or discharge, there should be no reactor.*

Comment The Regulatory Branch assessment notes that the estimated doses to the most exposed member of the public from any routine, authorised radioactive discharge is less than 0.0001mSv (see PSAR Table 12.5/12). This is assessed as satisfactory as it is 0.01% of the public dose limit in regulation 59 and 1% of the current dose constraint applied to HIFAR operation under the Authorisation for Airborne Radioactive Discharges.

II-102 *ARPANSA should require ANSTO to meet ALATA (as low as technically achievable) and not ALARA criteria.*

Comment ALARA is recommended as international best practice by international authorities.

II-103 *The issue that Sutherland Shire Council had previously raised about emissions of radioactivity through the sewer to local creeks during sewer surcharge and the presence of radionuclides in tertiary treated sewage water, which water has been approved for re-use in air cooling towers in a development at Kurnell, has not been addressed to date by ANSTO or INVAP. Council requires that the CEO of ARPANSA does not issue a construction licence until this issue is thoroughly investigated and resolved as part of the construction licensing process.*

Comment See RAR section 2.4(g). (Environment Minister's Condition number 10)

II-104 *We see no reason for the public to receive any dose whatsoever from the proposed facility. We advocate the immediate prohibition of gaseous or aqueous discharges resulting from the operation of HIFAR and will not tolerate such activities in a 'new' reactor.*

Comment See comment on issue II-101.

II-105 *Radioactive discharges from the proposed RRR should be completely contained. As there is no safe dose of radiation exposure (Benison 1976) ANSTO cannot impose radiation discharges on the local population. To say that these should be as low as reasonable achievable, social and economic factors taken into account can mean anything. Cost should not be a factor in safety. This is reflected in ARPANSA Expectation Guidelines states that "It is expected that the applicant will be able to demonstrate that the resource arrangements include: 1.1 Adequate financial capability to ensure safety. If ANSTO cannot afford to protect the local population, they should not be allowed to build the reactor.*

Comment See comment on issue II-101.

II-106 *The concept that radiation doses to the public from routine discharges should be as low as "reasonably achievable" is unacceptable. Our health is our right and not to be rationalised against economic issues. The ingestion of radionuclides, which confuse the body's metabolism because of chemical similarity, for example tritium posing in water as hydrogen atoms and strontium 90 posing as calcium, cannot be compared, as often quoted by ANSTO officials in the press, to exposure to natural background radiation from say cosmic rays.*

Comment See comment on issue II-101.

10 Acronyms

ACF	Australian Conservation Foundation
AINSEE	Australian Institute of Nuclear Science and Engineering
ALARA	As low as reasonably achievable, social and economic factors taken into account.
ANA	Australian Nuclear Association
ANSTO	Australian Nuclear Science and Technology Organisation
APS	Australian Public Service
ARPANS Act	Australian Radiation Protection and Nuclear Safety Act 1998
ARPANS Act	Australian Radiation Protection and Nuclear Safety Regulations 1999
ARPANSA	Australian Radiation Protection and Nuclear Safety Agency
ASNO	Australian Safeguards and Non-Proliferation Office
BDBA	Beyond Design Basis Accident
CBA	Cost-benefit analysis
CCF	Common Cause Failure
CDF	Core Damage Frequency
CEO	The Chief Executive Officer of the Australian Radiation Protection and Nuclear Safety Agency
CIS	Containment Isolation System
CNEA	Argentine Atomic Energy Commission
COGEMA	The French company contracted by ANSTO to re-process spent fuel from HIFAR and the proposed RRR.
CRD	Control Rod Drive
CSIRO	Commonwealth Scientific and Industrial Research Organisation
D ₂ O	Deuterium Oxide. Water containing significantly more than the natural proportion (1 in 6,500) of heavy hydrogen atoms.
DBA	Design Basis Accident
DEIS	Draft Environmental Impact Statement
DEST	Department of Education, Science and Training
DG	ARPANSA's Design Guidelines
DID	Defence in Depth
DNB	Departure from Nucleate Boiling
DNBR	Departure from Nucleate Boiling Ratio
EAR	Environment Assessment Report
EIS	Environmental Impact Statement
EMWS	Emergency Make-up Water System
ESD	Environmentally Sustainable Development
FMEA	Failure Modes and Effects Analysis
FRPS	First Reactor Protection System
FSAR	Final Safety Analysis Report
FSS	First Shutdown System

HIFAR	High Flux Australian Reactor
HLW	High Level Waste
HRA	Human Reliability Analysis
IAEA	International Atomic Energy Agency
IBP	International Best Practice
ICRP	International Commission for Radiation Protection
IGNS	Institute of Geological Nuclear Sciences
ILW	Intermediate Level Waste
INVAP	The Argentinian company contracted by ANSTO to build the proposed replacement reactor
ISO	International Standards Organisation
LEMC	Local Emergency Management Committee
LHSTC	Lucas Heights Science and Technology Centre
LLILW	Long Lived Intermediate Level Waste
LLW	Low Level Waste
LOCA	Loss of Coolant Accident
LTPCS	Long Term Pool Cooling System
NSC	ARPANSA's Nuclear Safety Committee
NSW	New South Wales
OBE	Operating Basis Earthquake
ONBR	Onset of Nucleate Boiling Ration
OSPAR	Oslo Paris Commission
PCS	Primary Cooling System
PGA	Peak Ground Acceleration
PPF	Peak Power Factor
PSA	Probabilistic Safety Assessment
PSAR	Preliminary Safety Analysis Report
RAPs	Regulatory Assessment Principles (ARPANSA)
RAR	ARPANSA Regulatory Branch's Regulatory Assessment Report (RB-ASR-09-02)
RCMS	Reactor Cooling and Monitoring System
RPS	Reactor Protection System
RRR	Replacement Research Reactor
SA	South Australia
SAR	Safety Analysis Report
SC	Safety Criteria
SER	Safety Evaluation Report
SES	State Emergency Service
SRPS	Second Reactor Protection System
SSE	Safe Shutdown Earthquake
SSS	Second Shutdown System

USDOE	United States Department of Energy
USNRC	United States Nuclear Regulatory Commission
WA	Western Australia

11 Attachment 1 – Form letter “A”

Dr John Loy
CEO
Australian Radiation Protection and Nuclear Safety Agency
c/o Regulatory Branch
PO Box 655
Miranda NSW 1490

Cc: The Honourable Dr Michael Wooldridge, Minister for Health
Ms Jenny Macklin MP, Shadow Minister for Health

Date:

Dear Dr Loy,

Please accept this letter as a submission to the construction licence process for a new reactor at Lucas Heights in Sydney. I have grave concerns about the process for the licensing of a new reactor, and also your ability to be a rigorous and independent regulator.

I am calling on you to ensure that this process is not a mere rubber stamping exercise for the benefit of ANSTO. I submit that by issuing a licence at this time ARPANSA will pre-empt many unresolved issues and commit Australian tax payers to fund a project which has an overwhelming number of obstacles. My reasons for opposing the licence are as follows:

1. Spent nuclear fuel management unresolved

ANSTO cannot demonstrate satisfactory arrangements for the management of spent nuclear fuel from a new reactor. COGEMA does not have the correct authorisations and licences to reprocess the spent fuel rods already sent to France. ANSTO's claims that the contract with COGEMA will cover the first fuel loads from the new reactor are spurious – the contract specifies that COGEMA does not offer these services for the intended fuel and COGEMA has only provided an additional “in principle” indication. The “back-up strategy” of sending spent fuel to Argentina is fanciful. Argentina has neither licences nor facilities to condition waste and the importation of spent fuel is potentially unconstitutional. The Argentinian courts have not resolved the issue of constitutionality. One real possibility is that spent fuel will be dealt with in Australia and this has not been addressed in any way during this process. It would be unconscionable to issue a licence with this issue outstanding.

2. Nuclear waste management unresolved

ANSTO cannot demonstrate a coherent nuclear waste management strategy. While Minister Minchin has declared that an intermediate radioactive waste store will be built on Commonwealth land, his panel of experts is no nearer to determining where it will be and will not release their findings until the 2nd half of 2002. Also, there can be no establishment or licensing of this facility until a proper EIS is undertaken and several licences issued by ARPANSA, potentially in 2003. This cannot be claimed as an “acceptable state of progress”. Issuing a construction licence at this time would pre-empt a satisfactory outcome of required processes and run roughshod over the concerns of communities that may have to live near an Australian waste site. I also note that there will be no progress on the low level repository EIS until after you are scheduled to issue the construction licence.

3. Reactor safety and emergency issues

There are serious concerns with the hypothetical “reference accident” submitted. It makes assumptions about seismic risk that cannot be sustained. This has been established by Sutherland Shire Council and independent commentators have shown that the level of seismic risk is open to question. Therefore, the reference accident must be completely redone with appropriate seismic risk assumptions. Otherwise, the reference accident is, for the basis of this project, unusable.

Given all these impediments, I demand that you do not issue a construction licence to ANSTO for the new reactor at this time.

Yours Faithfully,

Signature

Name:

Organisation (if applicable):

Address, postcode, phone, email.

12 Attachment 2 – Form Letter “B”

John Loy
CEO, Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)
ARPANSA Head Office and Regulatory Branch
PO Box 655
Miranda NSW 1490

Dr Loy,

I am writing to express my opposition to the proposal for a new nuclear reactor.

We do not need a new reactor for medical purposes. There are much cheaper, cleaner, safer ways of producing medical isotopes such as cyclotrons and synchrotrons. These alternative methods of production do not produce long-lived radioactive waste, that stays radioactive for 250,000 years with no method of safe storage or disposal.

We do not need a new reactor for scientific purposes. We do not need to spend approximately \$500 million of taxpayer money from the Scientific Research Budget on a new nuclear reactor. Internationally, reactors are seen as outdated technology. Scientifically, Australia is giving up the opportunity to be the leaders in cyclotron and other scientific research by proposing to build this new reactor.

We do not need a new reactor on national interest grounds. As Australia is a signatory to the International Nuclear Non-Proliferation Treaty, we should not be building nor advocating nuclear technologies. Diplomatic efforts are a much more sensible way to encourage a nuclear free zone like New Zealand, this would send a much more stronger and more legitimate message to the world regarding nuclear non-proliferation.

The proposal for a new nuclear reactor poses an enormous risk and possible danger to the residents that live within an 80km radius of the reactor, which is the approximate fallout zone suggested by Daniel Hirsch, American Independent Nuclear Safety Expert. This zone reaches from Kiama to the Blue Mountains to Newcastle. This proposal is certainly not in the interest of the residents in the wider Sydney basin.

There have been three separate incidents of threats of sabotage/terrorist attack at the Lucas Heights Reactor. These occurred in 1983, 1984 and recently two men have been charged in New Zealand linked to Osama Bin Laden’s terrorist organisation over threats made prior to the Sydney 2000 Olympics. Certainly citing the reactor next to the largest population concentration in Australia is a ludicrous proposal.

Particularly I am concerned that approvals for the new reactor are halted until recommendations by the ‘1983 Research Reactor Review’ and the ‘May 2001 Senate Inquiry into the contract for a new reactor at Lucas Heights’ for an Independent Public Inquiry are met. Both inquiries had serious doubts over the need for a new reactor. Both Inquiries had serious doubts over the need for a new reactor.

I call on you to recommend a Public Inquiry when you announce your response to the Construction Licence Application for the new reactor in February.

Yours Sincerely

(Name and Address)

13 Attachment 3 – Form Letter “C”

Joyce Papworth
ARPANSA Sydney Office
PO Box 655
Miranda NSW 1490

Cc: Dr John Loy
CEO ARPANSA

Date:

Attention: Joyce Papworth

I am responding to the second round of public submissions against the approval to construct a new nuclear research reactor twice as large as the current HIFAR.

I feel the a few important issues have not been addressed sufficiently and to build a new reactor would be a step backwards for the world rather than forwards for a non-radioactive future.

The issues I believe have been white-washed over are of grave concern to the surrounding community of Sutherland Shire. Also creating a legacy of high radioactive nuclear waste to be imposed onto a community somewhere out of sight out of mind.

Please strongly take into account the following points:

- Radioactive waste and spent nuclear fuel is still unresolved! – you mentioned in section 1.16 that it is controlled and safe, but by what standards.
- What are the international regulations for the safety of transportation of such materials and can you guarantee safe storage for the life time of highly radioactive waste that lasts for 250,000 years?
- Where will the waste from the new reactor be stored?
- until the environment impact statement has been completed, regarding the low level and intermediate level waste dumps – (which is not until February and later in 2002). Approval should not be given to construct a new reactor and create a further problem of high level radioactive waste storage.

South Australia and various other states have passed legislation through the state governments preventing intermediate and high-level nuclear waste either being transported or stored on their land.

Around 80% of South Australian voters and people all oppose the idea of a national waste dump being imposed in our outback and the indigenous community is strongly opposed to any process of the nuclear cycle and wishes uranium to be left in the ground!

Too much controversy exists within the nuclear industry and to build a reactor, costing taxpayers over half a billion dollars, creates a responsibility for future generations who will be left to deal with the waste problem which is being created for them.

I demand a nuclear free future ! –
No R – No Waste – No Mines – No Weapons

Thank you for acknowledging my submission.

Signature: _____

Name: _____

Address: _____

Any further comments against the nuclear reactor being constructed