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SENATE

SELECT COMMITTEE FOR AN INQUIRY INTO THE CONTRACT FOR A NEW REACTOR AT LUCAS HEIGHTS

Reference: Inquiry into the contract for a new reactor at Lucas Heights

WEDNESDAY, 25 OCTOBER 2000

SYDNEY

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SENATE

SELECT COMMITTEE FOR AN INQUIRY INTO THE CONTRACT FOR A NEW REACTOR AT LUCAS HEIGHTS

Wednesday, 25 October 2000

Members: Senator Forshaw *(Chair)*, Senator Chapman *(Deputy Chair)*, Senators Allison, George Campbell, Lightfoot, McLucas and Sandy Macdonald

Senators in attendance: Senators George Campbell, Chapman, Forshaw, Lightfoot and McLucas

Terms of reference for the inquiry:

To inquire into and report on:

(a) the need for a new research reactor, including:

(i) the validity of science and industry enhancement claims of the Australian Nuclear Science and Technology Organisation (ANSTO) and the Commonwealth Government,

(ii) the adequacy of supply, and the cost, of radioactive sources and nuclear medicines used in diagnosis and treatment,

(iii) the opportunities for alternative sources of nuclear materials for medical applications, such as additional cyclotrons at appropriate locations,

(iv) the validity of nuclear expertise and national interest claims of the Department of Foreign Affairs and Trade, the Australian Safeguards and Non-Proliferation Office, ANSTO and the Commonwealth Government for the replacement reactor, and

(v) consideration of alternative approaches and means through which Australia's national interests in nuclear disarmament and non-proliferation and nuclear safety can be supported and advanced;

(b) the process leading up to the signing of a contract in June 2000 with INVAP of Argentina for the construction of a new nuclear reactor at Lucas Heights, with particular reference to:

(i) the quality and accuracy of information relied on in assessing the tenders, including a review of how the economic, environmental and public health impacts were considered,

(ii) the probity of the tender arrangements and the accuracy of the cost assessments,

(iii) the checks made of the record of the preferred tenderer, INVAP, and its capability to undertake the project safely and economically and its record in matching international best practice in other projects, and

(iv) public access to information about the proposal and the consideration of issues raised through the public consultation process;

(c) the nature of the contractual commitments entered into and the degree to which they are binding on the Commonwealth, including in the event that not all approvals are obtained and all other preconditions met, or that a future Government decides not to proceed with the reactor, with particular reference to:

(i) the timeframe and process to be followed by the Australian Radiation Protection and Nuclear Safety Agency in considering the issue of a construction licence and an operating licence, and the consequences under the contract if such licences are not issued,

(ii) any other requirements for approvals from the Commonwealth, state or local governments and the consequences if such approvals are not obtained,

(iii) the consequences if preconditions set in the Environmental Impact Statement and other previous inquiries are not met at the time of granting of a construction licence,

(iv) the nature of any provisions in the contract related to the ability of either party to terminate the contract prior to completion and the provisions in relation to compensation for termination, and

(v) whether all or part of the contract and other documents created during its consideration and approval should now be made public;

(d) whether the preconditions set by previous inquiries and assessments into this proposal have been adequately met prior to the contract being entered into, with particular reference to:

(i) fulfilment of each of the conditions for approval set out in the draft Environmental Impact Statement and its supplement report, including requirements for waste management,

(ii) whether the recommendations of the Economics References Committee inquiry into the Lucas Heights proposal which reported in September 1999 have been adequately responded to,

(iii) the adequacy of occupational and public safety protection procedures, and

(iv) the adequacy of nuclear incident plans and emergency procedures; and

(e) the adequacy of proposed fuel and waste management provisions in the contract (or yet to be finalised), with particular reference to:

(i) the specific fuel proposed to be used and its source, the type of fuel rods and where they will be manufactured,

(ii) the proposed spent fuel management arrangements during operation,

(iii) the arrangements made to ensure that spent fuel rods can be reprocessed, stored and ultimately disposed of safely,

(iv) whether the new reactor is subject to negotiation of satisfactory contracts for international reprocessing of spent fuel rods; and, if so, which countries will be involved and will these contracts be subject to a provision which requires the return of Australian waste as is the case with some of the existing Lucas Heights fuel rods, and

(v) the timing of any requirement for the provision of an Australian long-term waste storage facility for rods from a new reactor.

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WITNESSES

Committee met at 9.24 a.m.

McSORLEY, Ms Jean Sarah (Private capacity)

CHAIR—I declare open this public hearing of the Senate Select Committee for an inquiry into the contract for a new reactor at Lucas Heights. This is the second day of public hearings to be conducted by the committee. Hearings were previously held in Canberra on Monday, 9 October, and transcripts of that hearing are available on the Internet. The committee will be conducting further hearings tomorrow in Parliament House, Macquarie Street in Sydney and in Canberra on Friday of this week and Monday of next week. We will then be scheduling further hearings as required.

I welcome Ms Jean McSorley to this hearing this morning. Would you like to make a statement about the capacity in which you appear before the committee today?

Ms McSorley—I appear in an individual capacity and also in my position as representative of the interests of the general public on the Nuclear Safety Committee of the Australian Radiation Protection and Nuclear Safety Agency.

CHAIR—The committee prefers that all evidence be given in public, but if at any stage you wish to give any part of your evidence in private, you may ask to do so and the committee will consider any such request. The committee has before it your submission, together with two supplementary ones. I think you have also provided us with some additional material this morning, which I will come to in a moment. Firstly, in regard to the original submission you sent in and the two supplementary ones, are there any alterations that you wish to make?

Ms McSorley—I think there is only one in my original submission. At one stage I said that INVAP is actually developing a new uranium-molybdenum fuel and that was meant to be CNEA. I just want to be exact about that. I will tell you where the distinction between INVAP and CNEA is quite problematic: it starts on page 1, the second paragraph from the end. Apart from typographical errors, that is it.

CHAIR—In respect of additions to your submissions, I have two documents here this morning which I believe you have provided to the committee. Do you wish those to be added to your original submission?

Ms McSorley—Yes. Thank you.

CHAIR—If there are no objections from any member of the committee, it is so ordered that they be treated as additional parts to the original submission. I now invite you to make a brief opening statement and then we will proceed to questions from members of the committee.

Ms McSorley—Firstly, I would like to thank the committee for inviting me to give evidence. I would also like to thank Dr Dermody and the rest of the secretariat staff for their prompt replies and help in advising on the committee process. In 10 years of giving evidence to committees, I have never before been met with such efficiency—all the more remarkable given the constraints on so many areas of parliamentary work.

There are some issues I would like to touch on in my opening address to the committee: national interest, nuclear waste and spent fuel management. I apologise for making a late submission to the committee on national interest, but pressure of work delayed my response on this matter. However, the delay did give me the opportunity to make comments after reading some of the other relevant submissions. It seems that attempts are being made to justify the reactor on national interest grounds, in particular, through linking it to Australia's position on the board of governors of the IAEA, the International Atomic Energy Agency. Professor Garnett told the committee on 9 October that we have that seat by virtue of our study in regard to the work we do not only in safeguards research but also in nuclear safety and nuclear applications. To say this is a disingenuous answer is an understatement. Australia's role as a uranium supplier and its activities as the white man of the Asia-Pacific nuclear club have virtually blinded humans to whatever nuclear doctrine the UK and the USA prescribed. These have been key factors in obtaining and keeping this position. Technical matters have come a poor second. The notion that a reactor is important or absolutely essential in helping Australia keep its position on the designated seat of the board of governors of the IAEA must be challenged.

The conflict and aims of the IAEA as a promoter of nuclear technology and industry watchdog may actually be something that Australia wants to distance itself from. It might in some circumstances be able to do better work in the safeguards and the non-proliferation field if it were not a member of the board of governors. The official view supposes, however, that only good things flow from the IAEA position. However, the obligation of this position empowers Australia to sell uranium, aid dual use technology transfer and consent to plutonium transfers. This must be questioned. Another claim on national interest is that Australia needs a new reactor in order to be able to take part in safeguards, non-proliferation work and provide assurances on nuclear activities in the region. Unfortunately, these assurances are used not only to alleviate concerns on overseas nuclear programs but also to justify further uranium sales, the transfer of weapons useable plutonium and the spread of dual use capable nuclear technology.

On this last point, I was particularly struck by the point raised by Mr Elbaradei, the Director General of the IAEA. In his submission to the inquiry, he noted that another example in the field of verification would be the opportunity offered by the reactor for Australia to assist in enhancing safeguards approaches for higher power research reactors of potential proliferation significance. This acknowledges the problems of the nuclear industry, which is that so much of the worth of the industry is questionable because of the potential for military use of both the technology and the materials. Such matters invariably lead this discussion on the work of Australia to what work Canberra does under the auspices of the Non-Proliferation Treaty. Having attended the NPT review conference in New York this year, I can say that the rosy view painted of Australia's perceived position in non-proliferation is not shared by all other national governments on many international disarmament organisations. Indeed the work of Australia described so aptly as raging incrementalism was seen by many as a steady as she goes approach that does nothing to aid initiatives to progress even the most disarmament measures. Key matters such as de-alerting nuclear weapons are vital. I remind the committee that we live in a world where there are 5,000 nuclear weapons on hair trigger alert. Australia did nothing to press this issue.

It is true however that, as a member of the G10 countries, Australia did much groundwork in areas on promoting safeguards and greater adherence to and transparency on technology transfer and so on. However, much of the good work that was done by Australia was undermined by its

pro-nuclear activities. Indeed, in discussions with Australian diplomats, it became very clear that Australia was being used as a sounding board on some issues because it takes such a conservative approach on non-proliferation issues. All of the above notwithstanding, the safeguards regime is an inevitable part of overseeing those technologies and nuclear materials already spread around the planet. It is an area Australia could make more significant contributions to. It is in this context that the new reactor that will see at least $500 million spent on it has to be considered against the annual budget for the Australian safeguards and non-proliferation office of about $1.4 million. The money allocated for the reactor would be far better spent on improving safeguards in non-proliferation and disarmament through technical approaches and other measures that do not utilise reactor technology. However, such work can only start from a position of honesty. Australia must recognise that its support of the US nuclear weapons system, the ANZUS, and potentially through the proposed national missile defence system will only continue to harm its reputation and efforts on non-proliferation work.

I would now briefly like to turn to the issue of nuclear waste and spent fuel management. You already have the submission on this and have had more time to read it, which is why I am spending less time on it than on the national interest matters. I apologise for making the second submission a late submission on this issue. As you will see from that paper, I have been waiting on replies from both INVAP, the Argentinean vendor for the reactor, and ANSTO on key points concerning spent fuel management.

The second submission contains concerns to key issues—namely, who will deal with what type of spent fuel, when and how? In particular, if the organisation to deal with the spent fuel is INVAP, at what facilities will it handle the spent fuel? At this time, there is no guarantee that Argentina can or will accommodate spent fuel from Australia either by reprocessing or conditioning. I doubt that such guarantees—and I mean real guarantees—will ever be available.

ANSTO and ARPANSA must therefore be asked if there are contingency plans if the original plans do not progress. What might happen here in Australia if the spent fuel does not go offshore? Similarly, what of the long-lived intermediate level waste created from isotope production? What are the guarantees over the secondary processing of these wastes, their removal from Lucas Heights and their long-term disposal? These are just some of the questions the committee needs to ask. However, quite how the committee will get access to the information it needs is hard to guess, for ANSTO will not willingly part with it.

When dealing with ANSTO, I am always reminded of that famous exchange, also in an inquiry on nuclear issues, when a British official was accused of being economical with the truth. ANSTO is not so much economical with the truth as positively miserly with it. Its scrooge-like approach to giving information is truly amazing. To date, ANSTO has claimed almost all its documents—those most relevant—are commercial-in-confidence or covenant-in-confidence. ANSTO's attitude is, however, not acceptable—certainly not from a government agency made up of public servants paid by the taxpayer. ANSTO must be made accountable to parliament; it must be made to disclose the details to the committee and the public on the issues it is seeking information on. No less will suffice.

ANSTO is not a private company risking its own venture capital; it is a government body risking hundreds of millions of dollars of taxpayers' money. The risk is not just financial, either. The operations at Lucas Heights represent the single biggest source of radiological risk

anywhere in Australia, and to Australia's biggest city. ANSTO intends to create more radioactive waste over the coming 40 years, despite having singularly failed to appropriately deal with the material it has already stockpiled. It has to answer the questions put to it on these issues. We demand, as citizens, to have our public agencies fully accountable. Those who claim to act in our interests, who use our money and who risk our health and wellbeing have to be made answerable. We look forward to this committee upholding and progressing those rights through its investigations and deliberations.

CHAIR—Thank you very much, Ms McSorley. Thank you very much also for your submissions that you have given to the committee. You certainly have put a lot of work into them and have provided us with a great deal of important information. We will now have questions.

Senator McLUCAS—On the issue of safeguards, there is a view that ANSTO is a world leader in developing safeguards methodology—if that is the correct word. Do you have any comments on that?

Ms McSorley—There are areas where ANSTO and the Australian Safeguards and Non-Proliferation Office—which I will refer to as ASNO—are certainly making great strides forward. These are not, however, all connected with the reactor. A short article I found in the *Sydney Morning Herald*, I think, last year talks specifically of Australia's role in developing accelerator technology—the tunnel accelerator—to improve testing of environmental samples as part of safeguards work. Now that is a source of technology—that should be not only be used here but also spread—that we would advocate is used rather than a reactor. It seems to me that in the safeguards field there has been the proposal for the reactor, and certain aspects of safeguards work in terms of utilising technology have been added on to the reactor proposal.

There are other ways of progressing safeguards, other than technology. There is the actual political system that supports the safeguards regime. Universal adherence to safeguards is an absolutely critical factor; Australia could put more effort into that. They could put more money into remote surveillance systems that give real-time monitoring, and access to the International Atomic Energy Agency. There is a whole field of areas that they could put more money into, rather than just tagging future safeguards developments on to a very expensive reactor.

Senator McLUCAS—Can I just go to the issue of U-Mo and silicide. For the record and for my clarity on the issue, can you tell me about how the proposed reactor is to use silicide for the first two events and then convert to U-Mo? Can you also talk to me about how the waste and the spent fuel is to be managed? I know it is a huge ask. I suppose the issue that I am really interested in is the difference between reprocessing and conditioning.

Ms McSorley—First, to answer on the silicide and uranium-molybdenum fuel issue, I am not a technician. However, I certainly have enough of an understanding of the industry to say that silicide fuel is the fuel most widely used at the moment. But, because it cannot be reprocessed easily and therefore does not come under the policy on reprocessing that ANSTO wishes to pursue, they do not want to use that fuel beyond at least the first two fuel lots, if at all. The proposal at the moment is to try to utilise uranium-molybdenum fuel from the outset—or this is what ANSTO says—however, that fuel will not be worldwide qualified until 2005, when the reactor is due to be opened. The fall-back position is that, for the first two fuel loads, ANSTO

will use silicide fuel. Silicide fuel is not easily reprocessed. Under the agreement with COGEMA, which is the French company that has the current reprocessing contract with ANSTO, it would be possible to reprocess silicide fuel for the first two years.

CHAIR—I am sorry to interrupt at this stage, but I take it there is a different fuel used at the moment at HIFAR; that it is not silicide and that it is obviously not U-Mo?

Ms McSorley—It is not uranium molybdenum. It is a highly enriched uranium fuel. They are all aluminium clad, which is one of the problems with conditioning and reprocessing. More modern research reactors use a variety of fuel, so there really is a plethora of different types of fuels used. But, in general, for the type of reactor Australia is looking at, it wants high density fuels in order to be able to meet the criteria on performance and safety. At the moment, those are not available in the form that ANSTO would wish, so they would probably have to use silicide fuel.

I will try to get back to the original point I was at. ANSTO says that it can have the silicide fuel dealt with under the COGEMA contract for the first two fuel loads. If, for whatever reason, it then has to go beyond those first two fuel loads using silicide fuel, it claims it has an agreement within INVAP, that INVAP will deal with the silicide fuel. However, my understanding is that INVAP, or, rather, its national partner organisation, CNEA, does not actually have facilities to reprocess or condition any spent fuel at the moment—not just silicide but a whole range of spent fuels. I have been told that these are under construction. However, how far developed they are or whether the Argentinean people will take kindly to this idea of reprocessing overseas fuel or even reprocessing their own fuel is highly questionable.

So then we come back to the issue of conditioning and, again, there are many different forms of conditioning. There is melt and dilute, where you take the fuel rod and you simply dilute it. You melt it down and deplete the uranium in it through adding additional uranium. So you reduce the enrichment level of uranium 235 to between three and one per cent. That, in theory, makes it easier to handle in terms of reducing criticality risks when you put it into a solid block and then put it into the geological repository. There are other methods. In fact, I could provide the committee with a copy of the pages from the American environmental impact statement by the United States Department of Energy where they actually detail in lists of, say, 10 different conditioning options that the US is considering. At the moment, the favoured option in the US for conditioning spent fuels of all types is melt and dilute.

I noticed that in a paper that ANSTO sent me yesterday—very kind of them—they say that if that melt and dilute process is not developed, for cost, technical or environmental options they will go back to considering the direct disposal option for spent fuel. But, to be quite honest, the question might as well be how many angels can dance on the head of a pen, because there are so many aspects to this. There are so many unanswered questions and ungiven guarantees that I think it is going to take some time for you to further unravel this.

Senator CHAPMAN—We have just had questions in relation to silicide pure and yet in ANSTO's response to you that we have before us it is clearly stated that it is not anticipated that silicide fuel will be required, so why are you focusing so heavily on silicide fuel? ANSTO makes very clear that there is no basis for your view, Ms McSorley, that silicide fuel is suitable for direct disposal. There can be no direct disposal arrangements.

Ms McSorley—There are two things. It appears again from the documents given to me by ANSTO yesterday that silicide fuel could be made ready for direct disposal. The fact that the US Department of Energy is considering melt and dilute for this does not mean that it cannot be prepared for direct disposal. I will make these papers available to the committee, obviously.

Moreover, in other evidence sent to the committee, I believe by the Medical Association for the Prevention of War, the nuclear physicist, Dr Frank Barnaby, talks about direct disposal of silicide fuel and I can provide more evidence on the controversy over this. However, to return to your original point, Senator Chapman, about the issue of ANSTO not utilising silicide fuel at all, it then brings us to another issue: if they utilise uranium-molybdenum fuel from the outset, and that fuel is not available for worldwide qualification until 2005, it seems to leave the gap for fully testing that fuel in terms of the expected performance and criteria for the proposed new reactor to be very short.

My understanding is that the final safety assessment report, which is talked about in one of the documents from ANSTO, would have to be undertaken before the worldwide qualification of the uranium-molybdenum fuel. This is a timing issue. How will ARPANSA, as the regulator, be satisfied over the effectiveness and worth of uranium-molybdenum fuel in order to sign off on the final safety assessment report if that fuel is not ready until after, or almost at the same time as, the final safety assessment report?

I cannot necessarily give you a firm answer on this and perhaps one of the recommendations from this committee could be that there be no signing off on the final safety assessment report until fully exhaustive tests have been undertaken on uranium-molybdenum fuel to prove that it performs to safety criteria as requested by ARPANSA.

Senator CHAPMAN—Surely, worldwide qualified would mean it does meet those safety requirements?

Ms McSorley—Worldwide qualified by 2005 at the earliest. I take it, Senator, you have read the submissions from Siemens and Technicatome on this very issue in which they both question—and, in particular, Siemens questions—whether uranium-molybdenum fuel would be ready by 2005, and yet the new reactor will be operating, or is meant to be operating, by then. ANSTO claim they will be using it from the outset of the actual operations. Again, this is a timing issue. To me it just does not make sense in terms of the timing. It seems to leave a very narrow gap for all of these things to happen, if indeed they were to happen in order.

Senator CHAPMAN—It might leave a narrow gap but that does not mean that that gap is not manageable or that the worldwide qualified provision will not come into place before the reactor opens. You have got no evidence to suggest that that is the case.

Ms McSorley—And this committee has no evidence to suggest that the opposite is the case either.

Senator CHAPMAN—We will know in 2005.

Ms McSorley—That is something of a gamble I would not encourage people to take.

CHAIR—We have to report before then.

Senator CHAPMAN—You would be aware of two major reports that have recently come out—the Batterham report and the Miles report—relating to the need for a greater priority to be given to science, innovation and entrepreneurship in Australia for the welfare of Australia's future. Do you seriously suggest that we can go into the future supposedly giving this higher priority to science and technology without leading edge nuclear research being part of that science?

Ms McSorley—I think there are a few issues in that. First of all, I have not read the reports fully that you refer to, and I do not pretend to give, in front of a committee, evidence to the contrary. However, I do have a broad understanding of the issues relating to the reactor and nuclear science. Having spent many hours talking to ANSTO officials and other nuclear scientists and scientists in general in Australia, there is significant debate as to whether everyone wants to pursue nuclear science. A reactor is the best way to do that. There are other nuclear technologies, spallation sources and cyclotrons that nuclear science research can take place on. Again, this is a question of values: what value you think you would get from the reactor as a potential multifunction facility and whether there are, in fact, other measures that Australia should be taking which are far more relevant to health and wellbeing, such as tackling climate change and really pouring huge amounts of money into not just developing further renewable energies and technologies but also offsetting the effects of climate change.

So there are many questions, and I never think that these have been properly addressed. I do not think that the scientific community has been approached properly on this issue. The fact that the Chief Scientist of the government at the time this proposal was put forward was not asked about this issue is one indication of the bad way in which this issue has been dealt with. But I do not wish to take that further, because I know you will be hearing evidence from both sides on this later in this hearing.

Senator CHAPMAN—Isn't it important for Australia to remain at the forefront of nuclear research and nuclear science rather than being dependent on obtaining information second-hand, and I guess with some considerable delay, from either America, the United Kingdom or other sources that are remaining at the forefront? Australia might finish up perhaps like New Zealand or other countries that are dependent on us to get information second-hand and with some delay on these issues.

Ms McSorley—It depends on what you mean by being at the forefront of nuclear research. Do you mean research into nuclear fuel cycle developments in terms of proliferation safeguards or do you mean nuclear research in general, because there are many different types of facilities that are used for nuclear research and many of them are not reactors?

Senator CHAPMAN—They are not mutually exclusive either. They are additions rather than substitutes in many instances.

Ms McSorley—I think that rather than being additions they should be seen as being complementary. What Australia is actually proposing to do is replicate technology which already exists overseas rather than develop important complementary technologies, and that is an issue that the committee could consider. But we are dependent on other countries in so many

other areas of nuclear research anyway, that to be dependent in some of the areas on reactor research is not necessarily a bad thing if it frees up resources to develop further and initiate complementary technologies and research on other aspects.

Senator CHAPMAN—Do you accept the evidence that it is not practically feasible for Australia to be dependent on foreign sources for its supply of medical isotopes because of our distance away from those sources and the timeframes involved in transport and so on?

Ms McSorley—In 1993 we gave—and when I say 'we', at the time I was with Greenpeace—evidence to the research reactor review on this. Some months later we had discussions with the ANSTO scientists from the Royal Prince Alfred Hospital medical cyclotron, with scientists from Melbourne and with people from the University of California, Davis School of Medicine. We had discussions with officials in the health department and we put forward a collaborative project proposal to look at the issue of utilising cyclotrons to make isotopes in this country, and that was not progressed.

However, since that time, some of the issues concerning the creation of isotopes using cyclotrons have been developed further. I do not believe there is any doubt that you can make the main isotope, technetium, from using cyclotrons. There is a question at the moment of a cost, and to some extent it is dependent on the type of cyclotron yield. I think at the present we are in exactly the same position that we were in many years ago with developing renewable energy resources, where, because money was poured into the traditional energy systems of fossil fuels and nuclear power, the renewable energy resources simply were not getting the resources for development that they needed. Many of the questions on that have now been answered. I believe the same is true of cyclotrons and other non-reactor sources for medical isotopes. At the end of the day the cost comparisons may be that we would rather not build a reactor, because of all of the risks and the environmental problems inherent in that, and even pursue more costly sources of medical isotopes—if indeed they are more costly—than utilise reactor technology. Again, these are issues that the committee has to consider.

Senator GEORGE CAMPBELL—Ms McSorley, are you aware of any technological developments that are occurring with respect to alternative technologies for the production of radioisotopes for medical use?

Ms McSorley—Those technologies already exist.

Senator GEORGE CAMPBELL—Are you aware of any other research that is occurring in this field?

Ms McSorley—No. When I say no, I am not aware that those that already exist are being developed further in a significant commercial sense. As I understand it, this market is already oversubscribed in terms of the amount of isotopes available to the market from reactor technology. In particular, the Canadian suppliers have pretty well cornered much of the market. It is understandable to a degree that many countries are not rushing out to build cyclotrons in order to challenge that market or to be a competitor in it. Developments are taking place, albeit very slowly. My understanding—again, I am sure you will hear further evidence on this—is that there are no major commercial developments on it because of the oversupply already on the market.

Senator GEORGE CAMPBELL—The Canadians supply most of the radioisotopes to the American market; the US does not have any nuclear reactors of the type that we are talking about?

Ms McSorley—Do you mean the type that Australia is proposing to use?

Senator GEORGE CAMPBELL—Yes.

Ms McSorley—I read recently that they are talking about developing reactors for isotope production, or as part of the development of a reactor there may be some isotope production as part of research reactors. I cannot say what types of isotopes in particular that they will be producing using those reactors, because those developments are going on at present. By and large, the majority of isotopes that are used in the majority of applications for medical uses are produced for the American market in Canada.

Senator GEORGE CAMPBELL—In your submission you talked about the different types of fuel that will be used in this new reactor. You also made the comment that many of the details of discussion of fuel types are not known to ARPANSA. You sit on one of the committees of ARPANSA. Can you explain to us what the role of ARPANSA will be in this whole process? Will ARPANSA have any influence on the final outcomes as to what will occur regarding this new reactor or is it simply sitting on the sidelines and watching?

Ms McSorley—This is only my opinion: I believe that ARPANSA feel somewhat frustrated by the way the current process has happened. They are not privy to the tender documentation or discussions on the contract et cetera. They are, however, now in a position of having to give evidence to inquiries and to make responses to the public on areas that they cannot give answers on. There is bound to be frustration. I believe that they take a very professional approach to their work, that they are keen to pursue a more open and transparent policy on nuclear issues. However, they will not become enmeshed in the details of this until the reactor design is given to them by INVAP and ANSTO in the middle of next year. I believe it will only be then that they will get their hands on some more of the details. Again, whether they will get to see costings on some of these issues, I cannot say. It is a very difficult process at the moment.

Senator GEORGE CAMPBELL—Do ARPANSA have a role in issuing the operating licence for the reactor?

Ms McSorley—They do indeed. They would have to issue the construction licence; they would have to sign off on the safety assessment report; they would take part in checking the reactor design, performance and criteria; they would hire an independent reviewer of that information; they would issue an operational licence, a decommissioning licence. They are the Commonwealth's regulator.

Senator GEORGE CAMPBELL—If that is the case, why do you feel they have not had access to the documentation at this stage?

Ms McSorley—I cannot answer that. Only ANSTO and ARPANSA can tell you why it is that the national regulator of these issues has been kept out of the process to do it. It is partly the way the act was put together, the way in which anybody applying for a licence for a nuclear

facility is made, or rather not made, to provide information at certain points in the process. When the act was put together in late 1998, and when the debate was raging over this, one of the issues we pointed out was that it may be that there would be significant gaps in terms of timing it when the regulator was actually brought into the process to be able to answer important questions—and I think we are now in one of those periods. ANSTO and INVAP are not forced under any requirement to part with this information until the middle of next year.

Senator GEORGE CAMPBELL—Do you think it would be difficult for ARPANSA if we spend $500 million or whatever in building a new reactor and then, once it is constructed, make a judgment that it is not up to the standard capable of being licensed?

Ms McSorley—ARPANSA could make the judgment that it is not capable of being licensed. Whether they would be able to get the government to follow through on that recommendation I would think is highly questionable. There may be some delays, but I think we would be in a position where a whole series of make-do approaches would come into being in order to get the reactor operating. I have dealt with nuclear agencies not just in this country but particularly in the UK where I had a lot of dealings with the nuclear installations inspector. He was quite clear that any regulatory agency works in a political framework and we cannot pretend otherwise. If they feel that they are under pressure from the government of the day to go ahead with opening a given facility because of the money already invested in it, they will invariably do what they can to make that go ahead even if some of them believe that it is not necessarily the best thing to do, and I have seen that with other agencies. I believe that the people at ARPANSA would do their best to make all the issues known. I believe that they would push for the best safety criteria, given their terms of reference and how they view these things. Let us be honest, these are people who, by and large, think that you cannot create reactors safely. I hold a slightly different viewpoint. I do not think they would be reckless in their decision making, but whether they could withstand the political pressure to not open that facility is a very big question. I doubt they would be able to withstand it.

Senator GEORGE CAMPBELL—So you are saying that the further this process goes along without them getting access to all of the information to make those value judgments, the further it would force them into a position of virtually having to compromise.

Ms McSorley—Indeed. I think it makes it more and more difficult not just for them but also for any future governments and for any future hearings or inquiries that might take place on this issue. I would point out that—and this is about the fourth committee I have faced over the years on these issues—you yourselves do not have access to some of the most basic information. You have not seen the contracts on spent fuel reprocessing. I think it is a completely unacceptable situation that this information is not being made known.

CHAIR—I will ask a question in view of the discussion you have just had with Senator Campbell about ARPANSA. You are a member of the nuclear safety committee of ARPANSA, and ARPANSA, as I understand it, has a number of committees—as well as a board?

Ms McSorley—No it does not have a board; it has a CEO.

CHAIR—We will be hearing in due course from Dr Loy, the CEO of ARPANSA but, just so that we get this clear, the ultimate licensing power rests with the CEO of ARPANSA, doesn't it?

Ms McSorley—Yes, it does rest with the CEO, but I believe that that is made as a recommendation to the minister and that, ultimately, the minister cannot question or perhaps overturn that decision. Whether that would happen is another issue. These decisions are made as recommendations to the minister.

CHAIR—What do you see is the role of the committee that you sit on, the nuclear safety committee within ARPANSA, in respect of being involved in the overall process which leads to the CEO making his decision? Is your committee involved? Do you expect to be involved?

Ms McSorley—We have absolutely no decision making powers. Various members, depending on their interests or their qualifications, take part in different aspects of looking up papers and reports for the committee. For example, there was a working committee on the safety assessment principles, which I sat on. There is the design criteria for the construction and modification of nuclear plants. That is another working committee. It is a mechanism whereby the public, local authorities or different people can have input into the process but they do not have decision making powers. My view is that my role is to question and to search out information where I think it is appropriate and to try not just to put the hard word on ARPANSA about these things but also to work with them to encourage them to make the process more transparent.

CHAIR—Are you as a member of that committee and the committee itself provided with all the information in regard to the things that you are supposed to be looking at? For instance, you mentioned earlier the contract for reprocessing spent fuel. You have also mentioned safety issues in regard to the design. What access do you and the committee that you sit on have to documentation from ANSTO to assess all that information?

Ms McSorley—We do not have significant access to information. We have access to those documents primarily that ARPANSA is developing as a regulator to regulate the industry. We do not have access to the contracts or to any aspects of ANSTO's activities. In fact, one of the problems we have with ARPANSA is that there is something of a hit-and-miss approach at times to how they give information to the committee members and the public. I am somewhat perplexed by the way in which they do this because I think that there is by and large a willingness from ARPANSA—particularly the regulatory branch, which I deal with—to give out what information it can, but it is being done in a rather ad hoc way. Sometimes we will be at meetings and they will say that X papers can be made available. You spend months and then you have to remind the committee that they should have been handed out, and so on.

Part of the problem is how ARPANSA was set up—it hit the ground running. It has not only had to deal with the new reactor process, which is being very much pushed to the fore; it is also having to deal with licensing and regulating 40 users of nuclear activities around the country. At the moment they are an agency under pressure, and I do not think that ANSTO has responded in an appropriate fashion. In fact, I know they have not in terms of information requests from ARPANSA even on the current licensing procedures and let alone over the new reactor. That gives rise to concern for future processors because, when it comes down to the point at which the safety assessment and the design is made known to the public—for peer review and access and overview of this whole issue—we are going to be involved in a gigantic battle with ANSTO to get information out of them. I do not know if ARPANSA will have resolved all of that by then in order to make ANSTO fully accountable in those areas where it should be accountable.

CHAIR—It has been said—I cannot recall offhand; it may have been in the council's submission—that the CEO of ARPANSA has actually had access to this contract between Australia or ANSTO and COGEMA but that it has not been provided for commercial-in-confidence reasons, or whatever, to anyone else. Is that your understanding?

Ms McSorley—Yes, it is. First, I thought that the CEO of ARPANSA had seen the whole of that contract. However, in his submission to this inquiry he makes reference to having seen the parts of the contract relevant to being able to assure himself over the reprocessing conditions with COGEMA. I do not know whether he has seen the whole contract, but it is a somewhat invidious position that elected members of parliament and committees cannot see contracts and that an appointed official can see them.

CHAIR—We can ask Dr Rolland about that but the point is that the committee that you sit on within ARPANSA, which looks at nuclear safety, has not had access to that material.

Senator LIGHTFOOT—Would you be kind enough to tell the committee who appointed you as representative of the 'interests of the general public' on ARPANSA?

Ms McSorley—I was nominated by the peak environmental organisations. That nomination then goes to the CEO of ARPANSA.

Senator LIGHTFOOT—Can you name those organisations?

Ms McSorley—All of the groups in Australia—ACF, Greenpeace, the Wilderness Society and a whole range of state conservation foundations.

Senator LIGHTFOOT—You were nominated by each of those?

Ms McSorley—Collectively. One of the positions on that committee was given on that understanding.

Senator LIGHTFOOT—What is the peak body called?

Ms McSorley—I believe it has changed its name now, but I believe it is the peak conservation council.

Senator LIGHTFOOT—It is called the peak conservation council?

Ms McSorley—It has roundtable meetings with the relevant ministers of federal parliament.

Senator LIGHTFOOT—How often do you meet in the peak conservation council?

Ms McSorley—I do not meet with them. I report to them and I make reports also to other groups about the workings of the committee. I send reports regularly about issues that are happening.

Senator LIGHTFOOT—You are employed by this peak conservation council?

Ms McSorley—No, I am not employed by them. I am purely in an independent position. If I might finish, Senator Lightfoot, my nomination was not accepted just because it was made by the environment groups. It was also because the CEO judged that I had enough understanding of the workings of the nuclear issue to be able to sit on that committee. That appointment or that recommendation is finally signed off on by the minister. There is a combination of processes in that position being given; it is not just, 'You represent the environment groups so we'll give you this position.' It is also based on an understanding of processes relevant to the workings of that committee.

Senator LIGHTFOOT—If you are not salaried by that committee, who are you salaried by?

Ms McSorley—At the moment I am doing research with the Medical Association for the Prevention of War. I am paid as a consultant. I am doing research on a book and a documentary with someone independent—I am being paid to do some work on a book and a documentary with a well-known activist.

Senator LIGHTFOOT—Who is the well-known activist?

Ms McSorley—That is really a confidential issue.

CHAIR—Can I just interrupt and say I am not sure where you line of questioning is leading, Senator Lightfoot?

Senator LIGHTFOOT—If you waited, Mr Chairman, you might find out.

CHAIR—We do not have all day. I have allowed you to proceed with the questions but I am not really sure how it is relevant to our terms of reference. The fact of the matter is, whether one agrees or disagrees with Ms McSorley's evidence, Ms McSorley has appeared many times before Senate committees and this is the first time I think I have ever heard detailed questions about these issues. I am not really sure that they are relevant.

Senator CHAPMAN—In previous hearings we have asked witnesses questions regarding their experience and qualifications.

Ms McSorley—If you want to have some understanding of my experience and qualifications to comment on this—

CHAIR—I think in regard to Ms McSorley they are on the record already. That is the point I am making.

Senator LIGHTFOOT—You might like to just repeat those ones that are on the record, starting with your qualifications, Ms McSorley.

Ms McSorley—I have a masters degree in policy studies. I have 20 years experience in working on the nuclear industry, not only in this country—

Senator LIGHTFOOT—On the nuclear industry?

Ms McSorley—On the nuclear industry, not in it, not only in this region but in—

Senator LIGHTFOOT—You are working against the nuclear industry might be a more appropriate way of saying it.

Ms McSorley—There are also positive aspects to my work. I believe that the input I have had over the years as a campaign adviser on issues such as radiation, health and protection issues has been, by and large, positive. I am a published author on this issue. I have made numerous submissions not only to Australian committees but also to the House of Commons and the European Parliament. I would describe myself as somebody who is more than adequately qualified to comment on many of the policy processes and the framework in which nuclear activities are undertaken. As I said earlier, I do not pretend to be a technical adviser on this, but I believe my qualifications stand the test.

Senator LIGHTFOOT—Let me perhaps exploit that qualification that you say is more than adequate. Would you be kind enough to tell the committee what cyclotrons in the world, and the country, produce molybdenum-99 and technetium-99m?

Ms McSorley—As you know, the majority of those are produced by the reactor at Lucas Heights.

Senator LIGHTFOOT—You are inferring when you say 'the majority' that there are cyclotrons that do produce Mo-99 and technetium-99m. Would you please name those countries?

Ms McSorley—That can produce them, or are producing them in significant commercial quantities.

Senator LIGHTFOOT—So there is no-one that produces those in cyclotrons that you are aware of?

Ms McSorley—I cannot say yes or no because I would have to come back to the committee with the exact figures on that, and I am more than prepared to give you evidence on it.

Senator LIGHTFOOT—Excellent. If you could take that on notice and come back with the countries that do produce it—

Ms McSorley—And or can produce.

Senator LIGHTFOOT—No, my question was, 'that are producing Mo-99 and Tc-99m.'

Ms McSorley—If indeed there are. Is that acceptable, Mr Chairman?

CHAIR—I think it might be helpful if we have one person speaking at a time. Do you understand the question that you have been asked?

Ms McSorley—Sure.

Senator LIGHTFOOT—Thank you, Ms McSorley. Is it not true that the reactors throughout the world at this stage are the only ones that are producing pharmaceuticals—

CHAIR—Excuse me, Senator Lightfoot, you have just asked the witness to take the question on notice—

Senator LIGHTFOOT—I accept that.

CHAIR—and so you then cannot follow it with the same question.

Senator LIGHTFOOT—I accept that, although it is very difficult. Mr Chairman, I have never known you to interrupt me before on issues, and we have worked together for several years.

Senator CHAPMAN—He is a bit sensitive on this!

Senator LIGHTFOOT—With respect to the present reactor at Lucas Heights, it is reasonable to say that it needs to be replaced. Would you agree with that?

Ms McSorley—No. I believe the assumption that you are basing your question on, that it has to be replaced, is from the various submissions from ANSTO and other organisations. I would advocate that there are other technologies or other means of meeting the same objectives that you would use a new reactor for.

Senator LIGHTFOOT—How old is the reactor at Lucas Heights?

Ms McSorley—It was commissioned in 1960. It is a fairly old reactor. It is technically almost past its use-by date. It has had extensions and modifications made to it to extend its life.

Senator LIGHTFOOT—Are you saying to the committee that the HIFAR reactor being replaced by the INVAP reactor is a negative move in terms of its safety?

Ms McSorley—It may be that the new reactor, were it to be built, would be safer than the current reactor, but that is not the question you asked. You asked whether it is right to replace it with another reactor, and I would say that that is not necessarily the best option.

Senator LIGHTFOOT—I was talking about the safety issue. You just said that the present HIFAR is past its use-by date. I am not talking about the economics of it; I am talking about the need to replace a reactor that is approaching 40 years old with a high-tech, safer reactor. Are you saying that the INVAP reactor does not have higher technical capabilities and that it is not as safe as the old reactor?

Ms McSorley—I did not say that. What I said was that it should be safer. In theory it is a more modern reactor, a more modern design. It would incorporate a whole new range of safety mechanisms, one would assume. However, since we will not get to see the final design for at least another 18 to 20 months—and we cannot look at any of the documents concerning the

final design until then—then I can only answer in a theoretical sense that one would assume that it would be safer and far better in a whole range of areas.

Senator LIGHTFOOT—What about the production of bomb grade material? You inferred in your opening this morning that Australia does nothing to reduce basic disarmament. The reactor does not produce anywhere near the quality of bomb grade material, does it?

Ms McSorley—I believe you may have mistaken what I said. I was talking about the wider proliferation field of Australia's work on disarmament measures. At no time have I suggested that ANSTO is utilising this reactor, or intends to utilise the future reactor, for the production of nuclear weapons material. I am all too well aware that there is simply not the capacity in the design, and certainly not the intent by any of the government agencies or the government of the day or future governments or past governments, to make nuclear weapons with Australia's reactor. I do not believe that that is the case.

Senator LIGHTFOOT—I am not talking about nuclear weapons. I am saying that the reactor does not produce bomb grade material.

Ms McSorley—I have not suggested otherwise.

Senator LIGHTFOOT—That was really the answer that I was looking for. Are you are aware that many of the universities in the USA have research reactors?

Ms McSorley—Yes.

Senator LIGHTFOOT—They are reactors. They use them for medical research.

Ms McSorley—Yes.

Senator LIGHTFOOT—I think something like 20 in the USA have research reactors something similar to the HIFAR but not necessarily of the same design.

Ms McSorley—There are a number of reactors used at universities or different facilities around the world of various size. I believe that the HIFAR reactors would certainly be at the larger end of the scale of what would be considered a suitable reactor for university research. They generally tend to be very small reactors.

Senator LIGHTFOOT—The present reactor here does not produce high-grade plutonium as a waste, does it?

Ms McSorley—Plutonium is produced as a by-product of the fission process. It is an inevitable part of the process. You are asking whether it produces weapons grade plutonium and in sufficient quantities to progress—

Senator LIGHTFOOT—I said it does not produce high-grade plutonium.

Ms McSorley—Weapons grade plutonium.

Senator LIGHTFOOT—All right, even weapons grade plutonium.

Ms McSorley—That is 93 per cent plutonium 239. No, it does not. Previous papers I have put to other committees on this have shown that that is not the issue in terms of Australia's non-proliferation disarmament work. It is where Australia can contribute in the wider proliferation disarmament field rather than hang onto some of the technical aspects that the reactor might be used for.

Senator LIGHTFOOT—When you refer to highly enriched uranium fuel, you are not referring to any part of any science in Australia that is producing highly enriched uranium fuel?

Ms McSorley—Australia does not produce it but we use it. The current reactor uses highly enriched uranium fuel. That is how HIFAR operates. As part of its commitment, and in its work with the US on non-proliferation issues, Australia, along with a number of other countries, has said that if it was to build a new reactor it would utilise low-enriched uranium fuels—that is less than 20 per cent uranium 235 enriched. At the moment, we do not produce highly enriched uranium. We do not have the facilities for that. We do use highly enriched uranium and that fuel either goes to the US, where it will be conditioned and/or directly disposed of, or it goes to COGEMA. We have sent some to Dounreay in Scotland in the past. We do use it. It has never been suggested that Australia at the present time has attempted to use that material for weapons. You must remember that when ANSTO's predecessor, the Australian Atomic Energy Commission, started out, a nuclear weapons program was considered an option for this country and then a nuclear power program. Since then ANSTO has changed its mission but we do use highly enriched uranium.

Senator LIGHTFOOT—Do you think that Australia could and should source its radiopharmaceuticals from other countries or should we produce radiopharmaceuticals?

Ms McSorley—The question is: should we produce them? The answer is yes if we use the best and most environmentally sound technologies. I do not believe a reactor is the best. However, as you will all be aware, there are significant moral implications of being involved in relying on overseas reactors for our supply of radioisotypes. In the same way there are significant moral implications in sending our spent nuclear fuel across the South Pacific Ocean and to France to have it reprocessed at a very hazardous nuclear processing plant. There are a lot of major moral and ethical implications in this reactor proposal and the links to overseas plants.

Senator LIGHTFOOT—I come to the hub of my question. Do you believe that Australia should produce radiopharmaceuticals or should we source them from overseas?

Ms McSorley—I think you should seek to produce them in this country through non-reactor methods. I think it should do all it can to develop and facilitate those methods.

Senator LIGHTFOOT—And if we can't?

Ms McSorley—Then the Australian public has to take on board the fact that, if we cannot do that, at the very least we have to take the responsibility from the risks of that program internally. That means looking at issues such as spent nuclear fuel. I do not believe that on the one hand

you can argue that it is unethical to outsource certain aspects of this and then say that it is ethically acceptable to outsource other aspects of the risk. That is what the government is doing. It is saying, 'We can have a reactor here, which is fine, but we are not going to risk reprocessing or conditioning at Lucas Heights. We will outsource that.' These are serious moral issues and they have to be addressed in tandem with each other and not in isolation.

Senator LIGHTFOOT—Would you agree with Dr Casey Allman, Director of Nuclear Cardiology at the Concord Hospital in Sydney, when he said inter alia:

Overseas sources have proved expensive, limited, unreliable and serendipitous.

Ms McSorley—I have no evidence to either prove or disprove the information given in the submission you have just quoted from. I do not have it in front of me, but I believe that you will be hearing evidence on those issues from other specialists in the field.

Senator LIGHTFOOT—You neither agree nor disagree with Dr Allman?

Ms McSorley—I do not know the evidence that he is basing his remarks on, that is what I am saying. I have scanned some of his papers; I have not read them all. As I said earlier, I do not pretend, and I do not think anybody would pretend, to be able to answer in an expert way all of the issues on all matters relating to this inquiry.

Senator LIGHTFOOT—I put this on the record, and perhaps you may be influenced, in your answer on notice, by what Dr George Larcos, Clinical Senior Lecturer at the University of Sydney, said:

The three clyclotrons within the country do not produce Technetium-99m, nor are they pivotal in the development of therapeutic radioisotopes.

Let me move on to another one.

Ms McSorley—The reason they do not produce technetium, the reason they are not used for that and the reason Australia has not developed them is that we have had for many years a highly subsidised source of technetium from the reactor. Again, as I have said with overseas countries, why on earth would you make or want to put yourself in competition with a national supplier that is giving you something that is highly subsidised? This is the problem generally with the isotope market around the world. Those issues have to be taken into account when you are considering some of these statements.

Senator LIGHTFOOT—Mr John Rolland, a 30-year veteran of ANSTO, Director, Government and Public Affairs, said yesterday that the radiopharmaceuticals produced by that sole source in Australia are not subsidised and that the facility makes a slight profit. What have you to say to that?

Ms McSorley—Again, comparisons can be drawn with the nuclear power industry in that the full costs of the reactor operations overall have not been—

Senator LIGHTFOOT—It does not give you the power, does it?

Ms McSorley—If you will let me finish, they have not been fully internalised. If you were to take the costs of the reactor overall—the costs of the fuel, the decommissioning of the waste et cetera—and if you were to give those costs in equal amounts to the various aspects of the operations of ANSTO, I think you would find that the cost of the isotopes would rise quite significantly. I would also add that it would be very good if ANSTO would release all the details of the costings of its isotope facilities and any information it has on isotope production costs from cyclotrons and other sources, so that we can all make our own judgments as to the exact costs of isotope production.

Senator LIGHTFOOT—Would you agree with Associate Professor Roger Uren when he said inter alia:

During the recent reactor shutdown at Lucas Heights for maintenance the practice of nuclear medicine in Australia was on a knifes edge with supplies of isotope being restricted in scope and activity. To consider switching to this situation on a permanent basis defies belief in a first world nation.

He also said:

... pilots of commercial airlines can themselves decide not to carry such cargo.

That is radioisotopes.

Ms McSorley—Again, my understanding is that you will be hearing evidence further on this matter from other people in this field, and I would leave it to them to answer the more detailed questions.

Senator LIGHTFOOT—What about Dr Neil Jones? He is a nuclear medicine physician and radiologist in Adelaide, South Australia.

Senator CHAPMAN—A very good one, too.

Senator LIGHTFOOT—Yes, I understand that, Senator Chapman.

CHAIR—Get to the question, Senator Lightfoot, please; we are running over time.

Senator LIGHTFOOT—Would you agree with Dr Neil Jones when he said:

There is no clinically validated or commercially successful accelerator-based production ...

You are taking that on notice. He went on to say:

Importation of the total national requirement of Mo-99M is not practicable for reasons of:

Cost

Limited overseas sources

Reliability of supply

Statutory limitations on total quantities which may be shipped

Ms McSorley—That is his opinion. I have not seen all the evidence on which he bases his opinion and I believe that you will be hearing further evidence on this. In particular, I think the issue of costs in terms of how one might produce isotopes in a reactor as opposed to a cyclotron is something that ANSTO and other agencies, and, indeed, other commercial enterprises, may be asked to give further evidence on and completely open their books on this issue. As I have said, it may be that cost at the end of the day is not the most compelling issue. It may be that Australia decides it will not want to take the risk of progressing a reactor, even if it were proven at this point that isotopes were more cheaply produced by a reactor, because it might be far better to produce them by non-reactor methods. It is an issue that the committee, I am sure, will look at in its deliberations.

Senator LIGHTFOOT—I will finish on this point: there are dozens of letters from highly qualified academics and medical practitioners within the nuclear sciences that totally contradict most of the evidence that you have given this morning. Why should the committee believe you, as an unqualified medical practitioner, at least, in the nuclear industry, and in a lot of the nuclear sciences, as opposed to the raft of evidence that overwhelms your statements here this morning?

Ms McSorley—I have not asked the committee to listen to me as a nuclear medicine specialist. I have not asked the committee to take me on as a technical specialist. I have given the evidence quite clearly as somebody who understands many of the implications of the public and policy aspects of the nuclear industry. Therefore, I have no problem in saying that I am not a specialist in these fields. However, for the many people who said that X is possible or not possible, there are a very large number of people who would question it—some of them scientists. Indeed, I have sat with a number of scientists in ANSTO and other fora. This is an issue of great debate. But I have not attempted to mislead this committee in any way, shape or form as to my qualifications to answer medical aspects. Indeed, one of the reasons I have been called up is that I have never, ever in the past presented myself as anything other than what I am, which is certainly somebody who understands the policy and regulatory processes.

Senator LIGHTFOOT—Thank you, Ms McSorley.

CHAIR—We are running over time but I have a couple of questions and there may be further questions that we would put to you on notice, given that we have only just received the other submissions this morning. Firstly, following on from the questions from Senator Lightfoot, you do not have any vested interest or any conflict of interest in regard to the issues that we are looking at?

Ms McSorley—Do you mean do I have shares in a cyclotron development company? No.

CHAIR—You are not employed in the nuclear industry, are you?

Ms McSorley—No, most certainly not.

CHAIR—You do not depend upon the nuclear reactor for your livelihood?

Ms McSorley—No, I am not dependent on the nuclear industry for my livelihood.

CHAIR—You talked about other countries and other reactors; you were asked questions about that. What future do you believe ANSTO would have if it did not get another reactor? Is there still a future for it as an organisation that can continue to do research work in the nuclear industry?

Ms McSorley—Certainly. I have no doubt that there is a role for ANSTO in many aspects of developing a whole range of scientific research, and probably technologies, which would be very useful. One of the things that has always struck me about ANSTO and Lucas Heights, which I have visited on numerous occasions, is that they are far better placed than other nuclear organisations around the world to deal with a significant change with one of their major facilities. It is better placed than, say, a place like Sellafield, which is basically a waste management handling and reprocessing plant. So, yes, there is a role for ANSTO. I am not aware of anybody who says, 'Get rid of ANSTO.' What we are looking at, of course, is the reactor, the costs and the benefits as a central issue in ANSTO's future and the role it can play in Australian society.

CHAIR—You were asked a number of questions about radiopharmaceuticals and the alternative of importing isotopes. That is what Senator Lightfoot was, obviously, particularly getting at in his questions. Can you tell me where the spent fuel rods come from to operate HIFAR?

Ms McSorley—My understanding is that half of the actual fuel that is currently used was sourced from the United States and half from the United Kingdom.

CHAIR—So this is on the record: we mine uranium in this country and preliminary-process it into yellow cake. That is my understanding of it. Then we export most, if not all, of that. Overseas, they produce fuel rods which we import back into Australia.

Ms McSorley—Interestingly enough, I do have on the record a reply from ANSTO about this very issue—in fact, from John Rolland. Some years ago, out of interest, I wrote to ANSTO and asked exactly where the uranium is from that the ANSTO fuel is made up of. It is not from Australia—so they say. They must know where it is sourced.

CHAIR—Okay. In any event, the fuel rods that are put into the reactor core at Lucas Heights are not manufactured in Australia, are they?

Ms McSorley—No, they are not manufactured in Australia.

CHAIR—They are all imported.

Ms McSorley—Yes.

CHAIR—So, to operate the Lucas Heights reactor, we actually have to rely upon importing the fuel rods?

Ms McSorley—We have to rely on importing the fuel rods. Most importantly—and you have touched on a point there which is particularly relevant to the new reactor—not only will we import the fuel rods but we will import the technical knowledge. There are significant issues of

how much we will be dependent on that technical knowledge and what other aspects of the reaction technology that we will import, both in terms of intellectual property and actual material. I know that there is a consortium of Australian companies to build it and produce most of the hardware but, in terms of being reliant on overseas technologies and companies, we will be highly reliant on supplies.

Senator LIGHTFOOT—We should make the rods here then?

Ms McSorley—That is an interesting one. I believe it is banned under the ARPANSA legislation; so you would have to take that back to parliament to amend it appropriately.

CHAIR—INVAP has been given the contract to design and build the reactor. In your written submission, you indicate that, because of a lack of information regarding the tendering process, you are not able to comment fully on that. But, from your knowledge of the international scene, were you surprised that INVAP was selected in front of companies that operate or have built reactors in countries such as France and Canada, that would possibly have been regarded as more involved in the industry and that had a longer history and were more expert? Can you comment on that?

Ms McSorley—I think that everybody was surprised that INVAP got the contract. I think that the lame duck excuse that it is improving our relationship with South America is probably the oddest reason that I have heard put forward for this.

Senator CHAPMAN—It was done for a good reason, though.

CHAIR—Will you let the witness answer the question. You will get your chance to debate it in the parliament, Senator Chapman.

Senator CHAPMAN—We do not want nonsense spoken here, Mr Chairman.

CHAIR—Then if you shut up, Senator Chapman, we might actually achieve that objective.

Senator LIGHTFOOT—Chairman, I think that is inappropriate.

CHAIR—I do not think we need members of the committee interjecting and casting aspersions on the witness's evidence.

Senator CHAPMAN—We do not want gratuitous statements from witnesses either, Mr Chairman.

Senator LIGHTFOOT—With respect, we were allowed interjections on every other committee I have ever been on. You seem to be oddly—

CHAIR—The interjection here was totally out of order. Ms McSorley, would you answer the question and finish your comments.

Ms McSorley—The remark I made was actually not just premised on my own opinion but on the views of a number of senior advisers, diplomats, bureaucrats and people in Australia on a range of issues. Some have not said outright that they are surprised over INVAP being chosen, but certainly there have been raised eyebrows. Others have commented directly that they are surprised INVAP was chosen, because of its lack of experience in reactor building and a whole range of other issues—spent fuel management and guarantees over the like not being available for them. I think it is a surprise that it was chosen.

CHAIR—To your knowledge, are INVAP a leading edge nuclear technology company? Are they world's best practice? Are they at the forefront of the nuclear research industry?

Ms McSorley—No, to my knowledge they are certainly not the name that springs to mind if you are thinking of the best company to build research reactors or that is at the cutting edge of nuclear technology developments. I am not quite sure where they would be in the league internationally, but they are certainly not in the top 10. Again, I know that you will hear evidence further on this, but they do not have the best record in building and designing reactors. There seems to be considerable dispute over the efficiency of some of the reactors that they have provided overseas. Whether that is due to the lack of efficiency of the country involved or of INVAP, I cannot answer. Of course, whatever efficiency or progress would be made within Australia would be heavily dependent on ARPANSA and the Australian government making sure it works, so it would probably be a better deal if it was built over here, but I think there are serious questions in INVAP having the carriage of this project as the supplier.

CHAIR—Thank you for your evidence this morning, Ms McSorley.

Proceedings suspended from 10.42 a.m. to 10.52 a.m.

McDONELL, Mr Kenneth James, Councillor, Sutherland Shire Council

RANKIN, Councillor Genevieve, Chairperson, Nuclear Reactor Task Force, and Chairperson, Local Emergency Management Committee, Sutherland Shire Council

SMITH, Dr Garry John, Principal Environmental Scientist, and Manager, Environmental Science and Policy Unit, Sutherland Shire Council

SONDA, Mrs Tracie Janet, Mayor, Sutherland Shire Council

CHAIR—I welcome members of the Sutherland Shire Council, and also officers of the council. The committee prefers that all evidence be given in public, but if at any stage you wish to give part of your evidence in private, you may request to do so and the committee will consider your request at that time. The committee has before it a submission from the Sutherland Shire Council. Are there any alterations or additions that you wish to make to your written submission?

Dr Smith—No.

CHAIR—I now invite you to make brief opening statements and then we will proceed to questions.

Mrs Sonda—I would like to ask Dr Garry Smith, the council's environmental scientist, to highlight the points raised in our very comprehensive submission.

Dr Smith—May I also indicate that I am a former member of the Safety Review Committee, which was appointed by the Commonwealth minister for science up until about 1998, which undertook quarterly safety oversight visits to the ANSTO facility. Subsequent to the demise of that committee, I am now a member of the ARPANSA Radiation Health and Safety Advisory Council and of the ARPANSA Nuclear Safety Committee.

You have before you a detailed submission with appended reports into the types of issues which the Sutherland Shire Council has tried to obtain information on over a number of years and are relevant to your terms of reference. These include issues such as the need for a new reactor, the contractual processes surrounding the replacement proposal, public access to information and matters of safety, waste and so on. What I would like to do this morning is go through in some little detail some of the key issues or aspects of those points so that we can then open it up for questions. I wanted to begin, if I could, by really trying to answer this question: why is the council concerned with the proposal for a replacement reactor, which anyone would have to say has been so heavily talked up by ANSTO itself and by the government? I would like to consider with you some of the positives and negatives of a replacement reactor proposal, which reflect on issues such as the need and the nature of the contractual process.

Firstly, in the positive context, ANSTO strongly makes the point that there will be a stimulus to the local economy in the Sutherland shire with respect to a replacement reactor. There is a local economy stimulus, which we have acknowledged in previous submissions. But it is clear

that this local stimulus occurs with a heavy subsidy, not only locally but also nationally, and it is based very much on questionable economic analysis. The expert reports appended to our submission by McVean and Abelson go to that point of a heavy subsidy in the light of very little return. We very much question the stimulus to a local economy, which is based on a heavy subsidy on which the economics for the long-term viability are open to question.

On radiopharmaceuticals, there is a convenience of local supply. However, there are clear questions within our submission and expert reports appended to it—again about the sustainability of that local supply. There will be very strong competition from international multinational companies in supplying radiopharmaceuticals to Asia. We believe the predictions of ANSTO, with respect to profits from radiopharmaceuticals, are very much open to question. Our expert reports have indicated also that overseas companies have dedicated radiopharmaceutical reactors, not the ones which are effectively competing between radiopharmaceutical production and research. So the question of whether ANSTO can supply effectively priced radiopharmaceuticals has been brought into question.

Finally, even in the ministerial consent for approval of the replacement reactor, a question has been raised over, if you like, the quality of the radiopharmaceutical production by way of environmental impacts. There will be serious costs imposed on ANSTO in the future to try to modify its radiopharmaceutical productions to make them cleaner methods. We think they are hidden costs that have not been built in either. The local benefit of radiopharmaceuticals into Australia is very much open to question as to its viability and long-term sustainability and its cost.

With respect to other issues, such as science impacts and industry impacts, you only have to look at the *Research Reactor Review* from McKinnon in 1993 to see that there were serious questions raised over the scientific benefits and impact of ANSTO activities and also over the industrial applications which occur. Clearly, there are major questions which have been raised all the way along through this replacement reactor proposal. Our question really is: why has the government not asked these types of questions? We would hope that the Senate would ask these types of questions, even at this stage of the proposal.

I have touched on some of those positives, but what about the negatives to our local community? Many of these points underline our concern about this proposal. Firstly, there is the cost to the taxpayer. It is a very heavily subsidised proposal which is based on a rather narrow application, even by the McKinnon review, of which our consultant, Professor Abelson, has indicated has a net profit of only some $6 million to the taxpayer. There is no question that this is a very heavily subsidised proposal.

The submission to your inquiry from Siemens, in particular, has confirmed our suspicions that this proposal has been seriously under-costed. This raises important implications, not only with respect to need, but also to contractual processes because undercosting of proposals, which I will mention again soon, can seriously jeopardise safety issues and waste management issues. I think the Siemens and the Technicatome submissions to your inquiry raise those very questions as to whether safety and waste are being adequately dealt with under the present proposal.

With respect to nuclear waste, the issues of spent fuel and storage and disposal are still very much open to question. Our consultant, Martin, predicts that we will remain the national

repository for spent fuel in Australia for many, many years to come due to the historic inability of governments, including the Australian government, to resolve this type of question about spent fuel in the longer term. Our particular concern about spent fuel is that we are very unprotected as a local community against manipulation of spent fuel should the Australian government in future judge that the cost of sending fuel overseas is exorbitant. With what we think are poor management arrangements on fuel, and high costs in processing fuel, we are very concerned as a local community that fuel conditioning, not reprocessing, but fuel conditioning, will occur at Lucas Heights, and we are very, very poorly protected under Commonwealth law against those types of activities and those types of decisions by government.

There are other matters too. Environmental pollution is a particular problem in our local area. We have had excessive air pollution in the past from ANSTO, and the McKinnon review allowed us to highlight some of those. We have now tried to obtain better air pollution control at that ANSTO site. There are still ongoing concerns about the primitive nature of the liquid waste treatment plant at ANSTO and the amount of radioactive waste that is put into our sewer and can enter our local creeks. There is also a question over reuse of water in our local community. We want to reuse water for industrial purposes and possibly for sprinkling on golf courses, and this is a route, potentially, for radioactivity, which enters the sewer from ANSTO, to enter the local community. So we have serious concerns over those matters.

Can I just put in context the fact that the council has raised these matters with a number of Senate and other inquiries over several years. I think it is fair to say that the record is emerging now that council has been greatly vindicated on a number of these concerns and matters. For example, on the matter of cost of a reactor, in 1992 the cost estimate from ANSTO on a reactor was $75 million. In 1993, a year later, it was $150 million, and at the research reactor review it was $200 million. We have assessed that the minimum cost of the instrument itself is $300 million and the total cost would be half a billion. We feel we have been corroborated on these, and our expert reports indicate that.

Our concern is that if this type of undercosting is occurring in the contractual process, what confidence can we have on matters of safety and waste for this particular proposal? We would very much hope that the Senate and the government would want to reassure itself about these matters. We have been particularly concerned, as I said, that the Siemens submission also raised the issue of undercosting of this proposal and, if you like, the maximum quality claimed for the proposal is not commensurate with the dollars that are available. When you get independent advice from a council and from a competitive tenderer raising those same issues, surely the government and hopefully the Senate will want to really reassure itself about those matters which are so fundamental to things like safety and nuclear waste.

Our particular concern here is that some government actions have actually precipitated this inquiry, particularly a number of unanswered questions about this particular proposal, questions on need and waste and on the location of the reactor. Why didn't the government take the opportunity earlier in the process, particularly pre-EIS, or during the EIS, to ask these types of questions which have emerged all the way along? I think we do have a particular concern that the government perhaps is unable and unwilling to test this development proposal from its own bureaucracy, otherwise why not use the full limits of the EPIP Act, which was relevant at that time, to fully test this proposal? We have never been given an answer to that particular question.

Under New South Wales planning law, we are sure that we would have had a commission of inquiry into this major hazardous facility and its local impact, particularly if it was of state or national significance. So why could we get that under state law but not under Commonwealth law? We have a particular concern with this. We do not feel our local community should put up with second-rate planning without proper inquiries into hazardous facilities and, in particular, with the withholding of information such as locational issues as cabinet-in-confidence processes. Who undertakes planning in secret? You just do not withhold planning documents from the public and avoid proper interrogation of them if you are making a major planning proposal.

I want to conclude by highlighting one or two more detailed points from our submission. I want to underline this and we will develop this a little more with you in evidence on Monday. What we currently have before us and you have before you in the ANSTO proposal is a conditional government approval to undertake the design of a reactor. Everything regarding safety, waste and so on is underpinned by the outcome of that design process. The nature of the contract with respect to design is fundamental to things like safety, cost, need and waste management. The quality of the design obviously is fundamental, and we have a real concern that Siemens and Technicatome have raised some questions about the quality of design. Finally, the quality of the licensing process through ARPANSA, which will probably occur next year, is also vital to safety and to nuclear waste in particular. I will not dwell on some of the more detailed points on need; I have already raised a number of those with you and we can answer some of them in questions.

With respect to the contracts themselves, much on them has been commercial-in-confidence and unavailable to us. We have had a real concern about the public access to information, particularly as to whether the design safety specifications under the contract are adequate for protection of our community. There is a major outstanding problem in the current design process and, we think, in next year's licensing process in that issues such as earthquake specification are still being worked out for this particular proposal, despite the fact that a contract has been let and the design is under way. I sat on a two-year Commonwealth committee looking at the earthquake hazard risk and the peak ground acceleration—how big an earthquake can be at Lucas Heights—which reported last year.

Senator LIGHTFOOT—What years were they?

Dr Smith—They were 1998 and 1999. That report, which has been produced, is still internalised within government. We do not know whether or not the particular results of that earthquake inquiry have been fully implemented in the tender process and in the design contract process. One of the things we are calling for in our submission—

Senator GEORGE CAMPBELL—Are you saying that this report that was done for DISR has never been made available?

Dr Smith—It has been made available, but the outcome with respect to a specification on design on what sort of earthquake you are designing for in this proposal is still internalised. It is being worked out, I understand, between ANSTO and ARPANSA in a very non-public process. So we have been taken so far into a process; we have produced a report; the report is critical to ministerial consent conditions, because the minister's consent for the proposal mentions the

earthquake issue and things like fast drain accidents, as we call them; that internal process on the sort of earthquake design for a reactor is still being undertaken; and the design is under way. We think that is totally unsatisfactory, counterproductive to the previous government process, and will possibly lead to qualified design standards.

With regard to the contract, we have also had interaction with ANSTO and the Commonwealth government on the potential for reversibility of this contract should the design prove to be inadequate at the licensing stage, and we have received very little comfort at all. We want to make sure that the government is not locked into building a second-rate facility, an unsafe facility, and one which is unproductive with research as well, just due to the fact that it has signed a contract in haste without earthquake and other specifications.

Finally, I want to touch briefly on the issue of ARPANSA, of which I have had some experience. There has been a tendency to underestimate the potential impact of this particular proposal in two ways. One is to say, 'It is only a small research reactor, it is not hazardous really, there is not a problem, we will take care of it for you,' but the second is to say, 'Well, you have an independent regulator who will fix things for you at the licence stage.' I put it on the record that we have significant concerns with the ARPANSA process. It has been an improvement in the Commonwealth approach to the nuclear industry and nuclear regulation, but there are significant weaknesses in the ARPANSA Act, particularly the fact that responsibility for decision making resides with a single person rather than a larger group or board and that other ARPANSA staff essentially are staff of the department of health; and, secondly, that there is some discretion within the act with respect to the level of safety that would be accepted by our local community. For example, we are protected in the act from spent refuel reprocessing but we are totally unprotected from spent fuel conditioning. Both can be highly hazardous processes.

Another concern we have with the act has been the record of implementation since ARPANSA came into being. There is the question of the earthquake specification for the reactor. Why hasn't ARPANSA become heavily involved and established an earthquake specification prior to commencement of the design process for the reactor? That is very poor implementation of the regulatory process. Why are there no public hearings into licensing of the design for the reactor proposed for next year? We understand international best practice would be to have licensed public hearings to test information on safety design specification. That is not currently a part of the ARPANSA process.

ARPANSA, as a pollution monitoring body, has very ineffective methods for minimising pollution. It is essentially an accreditation type facility. There are no financial or other usual environmental penalties against environmental pollution, despite the fact that in state law there are financial penalties and other processes for procuring a pollution minimisation process. At the national ARPANSA level, those tools do not exist, so we wonder how credibly we can take the assertions that ANSTO will not pollute in the future.

I will conclude by pointing to the five or so clear requests we have of the Senate committee and the Senate. They come at the end of the introduction to our submission. They go to the issues of requesting that the Senate support our call for a public hearing process as part of a reactor design licensing process and do so under the ARPANSA act when a design is finally available. We ask the Senate to require that the current earthquake specification for reactor

design also affecting cost be resolved in a publicly visible process and with an appropriate margin of safety for the public prior to design finalisation questions.

We ask next that the council request that the Senate require the Commonwealth government to resolve the new reactor spent fuel questions raised in our submission before the licence to construct a new reactor is granted. We have, finally, two slightly more detailed questions. We ask that the Senate support our view that fuel storage at Lucas Heights or other populated areas should be constrained to a maximum of four years rather than the current nine years for the new proposal; and that council ask the Senate to recommend that spent reactor fuel conditioning of any sort never be allowed to occur at any urban or sensitive site in Australia. On that basis, I finalise those points.

Mrs Sonda—Excuse me, Mr Chair. Prior to questions to Dr Garry Smith, could I ask Councillor Rankin and Councillor McDonell to make a few comments.

CHAIR—Yes, certainly. It would be helpful if we could keep them reasonably brief given our time constraints.

Councillor Rankin—Thank you. Very briefly, I would like to make it very clear to the committee that, based on Dr Smith's evidence, what our community is asking for is a fair go in this process. We believe that, if we get a fair go and there is a proper hearing, we can really bring the evidence to bear and show that this project is not appropriate for the middle of Sydney and is not needed. However, with ARPANSA at the moment we have federal legislation where it is said that they are to operate under world's best practice, and what we have had so far is anything but world's best practice. We have had a site licence given. It called for public submissions, gave people about a month to put them in, and did not properly consider those submissions. In fact, Dr Loy said in his site licence that he relied on the EIS process. As Dr Smith has just outlined, during the EIS process this community and people all over Australia requested the government under the EPIP Act to have a proper inquiry.

All we are asking is for both sides to be tested. If ANSTO says it has got all the sciences Senator Lightfoot was referring to earlier, if it is all there, why aren't they prepared to have this tested in a public forum? Why is council already having to shell out $11,000 in FOI requests, and half of what we have requested is still denied to this community? I would ask you to look very closely in your recommendations at the points made here by Dr Smith, but particularly to demand that ANSTO or to recommend that ARPANSA be called on at least to have a public hearing before they go ahead and give a licence to construct this reactor when that comes forward in April next year.

If we were a community in the United States, this would be a basic right. The federal parliament said that ARPANSA would operate under world's best practice, and they are not operating under world's best practice. If we, as a totally unfunded community, want to challenge this, we have to put up our ratepayers' money to demand these freedom of information requests, and here we have the federal government bureaucracy fighting us with barristers to give over even a little bit of information. We have no guarantee that, when that application by ANSTO is put in in May next year, we will even have a right to have the information properly tested by the various experts. So I would just make a plea: whatever your view is on the nuclear question,

consider our community and see that we at least have a right to have the facts tested in an open and public forum.

Mr McDonell—One of my major concerns is that the recommendations of the RRR committee report from Professor McKinnon have been ignored. One recommendation was that there should not be any further consideration of a new reactor within Australia unless work commenced on the selected site to prove the suitability of that site for disposal of the waste that would be produced from that reactor. Despite the fact that that was a recommendation from that committee, our community was not consulted before the decision was taken in September 1997 to build a new reactor. Then, to top it off, a secret report has apparently been produced as to why it should be sited at Lucas Heights. These are major concerns in our community, and I believe that people should be accountable to our community as to why we have now been selected to host another reactor.

CHAIR—I have one question before we go to the other senators. If this were a private proposal to build a nuclear reactor within the shire—not on Commonwealth government land within the shire—what processes could the council and the state government undertake—indeed, be obliged to undertake—that you are prevented from following through for the current proposal?

Councillor Rankin—It would be considered under New South Wales planning laws, as Dr Smith outlined. Under our planning laws we would have a right to a commission of inquiry being called where the information would be properly tested in a public forum. That is the fundamental difference. If residents in our shire want to build an extension to their garage or a toilet in the backyard, or whatever, they come and ask council for permission. If it is a designated facility, council has the ability to trigger a proper inquiry process. Because it is on Commonwealth land, we are considered as a community to have no rights whatsoever.

CHAIR—As everybody knows, I live in the shire—I do not have to declare that, but I will state it again. There have been other proposals in this shire, which have been rather controversial, to develop certain industrial plants out at Kurnell and other proposals for residential tourist developments not far from here, near the Wanda Sandhills. As I understand it, you have those proposals. You have to go through a process where there is full public involvement and full council involvement and, whatever way the decision goes from the council, it could then be further tested in the New South Wales Land and Environment Court. Am I correct in that?

Councillor Rankin—Dr Smith was involved in those inquiries, too. Maybe he would want to—

CHAIR—In those inquiries, Dr Smith, would you be able to look at the detail of the proposal, its environmental effects, its safety issues and so on?

Dr Smith—Yes, indeed. New South Wales planning law is set up on that basis. We call expert witnesses and test them thoroughly before an independent adjudicator.

Mr McDonell—In the situation you have outlined, I would suggest that, with the planning codes, the local environment plans and the development control plans we are capable of

producing in conjunction with the community, if there is any suggested proposal to build a reactor on private property by a private company we would move fairly quickly to improve our codes to make it a prohibited development.

CHAIR—I appreciate that. I suppose I should add that, as the council is well aware, you do not always win, but what you are saying is that there is a full process that is open to the council, the public and the developer.

Mr McDonell—Which we are denied in the current circumstances.

Senator GEORGE CAMPBELL—I have a series of other questions but can I just follow up on that point, Mr Chairman? I do not know what work is involved in it but it would be useful if the council could actually give us a schedule of the sorts of processes you would be required to go through if this were done under state government planning as opposed to what is occurring under the federal government and the fact that it is being built in a Commonwealth facility. That is just so that we have got some comparative processes to look at.

Mrs Sonda—I would be very happy to provide that to you, Senator Campbell. I would just like to say that two weeks ago a lady wanting to put a built-in swimming pool in her backyard was knocked back by council—and I believe the reactor has gone through without a blink of an eyelid. We are knocking people back because we would not allow her to remove a tree.

CHAIR—We do not want to start another inquiry.

Mrs Sonda—That is under the local environment plan.

CHAIR—I will go to Senator Lightfoot.

Senator LIGHTFOOT—Madam Mayor, should I direct my questions to you?

Mrs Sonda—Possibly through me and then I will decide who to hand them over to.

Senator LIGHTFOOT—Is it the council's wish that the whole of the Lucas Heights facility should be shifted out of your shire? Is that the wish of council?

Mr McDonell—That is not the wish of the council.

Senator LIGHTFOOT—Madam Mayor, with respect—

Mrs Sonda—I would ask Councillor McDonell to answer that question.

Mr McDonell—It is not at all the wish of the council for the ANSTO facility to be removed from the shire. That is a matter that we have discussed at length.

Senator LIGHTFOOT—Is there unanimity on the council? Does everyone agree with what you are saying?

Councillor Rankin—Yes, there is unanimity on all sides of politics. We had a debate on this at the last council meeting. There is strong support for the work that is done by ANSTO. There is strong support for the jobs to continue. In fact, out of the McKinnon inquiry when I was mayor—and I am sure Senator Campbell is aware of this—we had a series of negotiations with the ANSTO unions at that time, about 15 or so meetings. We came up with a joint position agreeing to disagree about the future of the reactor. We came up with a joint position with those unions in terms of the sort of positive research that we want to promote on that site. Very much, our shire is into—

Senator LIGHTFOOT—What do you include in positive research?

Councillor Rankin—All the non-reactor based activities. Of course, they have to be cleaned up a lot at the moment because of the waste.

Senator LIGHTFOOT—If it were non-reactor based, there would not be any—

Councillor Rankin—There is heaps. The McKinnon evidence varied between 16 and 40 per cent.

Senator LIGHTFOOT—What would you produce if there were non-reactor based—you are talking about radiopharmaceuticals?

Councillor Rankin—No. ANSTO say they need a reactor for neutron beam research. My understanding from staff members—I had a letter in just the last few days that confirmed this—is that about three per cent of the work that is done out there is about neutron beam research. There is a lot of other important scientific work that we have a need for in this country at the moment. I work at a university in my day job, and I can assure you that there is a heap of research not being funded in this country that could readily be done at Lucas Heights. We say we would love to see a centre—

Senator LIGHTFOOT—What could be done there, fundamentally? I do not mean that I want you to give me any details as to the minutiae of what you are saying, but what could be done there with respect to the other 97 per cent? You say that only three per cent relates to neutron beam research. What is the other 97 per cent?

Councillor Rankin—Our position is that a very small percentage of the work done at the Lucas Heights site at the moment—it is a huge site—relates to the current reactor. Much of the other work that is being done—

Senator LIGHTFOOT—Are you saying that you could do away with the reactor and still maintain a significant proportion of research and work? What about the production of radiopharmaceuticals?

Councillor Rankin—Absolutely; that is what I am saying. In fact, many staff at ANSTO believe that.

Senator LIGHTFOOT—How would you manufacture that?

CHAIR—Senator Lightfoot, it would help if you allowed the witness to at least attempt to answer the question.

Senator LIGHTFOOT—Please get to the question.

Councillor Rankin—The question you asked was: did we think that other research was important? Certainly, all the other work that is done—

Senator LIGHTFOOT—I did not say it was not important.

CHAIR—Excuse me, Senator Lightfoot, the witness has not even finished a sentence. You might want to debate with the witness, but the purpose here is for you to ask questions and the witness to answer them. I would at least ask you to allow the witness to attempt to answer the question and then we can move on.

Councillor Rankin—I do not mean to knock the media, but when people talk in the media you need to have a fairly simple message. Often that is interpreted by the community, and probably by some senators, as being total and absolute opposition to everything that happens at Lucas Heights. It has certainly never been the position of this council. In fact, there are many activities that take place and the reactor is only one.

The production of radiopharmaceuticals in a totally separate building is another activity. We have issues, as Dr Smith alluded to, with the process there because of the very unacceptable levels of iodine 131, et cetera, that come out and we are looking for that to be converted into no emissions technology. However, there is lots of work that is done there. There is an accelerator; there is a cyclotron that we have at Prince Alfred Hospital. There is a great deal of work within pharmaceutical production. They may even be involved in the temporary importation, if there was not a reactor causing all the pollution problems that we have at the moment. So I can assure you that there are a lot of other activities. The emphasis on the medical side has come out as a justification, but it is certainly not the main focus of work at the Lucas Heights establishment.

CHAIR—Councillor Rankin, could I ask Dr Smith to respond further to the question about what other research could be done. Meaning no disrespect to Councillor Rankin, Dr Smith is the qualified scientist.

Senator LIGHTFOOT—Dr Smith, could you tell us what your qualifications are before you answer.

Dr Smith—Yes, I would be glad to. I have a Bachelor of Science from the University of Sydney, a PhD in Biochemistry from the University of Western Australia and a Master of Planning from the University of Technology Sydney. Those are my academic qualifications. I am currently the honorary chair of environmental science at the University of Wollongong and I am on the ARPANSA committees, which I indicated to you.

Senator LIGHTFOOT—What is your experience with nuclear medicine?

Dr Smith—My experience with nuclear things generally is that, as Director of the New South Wales Cancer Council Carcinogenesis Research Unit at the University of New South

Wales for 10 years, I used radionuclides very frequently—imported and local. For the last nine years I have been attending the ANSTO site four times a year and, based on my scientific, biochemical and toxicity academic qualifications, I have been participating on that committee. I was appointed by the Commonwealth government to the Probabilistic Safety Assessment Committee and the Seismic Hazard Committee, to which I referred earlier, on the basis of my expertise rather than my affiliation with the council.

Senator LIGHTFOOT—So you are quite familiar with the production of radiopharmaceuticals from the facility at Lucas Heights?

Dr Smith—I have sat on a lot of committees considering those matters, including talking to the ARI personnel on a quarterly basis, as a member of the ministerially appointed Safety Review Committee.

Senator LIGHTFOOT—So with respect to the question, what can be manufactured there in terms of radiopharmaceuticals if the reactor were to be moved or shut down?

Dr Smith—Senator, I think in answer to your question, perhaps the most satisfying way I can respond to you is to refer you to the research we have done on that matter of what is reactor dependent and reactor independent at ANSTO and at Lucas Heights. Our very first submission to the research reactor review back in 1992-93 has a table, table No. 2, titled 'What research is reactor dependent?' I can make that table available to you. And the breakdown at that time, which was submitted to the RRR review, was that a total of $1.6 million was spent on reactor dependent research at ANSTO and $19 million on reactor independent research. So around about five per cent to 10 per cent was considered at that time reactor dependent. That is still our position, and I can supply that information to you. I hope the Senate and the government will test that information further and corroborate it to its satisfaction.

Senator LIGHTFOOT—In terms of nuclear medicine that report is getting pretty old, isn't it—eight years old?

Dr Smith—The facility out there has not changed much in that time, quite frankly, but you might want to satisfy yourself on that.

Senator LIGHTFOOT—But with respect to the facility then, do you see any great benefit from putting in a larger facility, roughly double the output that the present facility has? If you do, why, and if not, why not?

Dr Smith—Senator, interestingly this question arose at the RRR. I think the results and the findings to that are still current and I would confirm them with you. If you are going to base the need for the reactor on the radiopharmaceutical question, you can do it with a lot smaller reactor and probably a dedicated one that would produce radiopharmaceuticals a lot cheaper and much more competitively than it does at the moment with the very heavy public subsidy that exists. So the need for the 20-megawatt reactor as opposed to a 10-megawatt or even one much smaller does largely revolve around the issue of neutron flux and hot and cold neutrons and the intensity of flux you need for certain materials and other neutron beam research.

We question the viability and sustainability of the potential benefits to industry from that higher flux and, given that our community is at risk with respect to safety and public health because of the size of that reactor, we question whether Australia needs a reactor at all or certainly a reactor of this size to achieve the types of benefits which have actually been stated—and very few of them have actually been confirmed. So we do not agree that a large reactor is needed on that site. We are particularly concerned that it appears that Siemens and Technicatome on an independent basis have also questioned, for example, the ability of INVAP to produce hot and cold neutrons in places like Peru and possibly in Australia. So the question you raise is a very good one. Our view is that, no, we do not need a larger facility to do it and the type of facility that is currently being proposed may be underdesigned and undercosted.

Senator LIGHTFOOT—Would you be happier then with a smaller facility? Would this take away a lot of the apprehension within the shire and, indeed, within the council?

Dr Smith—My advice to council—if there were a proposal for a smaller reactor—would be that it would affect the issue of safety. A smaller reactor would be inherently safer. It would probably affect the issue of cost effectiveness and a number of other issues, including waste management. So I would say that a smaller reactor proposal would have to be assessed on its own merits. It would answer some of the types of issues we have been raising. It would probably leave open the question of whether we need a reactor at all or whether alternatives are equally profitable and of national and other benefits.

Senator LIGHTFOOT—So what is your opinion then of those two areas? You ask whether we need a reactor at all—what is your opinion?

Dr Smith—Senator, I take your question and I think it is a very important one. I will not give a personal view. It is a professional view and that is what I give to council. Frankly, based on the evidence I have seen over many years and on the evidence presented in the EIS process, this proposal is an ill-judged proposal. The benefits are highly inflated for this proposal. I have a serious concern that it is a Commonwealth bureaucracy attempting to promote a development under loose Commonwealth laws and very poor accountability criteria. It is not even producing a design at the EIS stage for a major hazardous facility. The economics are questionable as two totally independent and highly eminent economists have advised us—highly questionable.

In a scenario where a Commonwealth government does not ask the right questions, does not allow testing of information at a public inquiry—as would occur overseas—and where two unsuccessful tenderers raise the same types of questions about the proposal that we have been raising for over eight years, I think to move ahead with this proposal is ill judged and highly risky commercially, on safety grounds and on nuclear waste management grounds. That is my professional opinion on this proposal.

Senator LIGHTFOOT—Could you amplify, then—if I could paraphrase you—the questionable benefits, which you say are either dubious or have been inflated to the point where they are dubious?

Dr Smith—They are certainly untested, and many of them are dubious. Which one would you like me to talk about?

Senator LIGHTFOOT—Perhaps you could start with the area of radiopharmaceuticals. Are you saying that the benefits from technetium-99m and molybdenum-99 are overinflated?

Dr Smith—The benefits of producing that in an Australian reactor of this design and size et cetera are, I think, highly overplayed. It is a convenient local source, but some 15 per cent of radiopharmaceuticals are already imported from other countries on a competitive basis.

Senator LIGHTFOOT—That is 15 per cent of what sort of radioisotopes?

Dr Smith—It is in our submission. Fifteen per cent of overall radiopharmaceuticals used in Australia is the figure that we have quoted there. You can check that and check the sources. If you look more closely into the issue of radiopharmaceutical profitability and supply—as we would hope the Australian government would do—significant matters emerge, such as movement in the nature of the industry. There is a lot of technetium around the world at the moment; it is not undersupplied. So we have a convenient local supply, which can be competed with from overseas. Our information is that the industry is moving into kit form application of things like technetium and other radiopharmaceuticals rather than large generator driven facilities.

The technetium that ANSTO produces is, if you like, the marker on a more sophisticated radiopharmaceutical. ANSTO is not in the business of making sophisticated radiopharmaceuticals. It makes radioactive markers to put on them. These sophisticated radiopharmaceuticals from overseas are being made by major multinational companies with which ANSTO cannot compete. The only way I could justify the development of a reactor under this proposal for radiopharmaceuticals would be by saying that it is okay to have a very heavy public subsidy and to have a convenient local supply, which may not be as good as imported and patented kits from overseas. That is the evidence that I have seen. I invite the Senate and the government to look at that issue more closely.

Senator LIGHTFOOT—When you say, 'There is a lot of technetium around the world at the moment,' given the very finite life that technetium has, how can there possibly be a lot of technitium around the world? Isn't that a contradiction?

Dr Smith—No, no. Again, if you would like to read the attachments to our submission—a submission from Berkhout and others—there are quite a few reactors around the world producing technitium.

Senator LIGHTFOOT—Yes, I understand that.

Dr Smith—Particularly now that defence and other dedicated facilities are producing materials, technetium is available.

Senator LIGHTFOOT—So how can there be a lot of technetium around the world, given its finite half-life?

Dr Smith—The finite half-life does not affect how much there is in the world. It just affects how long it is technetium and how long it is radioactive. It decays.

Senator LIGHTFOOT—Are you saying that you can order some technetium off the shelf, if you wish to have it?

Councillor Rankin—And generators.

Dr Smith—Sure. Generators are imported to Australia from the UK and North America every day.

Senator LIGHTFOOT—Aren't they ordered as they are here?

Dr Smith—Ordered?

Senator LIGHTFOOT—Yes. They are not specified at a certain time with a certain expiry date on them?

Dr Smith—There is a link of supply. Those companies, which are commercial companies trying to make a profit, obviously judge how much they are going to sell, and it is available from overseas.

Senator LIGHTFOOT—Yes, but they are derived largely from neutrons—if not exclusively from neutrons—which have a decaying life from the moment they are created. Could you tell the committee whether you can take technetium off the shelf and send it out to whoever orders it, or whether it has to be ordered and then created.

Dr Smith—I think I see what you are trying to ask me. Look at the issue of when the reactor shuts down for four months, or whatever it is, every four years. We rely on imported technetium from overseas for that period of time. It will be the same process. If you want it, you order it. You get it from South Africa or you get it from wherever.

Senator LIGHTFOOT—And then it is brought in?

Dr Smith—Just as it is from ANSTO. ANSTO does not just produce millions of generators and expect someone to use them. It is ordered.

Senator LIGHTFOOT—I think we are saying the same thing.

Dr Smith—I am not sure of that.

CHAIR—You are both speaking at the same time.

Dr Smith—I take your point, Senator, that you have to make an order for a radiopharmaceutical if you want to use it.

Senator LIGHTFOOT—That is precisely what I am saying.

Dr Smith—It could be an order within Australia or it could be an order overseas.

Senator LIGHTFOOT—It took a long time to get to that. In spite of the evidence that we have from major hospitals throughout Australia, their apprehension is that you could not successfully conduct radiotherapy by ordering your radiopharmaceuticals from overseas. Could you tell the committee how that could be achieved and why you believe it can. It seems to be a contradiction of the experts we have here from the major hospitals in nuclear medicine throughout Australia and perhaps your opinion Dr Smith.

Dr Smith—You are asking me?

Senator LIGHTFOOT—I am asking Madam Mayor, I suppose.

Mrs Sonda—I will ask Dr Smith to answer that, but also Councillors McDonell and Rankin may have further comments to make after Dr Garry Smith.

Dr Smith—Yes, of course, anyone running a hospital would want to have some reassurance about the availability of radiopharmaceuticals. I will answer your question, but I would like to say first of all that the types of concerns that are being raised, which are obviously legitimate concerns, seem very much unaccompanied by evidence. This has been our difficulty in what we are asking the government to do; that is, to test the evidence about availability of supply. It is one thing to get an opinion from someone in a letter; it is another to show that there are problems. Why aren't there problems during the four months that the reactor is shut down every four years? We can get technetium generators in then and a significant number are sold in Sydney and Australia from companies overseas every week. From that point of view, I think the government has to reassure itself that the types of concerns that are being made are based on evidence and proper information.

But can I say if companies like Amersham and others—and I would hope perhaps you might even ask Amersham because they are a professional and private company that sells generators in Sydney all the time—can fly in and sell a significant number of generators, it is quite clear that there is a reasonable line of supply within Australia on that basis. My concern and question is whether the heavily subsidised production of radiopharmaceuticals by ANSTO is anything more than a convenient supply at a very heavily subsidised price. If you admit it is very heavily subsidised, which I think it clearly is—notwithstanding the comments that you raised earlier this morning—then is it viable? Is it long-term viable for jobs? Is it long-term viable for the medical industry as a subsidy? Why shouldn't it compete on the open market and why shouldn't the Australian taxpayer and the Australian consumer get the best possible price in a competitive market rather than paying heavy subsidies for a reactor which gets a few radiopharmaceuticals?

Senator LIGHTFOOT—You mentioned subsidies. It seems to be a favourite phrase of yours. I am not going to ask you about evidence of any heavy subsidy. I was informed by a very reliable witness that ANSTO, in terms of its radiopharmaceuticals, turns a small profit. There are other areas. Would you care to tell the committee the other areas outside the radiopharmaceutical industry in which the Lucas Heights facility plays a significant role or, indeed, a role?

Dr Smith—I do not accept, and I think we challenge the question, whether or not there is a subsidy and whether or not there is a slight profit. I think there are hidden costs. We have addressed that earlier in the RRR review. The RRR indicated it cannot be a profitable total

industry. It just cannot. You can jiggle the numbers and say what it costs but it is just not the case. It is specious economics and our appended reports indicate that as well. I think the point of your question is: are there other useful things that ANSTO does—is that what you are driving at—other than radiopharmaceuticals?

Senator LIGHTFOOT—If you want to rephrase it that way, yes.

Dr Smith—I think there are significant benefits for some nuclear activities in Australia of a well-costed and properly tested type. For example, there is quite a lot of very good work going on out at ANSTO in environmental research. You will notice from the table that I will give you from our RRR submission that none of that was, in our view, reactor dependent and I would challenge ANSTO to show that it is significantly reactor dependent.

There is very important work going on in accelerator technology, notwithstanding the fact that the accelerators out there are very old. A lot of really good cutting-edge nuclear research in the world is in accelerators for the reason that the work is very exciting, they are much cheaper and they are much less polluting than reactors. They do not have the spent fuel waste problem, for example. I would concede that there are benefits with respect to science, in schools visiting the facility and in scientists being able to do experiments but, quite frankly, I would think if I was even a neutron beam scientist I would very much want to go overseas to a very high level and often, may I say, shared nuclear beam facility, such as some of those in Europe, to mingle with other scientists internationally, rather than necessarily see a very large number of dollars spent on a reactor in Australia so that I could work here. I think these things are all very much open to question. That was the point of my comments on a submission earlier that these questions have not really been asked properly.

Senator LIGHTFOOT—The radiospectrometric work?

CHAIR—We do have questions from other senators.

Senator LIGHTFOOT—I have just two more questions that are quite important concerning the radiospectrometric work and the semiconductor industry, in which the facility plays a large role in the supply of irradiated silica to Japan.

Dr Smith—That is right. There are a number of lines of work that the reactor does which are useful. Silicon doping has been one of them, and the RRR recognised that there is a significant profit, on the small scale that it is done, to the facility. But, frankly, to justify a proposal of this proportion with the potential risks on safety, on nuclear waste management and, may I say, on things like science expenditure generally on a couple of very narrow applications, which are only profitable on paper and which are heavily subsidised due to the overall cost of the proposal—$300-odd million, probably $500 million; I call that a subsidy—is very questionable. I think the government would want to satisfy itself that that this very narrow, very unprofitable application is worth the financial risk, the safety risk and things like nuclear waste risk.

Senator LIGHTFOOT—That was not my question. Could you tell the committee whether, in fact, cyclotrons can produce the types of pharmaceuticals currently being produced at Lucas Heights?

Dr Smith—There are a number that can be produced by cyclotrons; there are a number that cannot be produced by cyclotrons. The main application of cyclotrons at the moment is to produce very short half-life pharmaceuticals, for example at Royal Prince Alfred Hospital; for very urgent work—very short half-life work. Your question earlier this morning about technetium: technetium-99m can be produced by cyclotrons. There is no question about it—it is proven, it is scientific and it is in the literature. It is not being done on a commercial scale at this point in time for a number of very good reasons. We have never said that you can supply all radiopharmaceuticals without a reactor. It is a matter of getting the right balance and right judgment.

Senator LIGHTFOOT—Can molybdenum-99 be produced by a cyclotron?

Dr Smith—It is mostly sourced from reactors, but Mo and technetium can be produced through the cyclotron route by a fissioning process or a non-fissioning process.

Senator LIGHTFOOT—Not commercially.

Dr Smith—That can be done; it is reported in the literature. They are not currently produced on a commercial basis, no, but why would they be?

Senator LIGHTFOOT—I am not here to answer your questions.

Dr Smith—I know. Really, it is a rhetorical question. There are reactors churning out technetium in generators all over the world. It will be a matter of that sort of process being seen to be much more cost-effective, which it would be, and much less polluting and earning its own spurs in the market. Do you see the point I am making?

Senator LIGHTFOOT—Yes, I do indeed.

CHAIR—We should go to other questions from other senators, but I understand you wanted to make a short comment, Mr McDonell, on the topic.

Mr McDonell—Mr Chairman, I just wanted to ensure that the committee is quite clear on our position in relation to a question asked by Senator Lightfoot concerning a smaller reactor. We already have a smaller reactor and we are totally dissatisfied with the performance of that particular facility. As far as we are concerned, given the history that we can go into but which I am not going to take your time up with now—and it has probably already been provided in previous submissions—that smaller reactor is producing nuclear waste, which the world does not know what to do with, and that is of great concern to me.

In relation to the radiopharmaceuticals, I understand there are going to be other people who will be making comments to you on that, but I would advise the committee to look at the assertion that has been put to us that neither the United Kingdom nor the United States produce their own radiopharmaceuticals, they import the lot. With regard to the radioisotope business at Lucas Heights being a profit making centre, I would certainly like to view the financial reports of that business, just to see whether or not we, the community as the owners of that business, are getting a suitable rate of return on the investment that we have out there. I doubt very much if that is the case.

Also, with regard to that facility, it is producing a liquid waste which, over many years we have been told by the safety review committee that ANSTO will have to solidify that waste, but they have not done it until recently. I understand they might have started to do it, but again we are not informed about that. They are in the radiopharmaceutical business. They have been producing a liquid waste which for years they were told by the safety review committee they should have solidified, but they did not do it. I understand they may have done it in recent times, but again I am waiting for some information on that.

Councillor Rankin—I have just two quick points for the committee's information. Last year I attempted to question the claim by Mr Rolland that the pharmaceuticals were making a profit. I went to the annual report and it showed there approximately $12 million of sales of isotopes and a $60 million annual subsidy from the government at that stage. There was very little detail and I did, through a parliamentarian, put in a request to the Parliamentary Library in Canberra. The answer came back that ANSTO was not providing the financial details that would back that up. I would suggest that this committee may well want to question Mr Rolland and get to the bottom of those subsidy issues.

The other point is that between February and May this year when the reactor was closed, the president of the Australian Nuclear Medicine Association—and I am sure people like Dr Green will go into this when they give evidence—who was very much in favour of the new reactor was asked by SBS where people got their supplies during the shutdown. He actually said he was not aware that it had even been closed in that 12-week period. That is how much there was a shortage.

At a conference in Canberra this year of the physicians concerned about nuclear weapons, there was a doctor there, Dr John Ringwood, who had always argued—he works around this area as a gerontologist—that we do need the reactor for nuclear medicine. However, when he was involved in a workshop and talked to some of his nuclear medicine colleagues he publicly stated at that conference that he had been misinformed over the years by ANSTO and his nuclear medicine colleagues. His belief now, having been exposed to the information, is that there were plenty of doctors there who were much happier with their overseas suppliers than they were with ANSTO.

Senator GEORGE CAMPBELL—Most of my questions are for Dr Smith, but if they are not then maybe you could redirect them elsewhere if you feel that appropriate. Dr Smith, you indicated that you are on a number of committees of ARPANSA. Were you here this morning when I asked questions to Ms McSorley about the interface between ARPANSA and ANSTO in relation to the progressing of this contract? What are your views on that? Do you think the way in which the process is now operating will ultimately compromise ARPANSA's ability to take an independent, objective view of the contract?

Dr Smith—My considered opinion would be yes, and I am on the record as indicating such at ARPANSA committees.

Senator GEORGE CAMPBELL—You have actually raised that within ARPANSA, have you?

Dr Smith—I have expressed the view, for example, that I think the reactor replacement project timetable is running the regulation timetable. I have given you an example this morning of the earthquake specification. It should have been specified and satisfied by the regulator, we think in a public process, prior to the design starting. That is an example.

There are a number of regulatory codes that are currently being developed—for example, for design of reactors—which are not complete, despite the fact that we have a design under way at the moment. In no way, again as with Ms McSorley, would I cast aspersions on ARPANSA personnel. A regulator always has a difficult job. It is working under a very difficult act. I have expressed the view that, in some respects, ARPANSA has been given the hurry-up to get things in place so that an approval can be given, to be quite frank. I have raised those as concerns with ARPANSA. They have taken those on board and listened, and I hope that we will do something about that. But I think any objective analysis of the way this proposal has gone ahead and of the way that the regulator has been set up, and the timing of both, would draw criticism from any credible organisation overseas. People are being put in very difficult positions and the public is being locked out of the process.

CHAIR—I am sorry to interrupt, but you have mentioned the earthquake issue a couple of times, so could you quickly indicate what this issue is? I think what you are referring to needs to be on the record.

Dr Smith—One of the issues which emerged in the Research Reactor Review, and which is still current, is the safety of HIFAR. The Commonwealth government undertook a four-year process to do a probabilistic safety assessment on HIFAR. HIFAR failed one of the two primary criteria for safety, the primary criteria being that they might affect people off the site if there was an accident. It failed one of those. One of the reasons it failed that criterion was there was a large degree of uncertainty about the level of earthquakes at Lucas Heights. So a supplementary committee process, hiring an independent consultant—a New Zealand consultant—was undertaken by the Commonwealth government to try to assess the seismic hazard, or the earthquake size that was relevant at Lucas Heights, for the purpose of seeing whether HIFAR really did fail the safety criterion or not. The study that was undertaken over two years was relevant to the current safety of HIFAR and is also relevant to the replacement reactor, because obviously any replacement reactor would have to be designed to be able to withstand an earthquake. The report of that independent consultant from New Zealand was—

CHAIR—An earthquake, but an earthquake of a particular magnitude?

Dr Smith—That is right—what is called the peak ground acceleration, the maximum distance the ground moves and how quickly, so that the pipes and various other parts of the machine can withstand that and no radioactivity gets out, to put it simply. The report of that independent consultant was to the effect that the estimation for earthquake came up with an earthquake size, a peak ground acceleration, approximately twice the size of that previously assessed by ANSTO and others. Our concern is that that measure of twice the earthquake has not entered into the specification process for the design of the reactor. From what we have seen—we are addressing this with ANSTO and ARPANSA—it was the earlier earthquake specifications that were initially used for the tendering process and so on. And we do not know what the current earthquake specification for the design is: whether that New Zealand study,

which is agreed to be the most comprehensive study to date, has been taken on board, or whether there is some earthquake number in between, or whether it is the low number.

CHAIR—The New Zealand study was done by the company IGNS?

Dr Smith—That is correct. This is very important because any earthquake accident can potentially affect the reactor, can potentially allow radioactivity to be released and potentially has off-site consequences. What is of particular concern is that the process of assessing this issue is occurring post-EIS, it is occurring in a non-public process between ANSTO and ARPANSA, and the public has no access to how that government information is being used. It is a real concern to us.

Senator GEORGE CAMPBELL—The obvious follow-up is that there have been earthquakes recorded in this area in the past.

Dr Smith—That is the point—a lot of people underestimate the potential safety risk of this proposal because of the fact that earthquakes have been of a certain size. The New Zealanders were hired by the government under a full tendering process to give their best estimate for an earthquake using the most modern information available, and they did that. The question is: how is that being used in a specification for the design of a reactor?

The issue of earthquakes often leads to a question of certainty and uncertainty. It is very hard to estimate earthquakes, particularly because the earthquake record in Australia is very limited. If there is any uncertainty with respect to the size of an earthquake which can potentially affect radioactivity release, surely the public can expect that the government will err on the side of caution and safety. You do not ignore a report just because you are not sure or the estimates have some level of uncertainty. You build in an inherent level of safety to overcome the uncertainty.

I am not confident, having been part of those committee processes and now part of ARPANSA, that under the current process those levels of uncertainty are being adequately addressed. If the type of evidence that Siemens and others have produced in their submission to you is accurate—that the reactor proposal is underfunded—then I have real concerns about the level of safety that will be achieved by the reactor with respect to things like earthquake specification. It costs money to build in safety features.

Councillor Rankin—There was a very small earthquake at Liverpool just a fortnight ago, at 0.2 on the Richter scale.

Senator GEORGE CAMPBELL—You have mentioned the issue of the proposal being undercosted a number of times. Is it your concern in respect of the undercosting of the proposal that we might be hit down the track with a substantially bigger bill for building the reactor than is currently being budgeted for by the government? Or is it the other concern that, because of the way in which the tender process has operated, it is cost that is setting the quality standard rather than quality that is setting the cost standard for the reactor?

Dr Smith—It is actually both. Firstly, we feel that the budget will be significantly higher than that currently estimated. Secondly, we feel that significant safety and nuclear waste

compromises will be made due to the fact that there is a limit to what Australia is prepared to spend on a reactor. So it is a double jeopardy in that sense. I can explain that by saying that Siemens have indicated that they do not believe that what they call the maximum requirements under the RFT were achievable on the current budget; they could not go to a level of safety, waste treatment and other things on that current budget. That is a clear indication of undercosting. Technicatome have highlighted their issues with respect to damage to the reactor and loss of coolant, and so on and so forth. They have, it appears, state-of-the-art equipment. Questions like why one company was chosen over another, given that companies offer different levels of safety, and whether enough money is being spent to produce a fully effective and safe reactor I think are clear questions for the contractual process.

Senator GEORGE CAMPBELL—In the submission we had from ANSTO and the department on the first day of this hearing, they said—and my colleagues can correct me—that a substantial part of the judgment of the INVAP tender was based on computer modelling of the proposal. Are you aware of whether this computer modelling has been made available to ARPANSA, and do you have a view on whether that is an appropriate way to test a proposal from any tenderer in respect of the construction of a reactor?

Dr Smith—I am not sure whether it has been given to ARPANSA. Certainly, at our level of the ARPANSA committees, which advise the CEO, we have not seen any. It may have been made available to ARPANSA. One would have thought, particularly as companies like Siemens and Technicatome raise the issue of a paper assessment with respect to quality, that it is a relevant issue. As someone who is attempting to protect our community from potential mistakes and misjudgments, I would be very concerned if the contractual process and the design process were being undertaken with a significant reliance on paper estimates of things like safety, particularly when there is no earthquake specification, et cetera. I have a real concern about that process. The point we have made in our submission is that we do not think bad decision making and judgments at that point can be rectified at the regulatory point through ARPANSA when the design licence comes through. The regulatory process is a better process but it is still not a good process, and we think it is still not world's best practice under the act. We have serious concerns all the way along there, and it affects our community safety.

CHAIR—I should indicate that Sutherland Shire Council will be appearing before the committee again in Canberra next Sunday, with Mr Hirsch from the United States as a witness. It may be that we can pursue further questions at that time.

Senator GEORGE CAMPBELL—I had better ask my questions today because I will be at another committee on Monday, unfortunately.

CHAIR—I just ask people to bear that in mind if, for instance, there is something you believe could be covered then.

Senator GEORGE CAMPBELL—I will try and get through them as quickly as possible. Dr Smith, are you aware or is the council aware of any discussions that have been held with the major multinational pharmaceutical companies in respect of their capacity to deliver continuity of supply of radiopharmaceuticals? There has been a fair bit made this morning of the importance of that.

Dr Smith—There were some discussions held with Amersham and others during the RRR process back in 1993. More recently, no, I am not aware of any particular discussions. I am not sure they will volunteer information but, quite frankly, I think the best thing if there are significant questions over those matters—which we have suggested today there are—is to go directly to them and ask questions and perhaps they will be prepared to provide accurate information.

Senator GEORGE CAMPBELL—We may take that point up and ask the major pharmaceutical companies whether or not that question has been posed to them and whether or not they could guarantee continuity of supply of radiopharmaceuticals. You may not be able to answer this—I do not think it is answerable—but are you aware of whether or not ANSTO actually engages in cost recovery pricing for any of the products it produces at Lucas Heights?

Dr Smith—I am not close enough to the economics to understand that. We only have access to things like annual reports. We know from the RRR submissions that we made, where we analysed a number of annual reports, that we had significant concerns about cross-pricing and subsidisation, but, beyond that, I cannot give you any detailed information. Basically, through advice from our expert economists, we have asked for more analysis of those points.

Senator GEORGE CAMPBELL—I want to raise two other quick questions which I think are important to the issue. There has been a lot of concern raised about having a reactor continuing to be placed in what is a highly populated residential area of Sydney. Have there been any medical demographic studies done in the local community as to any particular diseases, medical deficiencies, et cetera, which stand out in comparison to those in any other area? Has the council engaged anyone to do any demographic studies?

Dr Smith—We have not engaged anyone, but there were a number of limited studies done as part of the RRR process. They were done very quickly. You will see if you read the reports themselves that are appended to the RRR process that they indicated that more analysis, and more detailed analysis, needed to be done.

Senator GEORGE CAMPBELL—Perhaps Councillor McDonell might be able to answer why that has not been followed up by the council.

Mr McDonell—It has been followed up by the council. As a matter of fact, we have gone to the state government, and the state government advertised in the *Herald* only in the last few weeks calling for tenders for a feasibility study. We can provide you with the information. That was because of a political undertaking given by the state government prior to the last state election. I would like to comment on this question in relation to an FOI request that we put to the department, a very wide-ranging question, and what came out of that—

Senator GEORGE CAMPBELL—Which department?

CHAIR—Industry, Science and Resources?

Mr McDonell—Yes. What came out of that was a document in which were draft questions provided to senior bureaucrats and members of parliament who were appearing before the previous Senate committee looking into this question. Those questions—and answers, I might

add—were provided to those people to school them for when they were appearing before the Senate committee. I presume that is a fairly reasonable thing to do. If you are going to appear before a Senate committee you should anticipate the sort of questions you are going to be asked, and have answers.

One of the answers—and I think I am quoting rightly but if I am not we can easily provide you with this because we have the document—quite clearly indicated the department did not want a health study done of Sutherland residents. It sent a chill down my spine, when I read that, to think that senior bureaucrats would be suggesting to other bureaucrats and members of parliament appearing before a Senate committee that they did not want a health study undertaken of Sutherland residents. I think that is outrageous. We will provide you with the document.

Councillor Rankin—I can clarify the state study. As Councillor McDonell pointed out, residents have been calling for a health study for about 20 years that I am aware of. Now we find, through freedom of information, that there has been very heavy senior federal government bureaucratic opposition to any kind of health study of residents. There is certainly a lot of anecdotal evidence. There has been a study group. You might like to ask the Sutherland Shire Environment Centre about it when they appear this afternoon. They have had a very active health study group involving nurses, epidemiologists and other experts that they can get in. As a result of this state government agreement, a feasibility study was advertised last week because we do not want another whitewash sort of job.

What they want done is a proper cohort study of the people who are coming forward with unusual cancers and with thyroid disease. Anecdotally, doctors say there is a large amount of thyroid disease. That is caused by radioactive iodine 131 which we know comes out of the isotope production plant at a much higher rate than it should. It is much higher than in places like Sellafield in England. These things really need to be investigated and it is very hard to get a direct causal study in this area. The residents are looking for a proper statistical analysis of the things they are reporting and proper monitoring of the emission rates, instituted properly by ARPANSA. When there is an accidental release of emissions, we believe that, as a community, we have a right to know which way the wind was blowing, where it has gone, whether it has affected the school or whether it has gone to Liverpool. It makes a big difference to our health outcomes and yet we are not entitled to this basic information.

Senator GEORGE CAMPBELL—Mr McDonell, can you make that document available to us that you referred to?

Mr McDonell—Yes.

Senator GEORGE CAMPBELL—I have two final questions. The first one probably goes to Councillor Rankin. In your submission you refer to the council having a committee on the application of emergency management procedures. What arrangements or agreements are there in place with ANSTO in respect to dealing with emergencies that might occur as a result of any accidents at Lucas Heights? Is there an agreed procedure in place for dealing with those emergencies?

Councillor Rankin—Yes. The committee I referred to that I now chair is set up under the State Emergency Planning and Management Act—that is the Sutherland Shire Local Emergency Management Committee. Under that committee, there is what they call a DISPLAN. Every area of New South Wales has a DISPLAN. ANSTO has an on-site plan in which it acknowledges that there is a possibility of an off-site class A accident, which is an accident involving off-site consequences.

I have only chaired one meeting; I have just taken over this committee. The state government did a review of this by Mr Brian Carr—no relation to the Premier—who was involved in the state legislation. He looked at this question. He has made some recommendations to improve it. The basic flaw in the current planning is that we have listed the problems at the oil refinery as potential specific emergencies for the Sutherland Shire. We have listed bushfires, which are quite common in our area, plus oil spills and those kinds of issues, but there has always been a resistance from the ANSTO representative on that committee to even listing a nuclear accident as a possible accident.

The arrangements are in place to the extent that DISPLAN identifies who is in control. If there is an accident there, the fire brigade is in control. However, it did come out at our meeting last Friday that the fire brigade have not taken into account even the National Health and Medical Research Council guidelines or what to do in a radiation accident. They have been public since 1991. We are obviously going to review that through the committee. We have had an advisory group also to counsel specifically on DISPLAN and the review of that.

The community feeling from teachers, ex-principals and people involved in the bush fire brigade who have sat on the advisory committee for council is that the disaster planning needs to be specific. People need to be told what they should do in the event of a nuclear accident, just as they are told in comparable communities in America and Canada, for example, around Chaulk River where they make isotopes. We are not given this basic information, and this is what I am hoping to remedy through our state committee. In your report, there should be emphasis on the need for ARPANSA to be doing proper and independent monitoring. What they do now is just take figures from ANSTO, and this is not what we would call independent monitoring.

As I say, at the state level, we are certainly taking up the need to have a much more specific plan. We do feel, though, as a Commonwealth instrumentality, that ANSTO have been using their voice on that committee for many years to not have proper nuclear specific planning. They say, 'We've got an all hazards approach like any other chemical that might come off the back of a truck.' But it is not on the back of a truck; it is Australia's only facility where we have a 10-megawatt reactor with a dangerous decommission process, nuclear waste processing facilities, isotope production and now a proposed new 20-megawatt reactor.

Senator GEORGE CAMPBELL—Are you saying that ANSTO is cooperating with you or not cooperating with you?

Councillor Rankin—It remains to be seen. What I am saying is that ANSTO has used its voice on the state local emergency management committee for many years to argue that there should not be nuclear specific plans announced to the public. What I am saying is that we are in

the business now, as a council, of trying to redress that. We have not got cooperation yet, but we also have not got any specific obstruction yet either.

Senator GEORGE CAMPBELL—Are you aware of what plans ANSTO has in place to deal with emergencies internally within the site?

Councillor Rankin—Yes. There is an on-site plan. They do emergency planning exercises. I believe Michael Priceman is going to speak here this afternoon, and he was involved as a community observer in Operation Dingo—the last planning exercise. However, there were two community representatives, including Will Langham, Michael and another member of the community whom I think is here as well, who put in very critical reports of that response. You might like to find out those details from those people.

Senator CHAPMAN—Councillor Rankin, if I quote you accurately you said that you wanted a 'fair go' in Sutherland and you wanted a further inquiry. This is the third parliamentary inquiry we have had on this issue, plus the McKinnon report, the environment impact study and all the rest of it. As Dr Smith said earlier, all the issues that have been raised today have been raised before in those various inquiries. Can I ask you what you hope to gain out of yet another inquiry after we have this parliamentary inquiry?

Councillor Rankin—Thank you for that, it is a good question. Senator Minchin is certainly writing to members of our community at the moment saying that we have had 71 months of inquiries, and he lists the RRR as one of those. I would say the only inquiry we have had is the RRR—the McKinnon review—because in that review, even though he was sceptical about it when it was announced by the former government, we at least did have a hearing process where scientific experts from both sides could come in a public forum, put the evidence and have it cross-examined. We had people there, such as Dr Garry Smith, who could ask ANSTO scientists questions.

What we have had this time, in the 71 months that Senator Minchin is referring to, is a RRR report where we did get a reasonable hearing where the outcome was said to be that ANSTO had not demonstrated the need for a new reactor and that, if they did have one, there were certain steps that had to be followed—such as the establishment of a nuclear waste dump, and not just thinking about it. There were requirements, when we did get a fair hearing. This is why we believe in a fair hearing under, for instance, the environment protection act that Senator Hill could have called when the EIS was on. We believe that we have the evidence, as a community, to say that that should not be going ahead there, but what we have is a decision made cabinet-in-confidence about the locational study. We have done FOIs, which Garry Smith can give you the details of, which show that cabinet had very sketchy information. They said they did an alternative site study and the figures we have seen under the FOI for that just show that cabinet had basically the wrong information before them on the costing. We do not know whether that was influential in their decision because it was made in secret.

Secondly, the previous Senate inquiry on waste was very critical of waste management and, to my knowledge, those things have not been properly implemented. In the process under the EIS and ARPANSA, when they did the site licence, they called for submissions and they do not give any evidence whatsoever that they have taken those submissions into account. I can tell you that there are a lot of people in our community that are very sick of that process. I would

refer members of the committee to the submission by Mrs Hazel Wilson, who decided, after many years of appearing before committees, that the core issues need to be addressed as to what kind of rights we have in the community. This is an EIS process that goes to the minister and makes recommendations without having a proper hearing to test ANSTO's information as to even simple statements like 'we need it for nuclear medicine'. If that is going to be said on the basis of government decision making, it must be open to testing in some kind of sensible manner.

Senator CHAPMAN—As Dr Smith said, all the issues have been raised before. As I recall, both on the occasion of the radioactive waste inquiry and also the Senate economics committee inquiry, the Sutherland Shire on balance supported the provision of the new reactor, and yet today you are opposing it.

Councillor Rankin—My understanding of the last Senate economics committee was that the committee itself called for an inquiry. That was the main recommendation that came out of it.

CHAIR—That was a recommendation.

Councillor Rankin—But you are talking about council's position.

Senator CHAPMAN—Council has changed position?

Mr McDonell—Can I comment on that? Council's position on this has varied depending on where certain councillors are coming from.

Senator CHAPMAN—So it is not a unanimous view in council on this matter?

Mr McDonell—It was. There was a unanimous view on our council in opposition to a new reactor at Lucas Heights. There was a unanimous decision on our council to oppose the expansion of the nuclear activities at Lucas Heights up until the government took a decision in September 1997 to build a new reactor. They took that decision and told us that they were going to do that on the very same day that they announced that they were not going to proceed with the Holsworthy airport. In the morning they told us there would be no Holsworthy airport, which we were fighting, and in the afternoon they told us that there was going to be a new reactor at Lucas Heights. The council at that time—

CHAIR—Could I interrupt and ask what the reaction was of the then Liberal mayor of Sutherland Shire Council when the announcement was made that the government had decided to put a new reactor at Lucas Heights?

Mr McDonell—In opposition to the new reactor.

CHAIR—That reflected the then current position of the council?

Mr McDonell—That reflected the unanimous position of the council. The position of the council changed in a very short space of time to support the new reactor. You can draw your own conclusions about that. There was a change—

CHAIR—What happened at the last council elections?

Mr McDonell—There was a change in the council at the last council elections and the previous Liberal councillors no longer control the council.

Senator CHAPMAN—Do you have party politics in council?

Mr McDonell—I think there is party politics in most councils in New South Wales, or in a lot of councils in New South Wales.

Senator CHAPMAN—I come from South Australia, where we do not have it.

Mr McDonell—That is a whole question to go into in itself. In Sydney, certainly there is party politics in local government in a very big way. There was a change in the make-up of the council and I was elected as mayor at that time. Within a week we carried an overwhelming majority resolution in opposition to the new reactor at Lucas Heights.

Senator CHAPMAN—In fact, it would be fair to conclude that the position of the council is based on party politics. The Labor Party federally is opposing this reactor and the Liberal Party supports it. The Labor Party in council opposes it and the Liberal Party supports it.

Mr McDonell—That is not correct.

Councillor Rankin—I do not really want to get into party politics, but what I would like to say is that I am an Independent and I have a team of Shire Watch independent councillors who went to the local government election campaigning against a new reactor, and we had four councillors elected on that basis.

Senator CHAPMAN—How large is the council altogether?

Mr McDonell—The council has 15. There are five Labor councillors, four Shire Watch, four Liberals and two independents.

Councillor Rankin—My election as an independent was also based on campaigning very strongly against the reactor.

Senator GEORGE CAMPBELL—You cover the area where the reactor is?

Councillor Rankin—That is right.

Dr Smith—If I could also contribute to that answer, you will find, Senator Chapman, if you look over the staff policy recommendations including my own over several years and several councils, that there has been a singular consistency in the nature of our concerns and our calls for an inquiry to test that information, including attachment of the independent expert reports. Certainly that has been a very consistent record over council, and there is a very significant non-political component. Our real problem has been getting a hearing. A simple answer to your earlier question about the nature of inquiries is that these inquiries have been very useful to try

to get closer to the truth, but a technical inquiry is best practice overseas. We have had none of those. McKinnon went close, but we have had none of those.

Mr McDonell—If you go back to the McKinnon inquiry, which was in 1992-93, our council made a big contribution to that inquiry and that was recognised in the report that came out. I invite the committee to have a look at that to see what sort of commitment this council has had over the years in relation to this particular question. It is not something that has just sprung up because of a political difference between the major political parties, because we had the other major political party at one time supporting a unanimous position in opposition to a new reactor at Lucas Heights. It is documented in the local papers. I would invite you to look at the submissions that we have put in over the years and at the recognition that has been given to those submissions about this issue. It has not been argued as a political issue.

CHAIR—Indeed, what was originally the position of the member for Hughes, Mrs Vale?

Mr McDonell—I have to say, again, that I am reluctant to get involved in the party politics of it. However, it is useful to know that in March 1997 our local member put out a press release in which she said—I cannot quote it exactly, but it is a public document and it is around—that she was totally opposed to the expansion of any nuclear activities at Lucas Heights. As a matter of fact, I think it went on to say that Australia is a big country and maybe we should be looking somewhere else. That was the import of what was said. There were comments in the press by our former Liberal mayor, Councillor Schrieber, that were along the same lines, particularly in relation to the production of radiopharmaceuticals. They were opposed to it occurring at Lucas Heights at that time, and their position changed. I know that is getting into the politics of the thing, and I do not know how important that is to your deliberations, but I would invite you to look at the merits of the submissions we put forward rather than get into that particular angle.

Senator CHAPMAN—Dr Smith, in your evidence I think you said that the United States did not produce its own radiopharmaceuticals?

Mr McDonell—I made that comment.

Senator CHAPMAN—Could you cite your evidence for that, because my understanding is that they certainly produce them.

Mr McDonell—That is on the advice that we have been given. That is why I invited the committee to have a look at it.

Dr Smith—I think you were referring to technetium in particular. As background evidence, technetium generators are imported largely from Canada. But they do make some radiopharmaceuticals, just as we do in cyclotrons here, and they do in reactors.

Senator CHAPMAN—In reactors too?

Councillor McDonell—That is what I am asking the committee to have a look at, because the information provided to us is that they do not. On that point, could I add that there is a public document from a private laboratory in Idaho in the United States. That laboratory claim that they have a process which can produce all of the medical radiopharmaceuticals that the

United States needs. If 20 of their I presume cyclotrons were constructed around the country, they could produce all the United States needs at a price cheaper, they say, than the current subsidised price for the production of radiopharmaceuticals used in the United States.

Councillor Rankin—That research was recorded in a magazine called *Nuclear Technology*, an internationally refereed journal, in April 1999. The Parliamentary Library might be able to make that available to senators.

CHAIR—I have one further question. As I said, we will be taking further evidence next Monday from you. We have been discussing this issue raised by Senator Chapman about the number of inquiries that have been undertaken and, just so that it is clear, each of the inquiries that have been referred to—the Senate economics committee, the public works committee and now this one—has been initiated after the decision made by the government to build a reactor. That is correct. As I understand it, the position of the council has always been, and continues to be, that there should have been, and should still be, a full public inquiry, as was recommended by the McKinnon report in 1993. Is that a fair assessment?

Councillor Rankin—Yes. As Dr Smith referred to in our submission, when Mayor Schrieber was mayor, that was the call of the council then as well to have it properly tested.

CHAIR—Professor McKinnon and his team recommended that that public inquiry should take place around about the time that the decision was actually made, which was five years after the report came down, to look at the issues that he had identified in his report, such as location, such as the need for a new reactor, such as alternative technologies. Professor McKinnon did not rule out a new reactor, in fact he indicated that there could be a good case for a new reactor, but that was something that should be addressed in a full public inquiry under the EPIP Act. That is my understanding. Is that correct?

Councillor Rankin—Yes. Could I emphasise, seeing that we are finishing up, the point where we started? As Dr Smith says, a technical inquiry is minimum standard practice in America—you will no doubt hear that from Daniel Hirsch as well—and ARPANSA still have to consider the licence to construct. I would think one very constructive thing that this committee could do is make a strong recommendation that there be a proper technical inquiry where the evidence can be heard. In answer to Senator Chapman, we have not had that, not even in the McKinnon report.

Senator GEORGE CAMPBELL—Is that what you are saying your priority position is at present, for a technical inquiry as opposed to a general type inquiry, given the set of circumstances where we are at the moment?

Dr Smith—I am still searching for an answer of why the Commonwealth government did not use the full resources of the EPIP Act to test this proposal during the EIS process. That is very unsatisfactory. It may be that the government will go ahead and ignore that fact, but an inquiry into the design in a public hearing process, preferably with some sort of independent adjudicator a la overseas best practice, is the minimum we seem to be able to get at this stage. From the technical analysis point of view, and testing of information, it is all totally unsatisfactory, but that would be a minimum we could have. Whether the government would grant us some sort of inquiry under the act to retest the EIS, particularly given that a design still is not available, we

do not know. That is what we would very much favour, but we think the minimum we could get is the other.

CHAIR—Maybe if you lived at Badgerys Creek you could actually get that.

Dr Smith—I am still trying to find the answer to that question.

CHAIR—There have been a number of inquiries and a number of cabinet meetings about that issue.

Dr Smith—As we are winding up, could I also make a small addition to the answer that I gave to Senator Campbell about the state planning law issue, which I am going to provide the committee with more information on. We have just received some Freedom of Information Act information which indicates to us that the New South Wales government asked the Commonwealth government to do a full alternative location analysis for this reactor proposal and that that was not undertaken, on the basis that the government had made a decision that it would be going with Lucas Heights. I think that counterpoints the difference between Commonwealth law and state law with respect to veracity and testing of these types of hazardous facilities. If you wish, I will give you more information on that too.

CHAIR—That would be appreciated.

Councillor McDonell—Could I add to that as well? The document that I will provide, as a result of our freedom of information request, will comment on the fact that Professor McKinnon also said that, in looking at the site of a new reactor, there should be full consultation with the community. There was no consultation with the community at all before that decision was taken. The information provided in that document by the bureaucrats in that note is interesting in that they really did not want any participation at all because they drew attention to what happened in the airport inquiry.

CHAIR—Thank you for your evidence this morning.

[12.37 p.m.]

GRAY, Associate Professor Evan MacAlpin, Councillor for Griffith University; and Chair, Neutron Scattering Specialist Committee, Australian Institute of Nuclear Science and Engineering

KISI, Dr Erich Herold, Member, Neutron Scattering Specialist Committee, Australian Institute of Nuclear Science and Engineering

CHAIR—Welcome. Do you have any comments to make on the capacity in which you appear?

Prof. Gray—I would like to say that my credentials to appear before you are as follows: I am an associate professor and head of physics at Griffith University; I am one of the neutron beam scientists that Dr Smith just referred to a little earlier; I have 27 years of experience in neutron scattering in Australia and overseas; I am a member of the National Committee for Crystallography of the Academy of Science; I am chair of the AINSE Neutron Scattering Specialist Committee, which allocates neutron beam time at HIFAR and overseas in Australia's partnership with ISIS in the UK; I was an AINSE representative on ANSTO's beam facilities consultative group, which made recommendations about areas of science to be supported by the new research reactor; and I was an AINSE representative on ANSTO's beam facilities technical group, which set performance criteria for the beam lines of the new reactor.

Dr Kisi—I am a senior lecturer in material science and assistant dean for postgraduate studies in the faculty of engineering at the University of Newcastle. I am appearing for the Australian Institute of Nuclear Science and Engineering as a member of the Neutron Scattering Specialist Committee, which allocates access to the neutron beams at Lucas Heights for scientific research purposes.

CHAIR—The committee prefers that all evidence be given in public, but if at any stage you wish to give any part of your evidence in private, you may ask to do so and the committee will consider your request. We have before us a submission from the Australian Institute of Nuclear Science and Engineering. Firstly, are there any alterations or additions you would like to make to the submission at this stage?

Prof. Gray—No. I believe that anything extra will be covered as we go along.

CHAIR—I would now invite you to make a brief opening statement and we will proceed to questions.

Prof. Gray—Thank you. I would like to read an opening statement that deals with technical issues. I have already made available a transcript to assist with the *Hansard* record. Firstly, I would like to make it clear that AINSE's submission was prepared with no input from ANSTO, and that, unless ANSTO has obtained our submission from your web site, it has no knowledge to this minute of the contents of the AINSE submission. It is a totally independent document.

I would like to address the key questions as they are seen from the point of view of researchers who rely on access to neutron beams in Australia to carry out their research. The

first of these key questions is: why should Australian researchers have access to neutron beams for research? AINSE's answer is because there is a demand for such access from researchers working in the fields of physics, chemistry, biology and engineering—and I refer you to the list of Australian Bureau of Statistics field of research category data in appendix 1 of the AINSE submission as evidence of this. The fact is that, contrary to what you might have concluded from previous evidence, most users of the neutron beam facilities on HIFAR come from outside ANSTO. The figure of three per cent is entirely misleading. It might represent three per cent of ANSTO's internal research effort. However, HIFAR is central to the Australian research effort in universities on a much bigger scale than ANSTO.

In fact, one of AINSE's biggest functions is to manage the access of neutron beam users from the university community in Australia to the neutron beams at ANSTO. As an aside, I might say that this access is essential to people like me who work in alternative energy. We need neutron beams for research into new materials whose ultimate use is in the alternative energy area. Much of the demand for neutron beams worldwide concerns the development of new materials or understanding at a fundamental level of existing materials. Neutron beams are uniquely suited to studying the structure and dynamics of materials on the atomic scale. They may be used to examine samples under regimes of vacuum pressure, high temperature, low temperature, magnetic field and so on essentially under real-world conditions. Neutrons are quite unique in this respect.

Hence, neutron beam techniques underpin materials research, and I would like to read you two quotes in support of this claim—which I have also provided for the *Hansard* record. The first is about the importance of materials research, and it states:

> The transformation of materials into products is the central purpose of most industries. Driving the widespread interest [from industry] in this area was anticipation of near-term, technology driven developments down the cost curve...that would permit the wider application of new materials—both structurally and functionally…Here, *criticality* was characterized by the potential transformations of traditional product lines and processes that would ensue from entirely new classes of engineering materials.

The source of this quote is a report called 'New Forces at Work: Industry Views Critical Technology', by the Rand Critical Technologies Institute to the Office of Science and Technology Policy in the Executive Office of the US President 1998. Materials was classed as a critical technology with cross-sectoral ubiquity. The second quote is about the necessity of access to appropriate infrastructure. It reads:

> Progress in condensed-matter and materials physics, as in many other scientific fields, will require continued investment in major facilities for experiments in such areas as neutron scattering and synchrotron radiation. These facilities provide capabilities far beyond those available in individual laboratories. Though they have been developed and supported primarily by the condensed-matter and materials physics community, they also serve thousands of scientists and engineers in other endeavours, such as structural biology and environmental science.

The source of this quote is 'The Physics of Materials', a report by the Committee on Condensed-Matter and Materials Physics of the US National Research Council 1997.

The second question I would like to address is: why must we have local facilities; why not use overseas facilities? Firstly, we need an agreed access mechanism in place to be able to plan research. Ad hoc arrangements are unsatisfactory. Secondly, we need access to instruments appropriate to Australian research directions. This would require agreed access to several overseas sources: no one source is sufficient.

Thirdly, it is unreasonable that all Australian demand could be met overseas on the grounds of efficiency. There is a roughly five-day overhead of lost time to go to Europe or the USA where the sources that Australians use are located. There is complexity of peripheral equipment that may need to be taken to the source. Industry does not like to send samples and personnel overseas. Commercial research does not travel well.

The next question I would like to address is: why do we need a reactor rather than a spallation source? Firstly, not all sources, with given flux, are equivalent. Spallation and reactor sources are generally complementary. Secondly, Australian neutron beam time use is dominated by powder diffraction and cold neutron techniques like small angle scattering and reflectometry. Many users believe that these techniques are best implemented at a reactor source. Spallation sources are best for high energy inelastic techniques and there are not many Australian practitioners of those techniques. I am one of the few. Thirdly, most big sources now being built overseas are pulsed spallation sources. Australia cannot afford a competitive spallation source. Having a world-class reactor will make our facilities sought after and encourage international collaboration.

The next question, and the penultimate one I would like to address, is: why do we need a new reactor? Why not re-equip HIFAR with new instruments? Firstly, HIFAR's existing instruments are not competitive and cannot be made competitive even by totally renewing them. Secondly, this is because HIFAR has radial beam tubes and was not designed for neutron beam research. The reactor building is very cramped, with a high neutron background count relative to a neutron guide hall—that is a building outside the confines of the reactor in which you may place experimental equipment. The useable flux is much lower than on a purpose designed reactor with the same peak flux, even if a guide system were installed. Thirdly, HIFAR has no cold source. This precludes most experiments in soft condensed matter and biology. Fourthly, for the reasons just given, it is not possible to achieve competitive cold neutron performance by upgrading HIFAR and fitting a cold source. Fifthly, the security arrangements at HIFAR are obtrusive and inappropriate for a modern user facility.

The final question I would like to say something about is: what benefits will Australian science get from the replacement research reactor? Firstly, it will get parity with what is available in developed countries overseas. Secondly, it will get an instrument suite specified by Australians for Australia's needs. Thirdly, it will get quick turnaround for industry. Fourthly, it will get no five-day overhead for overseas visits. Fifthly, it will get instruments that are first class—not second class or third class—with some being world leaders. That is the end of my opening statement.

CHAIR—Thank you. Did you wish to make any comment, Dr Kisi?

Dr Kisi—No, we prepared that jointly.

CHAIR—I will start off with a couple of questions. Firstly, is it necessary that any new reactor be located at Lucas Heights? For the purposes of the work that you have referred to, and what you say is its importance to people such as yourselves and other professionals throughout Australia working at universities and so on, could it not be located anywhere?

Prof. Gray—From the point of view of neutron beam users, it could be located anywhere as long as it is not somewhere that is hard to get to. You need to have ready access for people and equipment from Australia and overseas.

CHAIR—Have you had a chance to read the Sutherland Shire Council submission at all?

Prof. Gray—We heard the evidence.

CHAIR—They did provide a very detailed submission which includes quite a number of attachments. Those attachments include various reports that have been commissioned by the council. They refer to a report by Professor Ian Lowe which is attached to their submission. That is his report to council which looked at the issues regarding the validity of nuclear expertise, national interest claims and consideration of alternative approaches.

Professor Lowe said in his report that he considered that ANSTO took advantage of an Australian Science and Technology Committee inquiry in 1991 into the provision of major national research facilities to put forward its claims for a new reactor and to acquire some sort of support from the science advisory structures. However, Professor Lowe noted that the ASTEC report announced that seven facilities considered to have the highest priority included a proposed reactor with an estimated cost of $150 million—that was in 1991—and six others with a total cost of $125 million. The ASTEC report emphasised that it did not employ peer review, on-site visits or other steps necessary for a full evaluation of proposals. He added:

> In terms of science and technology policy, the picture is clear. The growth areas of the future are information and communication technologies, biological technologies, clean energy systems, new materials, advanced manufacturing and clean sources of energy. Nuclear reactors contribute very little to these areas.

There is a range of other comments that he makes which support that argument.

I should also say that I understand from previous inquiries that a previous chief scientist—I believe it was Professor John Stocker—also raised some doubt about whether or not a new reactor would be of benefit or should be built, given what that amount of money might be able to be used for in other areas: medical or scientific research. Could you comment on the arguments that are put—and, for a new reactor, we are looking here at an expenditure of $300 million or $400 million and a commitment over a 40-year period—and whether or not, in your view, they stand up, compared with what that amount of public money could be used for in a whole range of other areas of research. Why should it go into a new reactor, given the arguments that have been put about the value of nuclear research to Australia compared with everywhere else?

Dr Kisi—It should be pointed out here that neutron scattering is not nuclear research. Neutron scattering uses neutron beams that are produced by a nuclear reactor more or less as a by-product. We take those and use them to investigate engineering materials, materials that are used in new energy systems and materials that are used in information technology. All of the things that are on Professor Lowe's list people in this country are currently working on with neutron beams, and they could do better with a better neutron source. I really find that list is totally out of agreement with the facts. You only have to look at AINSE's list of users and what they are working on—it should cover all those reasons.

CHAIR—Are all of those areas of research—let us say biotechnology, molecular biology research—dependent upon having a reactor? Let me put to you something else—which is hearsay, I know. I have visited facilities at CSIRO, and I remember talking to an eminent person in CSIRO—I will not name that person—who is world renowned in terms of research. He was saying, 'If the government could give me $20 million, I could get a microscope.' He said that if he had it here in Australia he would not have to travel to the US to do research work in developing cures for cancer or for flu vaccine. In other words, he was complaining that for $20 million he could get equipment here in Australia that would—

Dr Kisi—There are a couple of points. Firstly, the money for the reactor is not part of the national science budget. It is in addition to the national science budget. Secondly, it supports an extremely wide range of research. Sure, we could all do with an injection of $20 million into our research programs. In fact, that would keep all of the research in my faculty going for a couple of years, which is possibly a comment on the relative size of claims by CSIRO and universities.

In terms of public expenditure—and this is just a private comment—the amount of money here is relatively small. We are talking about the equivalent of 10 kilometres of four-lane freeway. That is about the amount of money we are talking about as the up-front cost. If you are talking about that amount of money supporting the research of, at the moment, a neutron beam user community of 60 or 70 people and a larger number who go overseas to do their research, a large number of expatriates at the best neutron sources in the world, you will find that, in expenditure terms, although it is very big business and it is a very large amount of money for us meagre scientists at the coalface, it is not a large amount of money in public expenditure terms. Three parliamentary committees do not examine the rationale for every 10 kilometres of freeway that is built. That is a personal comment and that has got nothing to do with AINSE.

CHAIR—Ten kilometres of freeway is probably going to be used by a lot more Australians than the Lucas Heights reactor.

Dr Kisi—A lot of them will be killed on that 10 kilometres of freeway.

CHAIR—A lot of lives might be saved by that 10-kilometre freeway rather than a single lane, winding road. Have a look at the Pacific Highway, if you want to get into that debate. In any event, whatever is spent on roads, and I am sure the current council would agree—

Senator LIGHTFOOT—That is not our commission.

Senator CHAPMAN—A lot of lives might be saved by nuclear medicine, too.

Dr Kisi—It was a side issue, but if we are going to mention expenditure, we do need to keep it in perspective.

CHAIR—Another assertion is made—it is in some of the submissions and it is also put by people—regarding Australia's involvement in terms of a single reactor which is not a power reactor and which is of a limited size. ANSTO are always telling us how small this is compared with everything else in the world. It is then argued that we have 10th grade or 12th grade involvement compared with overseas countries. Therefore, the argument is advanced: should we

be putting a significant amount of public money—$400 million is not a small amount—into that area of research when, compared with the rest of the world, we are not a major player? They would then argue: isn't it better to look at other areas where we could utilise that money more effectively?

Prof. Gray—The quick answer to that question is that that is not true. We are first rank players in research using neutron beams. The number of Australians in senior positions overseas at the best neutron sources is significant. The reason they are there is that those of us who persist in working in these fields of research in Australia do so with an inadequate suite of instruments on an uncompetitive source. It is absolutely untrue that we are lowly ranked. We are Australian scientists who use neutron beams for world-class materials research, and some of them are world leaders in their field—right at the very top. So I absolutely reject that.

CHAIR—I do not think that is quite the point that I am making, or that I am asserting. The point I am making is that, when you link that to HIFAR—in other words, you just referred to our world expertise, whereby many of those people are working overseas—

Prof. Gray—Because we do not have a decent source in Australia.

CHAIR—That is the point I am getting at. What is the advantage to Australia of having a reactor here when it is argued that everything that is world's best practice, that is world class, is happening elsewhere? Australians may be very good—I am not decrying that at all—but how dependent is that, at the end of the day, upon us having our own reactor?

Prof. Gray—I have touched on the issues of access and efficiency. I think this is the nub of what you are saying: why should we not go and do such experiments overseas and gain the same benefits? Is that really the question?

CHAIR—It is not as simple as that, but at the end of the day the argument, as I understand it, is that if we really wanted to be at the cutting edge we would be putting a heck of a lot more in than just having a single reactor, but we are not going to do that as a public policy position. Therefore, why even be involved in the minutiae?

Prof. Gray—Okay, I now understand what you are getting at. The source that is proposed to be built at Lucas Heights is a source of world class. It is a first-class source, it is not a second-class source. The reactor itself is small; it is only 15 to 20 megawatts in thermal power. The flux is classed as medium flux, approximately 3 by 10^{14} neutrons per square centimetre per second. However, because it is designed as a neutron beam research reactor, the effective flux is very high, and every one of the instruments that the beam facilities consultative group recommended be built on the reactor—there are 17 of them over the next decade or so that we recommended to be built—is world class. We adopted a policy of excellence, and we recommended that no instrument be built unless it would be of world class and that some of the instruments would be world leaders. The facility would be smaller than some facilities overseas and it would be larger than some facilities overseas. However, the quality of the science is not related to the size of the facility, it is related to the performance of the facility. I have some personal knowledge of this because I was involved in the group that drew up the specifications for the beam lines, so I hope it is taken that I speak with some authority on this issue. The performance will be first class.

Senator GEORGE CAMPBELL—Are you saying you are familiar with the detailed specifications in respect of this reactor?

Prof. Gray—No, that is not what I said.

Senator GEORGE CAMPBELL—Only as it affects the beam lines.

Prof. Gray—I have a reasonable degree of knowledge about the beam lines. The reactor is a source of neutrons. The beam lines are the neutron wave guides that are attached to the reactor to transport the neutrons from the reactor to the experimental areas.

Senator GEORGE CAMPBELL—Did you act as a consultant to ANSTO on these matters? I think you said you did, that you were on some committees.

Prof. Gray—I was one of a large number of external representatives of peak bodies which included AINSE, the Australian Institute of Physics, the Royal Australian Chemical Institute, CSIRO, DSTO and probably a couple of others that I have forgotten, which was the beam facilities consultative group, which made recommendations about the areas of science that should be supported by the reactor, tailored to Australia's needs as perceived by this committee of representatives of peak bodies within Australia. It was a committee dominated by people outside ANSTO, I emphasise, and this committee made some recommendations about the kinds of instruments that would be built and what the performance of those instruments should be. That was handed on to a more technically oriented group on which I also sat, and that group looked at the realities of what performance could be achieved and so on.

Senator GEORGE CAMPBELL—Was that done on a voluntary basis or did you receive a remuneration from AINSE?

Prof. Gray—It was voluntary with no remuneration for any of it—and a lot of time contributed, I might add.

CHAIR—Do you have any comment to make at all about the expertise and performance of the successful tenderer, INVAP, against other companies?

Prof. Gray—That is outside our area of expertise. The only comment I can make is on the aspects concerning the drawing up of the criteria against which the performance of the beam lines would be evaluated, because I saw that and commented on that. I regarded the process as excellent and watertight.

CHAIR—Was that before the contract was given?

Prof. Gray—Yes, of course.

CHAIR—Will you have any involvement from here on in with assessing INVAP's capability, if you like, to deliver?

Prof. Gray—I was involved in a small way in assessing the performance of the neutron beam lines that all tenderers proposed against the specification.

Senator GEORGE CAMPBELL—Did you do that through computer modelling? Was that made available to you? How did you make that assessment?

Prof. Gray—I have some knowledge of this, but it is at second-hand. However, my belief is the following: ANSTO has in its service some expert computer modellers, who can deal with Monto Carlo modelling of neutron populations in optical systems, and so on. My understanding is that they spent a lot of time constructing and running computer models of the performance of the core of the cold source and of the beam lines and that all claims made by all tenderers were assessed against those models.

Senator GEORGE CAMPBELL—Did you personally have a look at these models and make any judgment in relation to them?

Prof. Gray—No, I was not involved.

Senator McLUCAS—On that matter, I would like to get an understanding of how the specifications from the scientific community were developed. You said that you were involved in developing the specifications of the reactor, or its output, anyway.

Prof. Gray—No, not of the reactor. I would like this to be extremely clear: I have not been involved in the drawing up of the specifications of the reactor; that is outside my area of expertise. My expertise is in neutron scattering. I was involved with other people in meetings concerned with the specifications for the beam lines—that is, for the provision of neutrons to instruments outside the reactor. In order to make it clear, I might reiterate that a neutron scattering facility consists of a source, which, in this case, would be the reactor. Inserted into the biological shielding of the reactor there are various beam tubes, literally holes in the shield through which beams of neutrons can emerge. Some of those are taken directly to instruments at the reactor face; some of those are taken through neutron wave guides to instruments in a separate building; and some of those neutrons are rethermalised to very low temperatures in a cold source, so-called, which produces neutrons of long wave length—cold neutrons. Then those are taken through wave guides to an adjacent building for use on instruments. So my concern has been only with issues concerned with the neutron beam lines and the instruments that go on those beam lines—nothing to do with the reactor itself.

Senator McLUCAS—What ongoing role does your organisation have in ensuring that the specifications for the beam lines, for the neutron source, deliver the outcome that you, as the science community, would like?

Prof. Gray—The community was involved, first, through the BFCG and then through the BCTG, the technical group in drawing up specifications of beam line performance. It is entirely up to ANSTO to operate the tender process, which is entirely outside our area of expertise, and to do the best it can to obtain the performance that we are asking it to obtain. I cannot comment further on aspects of the tendering process and of measuring performance. That is up to ANSTO; it is dealing with the contractor itself.

Senator LIGHTFOOT—We have heard a lot, particularly since the committee was formed, about the inadequacy of the HIFAR reactor as it pertains to medicine, both in the clinical sciences and all that that indicates—from cardiology through to radiotherapy—and other areas. But what of the other commercial applications that the HIFAR and the proposed INVAP reactor are proposed to be used for? Could you give the committee a broad outline of some of the other sciences, outside the medical area, that could use them?

Dr Kisi—It is covered largely in Professor Gray's opening statement. Can I just be clear that we do not regard science as a commercial enterprise.

Senator LIGHTFOOT—No, in pure science.

Dr Kisi—The kinds of fields that use neutron beam research include pure physics and chemistry, biological sciences, biomedical sciences, material sciences—that is, in engineering, the study of functional materials—and the geological sciences, and mining industries also are starting to make use, largely through scientists in Western Australia, of the neutron beam facilities already at HIFAR.

Senator LIGHTFOOT—And physical chemistry?

Dr Kisi—Yes, physical chemistry. All branches of chemistry can benefit. It is largely down to where there are people working on the structure of materials or the structure of entities that are of concern to their research.

Senator LIGHTFOOT—Is there anything you want to add, Professor Gray?

Prof. Gray—No, I attempted to cover that broadly at a high level by showing you how independent, very high level bodies in the USA have asserted that materials research is underpinned by neutron and synchrotron x-ray sources. The availability of tools to study the structure of new materials is immensely important.

Senator LIGHTFOOT—Yes, that is the point I wanted to make. I wanted to break the perceived nexus in the use of radioisotopes as an exclusive source or exclusive product that the reactor actually participated in.

Prof. Gray—Yes, indeed, and I thank you for making that clear. There is a large community of users which depends on HIFAR—inadequate and outdated as it is—for aspects of their research. There is an equally large community which is forced to go overseas in order to perform leading edge research in materials because our facilities here are so inadequate. This is a community which one does not often hear too much about. But it is there working always on the new materials of the future, and Australians do that very well.

Senator LIGHTFOOT—Yes, I understand that and I am very proud to think that we do. What is it that the INVAP reactor would do that the HIFAR cannot do or is inadequate in delivering?

Prof. Gray—HIFAR is a very old design of a reactor. It was not designed for the use of neutron beams. It was literally a case of drilling holes through the thing and taking beams out.

There are several central issues, but really the most basic one is that the extraction of neutron beams at HIFAR is by radial beam tubes, that is, they point at the core. Those are completely unsuitable for use in neutron scattering research. You really mostly require tangential beams and you cannot do that to HIFAR without completely deconstructing and reconstructing it—which is a new reactor. The physical conditions in HIFAR are most unconducive to research. You cannot put big equipment in there; it is a totally unsuited building and the flux is also too low. The neutron flux is too low to be competitive.

The new reactor, wherever it comes from, has a higher flux. It has tangential beam tubes and, much more importantly, the beam tubes, the cold source—everything concerned with the use of the neutron beams—is optimised for neutron beam studies. That means that you can expect at the instrument a factor of something like 100 times useable neutron flux. The speed and useability of instruments are going to improve by something like two orders of magnitude. This is because you are now talking about a reactor designed for this purpose, not one which was used ad hoc.

Senator LIGHTFOOT—So there is going to be not only an exponential increase in the availability of neutrons but also a new source of neutrons that is unavailable from the HIFAR.

Prof. Gray—Yes, indeed. A cold source is an integral part. This is in recognition of the modern enormous demand for cold neutrons around the world for research in soft condensed matter and biology, for example, polymers, colloids, emulsions and biological materials.

Senator LIGHTFOOT—There is a perception that because the proposal to build the INVAP reactor was a joint venture between the Argentine and Australia that somehow it is inferior. Could you confirm that or, if not, could you tell us at what position it sits in terms of its importance in leading edge technology?

Prof. Gray—I am unable to comment on that. It is outside my expertise. I viewed the process as far as the specification for beam lines is concerned because to the neutron scattering community the beam line delivering neutrons summarises the entire performance of the reactor. The beam line performance that has been promised, as I understand it, is in line with the specification. The specification is an excellent one in terms of performance, it is world class, but I am unable to make any comment on issues to do with the reactor itself.

Senator LIGHTFOOT—Dr Kisi?

Dr Kisi—Likewise, I have no expertise in the construction of reactors and I have not made—

Senator LIGHTFOOT—I am only talking about the delivery of those particular products.

Dr Kisi—I have not gone into the record of the competing tenderers. Basically, I have relied on ANSTO to—

CHAIR—For the record, all of the tenderers, as I understand it, involved an Australian partner. That was a requirement.

Dr Kisi—Civil engineering and—

CHAIR—Yes, certainly.

Senator LIGHTFOOT—If I could just revert back to the use of the proposed new facility for the sciences, does it create sciences that we do not have now at a tertiary and postgraduate level in universities that universities cannot avail themselves of now because of the old nature of HIFAR?

Prof. Gray—That is certainly true. The new source will have 17 instruments eventually, if it is equipped as the committees I sat on recommended. The number of functional instruments on HIFAR now is a handful. Therefore, there is a tremendous expansion coming, if it is built as expected, in the breadth of scientific studies that can be conducted at the research level.

There is another very important aspect, however, and that is training. At the moment we can do a certain amount of training on HIFAR, and we do. However, the more technically demanding experiments are necessarily carried out overseas, and then you have the difficulty of getting enough people to go overseas to do them. That means that students who could be trained at the local facility are missing out on opportunities to do that. Therefore, that is a loss to the Australian community just because of the restriction. There is a bottleneck in having to go overseas in training.

Senator LIGHTFOOT—Before I defer to my colleague Senator Chapman could you tell the committee, insofar as you are able—or give some indication, if it is at all possible—the percentage of students/scientists who would be retained in Australia but who currently go overseas because of the limitations of HIFAR? If it is just a generic reference it would be very much appreciated.

Prof. Gray—That is hard to address quantitatively, obviously. The number of people who leave Australia permanently because of the lack of neutron facilities here is almost impossible to guess, but I have already said that there is a significant number, a quite amazing number, of very senior scientists at neutron beam centres overseas who are Australian, and in order to work at the best sources to pursue their careers they have had to move and live overseas. That is a partial answer I suppose.

The number of Australian PhDs who have worked at HIFAR is significant. I will not attempt to give you the statistics from memory but I know it is in the ANSTO and ISR submission for you to refer to. It is a surprisingly large number. It goes entirely against the assertions that this is an unimportant activity, at least in the physical sciences. In the material sciences it is a very important activity. It is very hard to make any more concrete estimates than that, I am afraid.

Senator LIGHTFOOT—But, clearly, there is a brain drain.

Prof. Gray—Absolutely.

Dr Kisi—Yes. In terms of travelling to do an experiment, there is also the consideration that, in order to get access to sites overseas, it is usually a condition that you collaborate with someone from the country that provides the neutron source, even if they have no prior knowledge of the kinds of experiments that you would like to do. So there is an effective technology sharing, in that sense, rather than drain. We have to write proposals which are peer

reviewed by people from all sorts of countries. Your ideas are, if you like, flashed out across Europe or America for people to consider and possibly influence their own thinking.

Prof. Gray—And reports of one's work are published in the overseas source's annual report rather than our own.

Dr Kisi—The overhead of going overseas is far greater than just the number of days travelling and preparing. In order to do it, you have to be an established researcher, which immediately precludes postdoctoral or research students unless their supervisor has international credibility. You need to apply to the source for beam time. That is peer reviewed. Within four or five months you get a notification of whether you have got your experiment, which may be two, three, four or five days on a particular instrument. You then have to apply to the Commonwealth for travel funding through the access to major research facilities fund, which has a finite budget; if they are out of money you have to try to obtain travel funding from elsewhere. Then there is all the organisational overhead of preparing to ship equipment and people a long distance, accommodate them while they are there, and conduct an experiment which runs continuously for the full time: if we are doing a five-day experiment, we have to man the instrument 24 hours a day.

Senator McLUCAS—On the same issue, if you were a scientist in Brisbane or in Perth and you wanted to come and use HIFAR, what is different about that process?

Prof. Gray—A 24-hour flight.

Senator McLUCAS—Is that all the difference is?

Dr Kisi—To gain access to HIFAR, we obtain a certain number of days. We can apply for any number of experiments in any number of areas. We get an allocation of beam time and we can plan ahead for a year rather than in small bites. The Australian Institute of Nuclear Science and Engineering, because it has a small pool of funds from the universities, provides travel funding to come down. If your experimental work is accepted, then you get travel funding with it, so there is a single application process. Travelling from Brisbane and shipping equipment from Brisbane does not involve the Australian Customs Service, the UK or French customs services. The point is that it is a probably a factor of 10 to 20 times more difficult and more time consuming. Remember that individual scientists running a scientific group do not have good administrative support. We have to do all of this ourselves.

Senator McLUCAS—It is an organisational issue, not the scrutiny of the quality of the application? Is it the same scrutiny that happens with Lucas Heights as would happen through another place?

Dr Kisi—Yes—

Senator McLUCAS—So it is simply logistical.

Dr Kisi—It is not the level of the science, it is the practicalities.

Prof. Gray—It is more than logistical, because what happens in reality is that you get funding to go overseas for the number of beam days plus a couple. I recommend that you try getting off a plane after 24 hours, going to a source where you are working in a potentially hazardous environment and working 24 hours a day. It is dangerous.

Senator McLUCAS—That could be a problem with the funding arrangements. There is a whole range of ways we can solve that problem.

Prof. Gray—The reality is, however, that one has a job at home which involves lecturing or administration or whatever, and that has to be done as well. You cannot just disappear overseas for two weeks in order to do a two-day experiment; it is just unrealistic—it is not possible to do that. One's job at home has to be done at the same time. So this is a real issue, it is not merely logistical. It is an issue of logistics, cost, safety, and the wear and tear on the people involved and on their effectiveness because of the difficulty of the process.

CHAIR—But that is not unique to your area, is it?

Prof. Gray—No, indeed it is not. It is wherever there is big infrastructure to be accessed overseas. I have to say, however, the access to major research facilities program funding goes, I think, in substantial majority to neutron scattering experiments.

Senator CHAPMAN—You have referred earlier to the inadequacy of spallation or cyclotron technology for the provision of neutron beams and nuclear medicine suppliers of neutrons. What about the option of importing neutron beams? Is that a practical or feasible option? Some have argued that you can import the radiopharmaceutical requirements.

Dr Kisi—You may or may not be able to import sufficient supplies of radiopharmaceuticals. Again, that is a little outside our area. We are dealing specifically with experimental work which must be conducted at the site of the source of the neutrons. There is no method for transporting beyond about 200 metres or so.

Senator CHAPMAN—So, I guess, given the acknowledged benefits that are to be achieved from that and also from the nuclear medicine sale of supplies, do you think there is an element of the NIMBY principle at work here in terms of opposition to this new facility?

Dr Kisi—Yes, I believe that Sutherland Shire Council and others are very happy for radiopharmaceuticals to exist and be available to them, regardless of whether they are produced elsewhere in Australia or overseas. Somewhere there is a reactor producing radiopharmaceuticals. It has to operate in a safe manner and, if you are happy to benefit from the existence of those radiopharmaceuticals, possibly one should examine one's conscience and say, 'They have to be produced somewhere.' That is a personal view and not really—

Senator CHAPMAN—With all of the effort that has gone into raising the profile of science in recent years—and I guess that has culminated in the reports by Dr Robin Batterham, who is the chief scientist and also the report by David Miles on innovation and entrepreneurship—is it really feasible to take science forward in Australia in the way that particularly those two reports envisage without us having a new nuclear reactor? Is that an important part of our overall scientific effort?

Prof. Gray—AINSE's position is certainly that that is so. As I have said, the availability of neutron beams and synchrotron x-ray beams underpins materials research; therefore, you must have access to them before you can be a credible investigator and developer of new materials. If new materials are part of the scientific plan of the country, then you had better have yourself some access to neutron beams.

Senator GEORGE CAMPBELL—They are not interested in turning it into products. They are not spending any money in research and development and product development.

Prof. Gray—One would hope that the turning of research into products would happen in industry. I am sure you will find many researchers in Australia who are extremely happy to tell industry about new materials and how they work; however, those researchers are not in the business of making the new materials and commercialising them.

Senator GEORGE CAMPBELL—That is where the major deficiency is, and that is what the chief scientist was pointing out in this report.

Prof. Gray—My personal belief is that that is entirely Australia's problem: we are very good at digging things up and selling it raw overseas and buying it back value-added at a much higher cost. The availability—

CHAIR—Such as fuel rods for reactors?

Prof. Gray—Such as motor cars and—

Senator GEORGE CAMPBELL—All major products—computers, hardware, software.

Prof. Gray—Yes, just about anything you can think of. Why can we not have some of our own, as we used to?

CHAIR—No-one is necessarily arguing about that.

Senator GEORGE CAMPBELL—Not on this side of the table, anyway.

CHAIR—There might be a different argument about actually where you put the plant that manufactures the motor cars, but that is another issue. This new reactor is being proposed because the existing reactor has outlived its useful life. Looking to the future, this reactor will last for 30 to 40 years, as I understand the proposal. Presumably you would see that there would be a need to replace or build another reactor at the end of this time. Is that something you can comment about?

Prof. Gray—It is too far ahead.

CHAIR—Why is it too far ahead, Professor Gray?

Prof. Gray—If you think back three decades, would you have had any hope of predicting what is required now? I do not regard myself as prescient to that degree. What I would say,

however, is that certainly the people who recommended the kind of science that should be supported at the new facility had an eye on the future and tried to build into the recommendations as much flexibility and accommodation of what could presently be foreseen as possible. What we foresaw was, among other things, that biology oriented applications, biotechnology and biophysics would become much bigger users of neutron beam facilities than they are at the moment. Neutron beams are highly applicable in that area. They have been underutilised so far, but the whole area of biomaterials is really going to demand the application of neutron beams because of their special ability to distinguish light atoms.

CHAIR—Following on from that, and given the earlier discussion, it would seem that there is going to be, from your perspective and ANSTO's and others, an increasing need to have research reactor facilities in Australia, which raises an issue which Senator Chapman describes rather despondently as a NIMBY—not in my backyard. Would you think that it might be a matter of good public policy to look at where we might locate our nuclear research reactor in Australia for future needs other than at Lucas Heights—in other words, to spread the benefit around? Which university are you from?

Prof. Gray—Griffith University in Brisbane.

CHAIR—And, Dr Kisi, you are from Newcastle?

Dr Kisi—Yes.

CHAIR—Surely, it might be of economic benefit to the City of Newcastle.

Dr Kisi—I believe that the local council was active in promoting the old steelworks site as a possible alternative but I do not believe that was taken seriously because of the costs. You talk about decommissioning a reactor. You should try to decommission a steelworks that has been there for 60 years covering 2,000 hectares.

CHAIR—You would be aware, for instance, that there was a proposal which was well advanced and, indeed, construction work was actually done to build a nuclear power plant at Jervis Bay some years ago. That proposal was abandoned.

Dr Kisi—We have no particular attachment to the Lucas Heights site. We can read the economic and technical justification which are medium-term about duplication of infrastructure, technical support, and so on, but we have no particular attachment to that site. We are interested in a high quality, world-class suite of neutron beam instruments attached to a good source.

CHAIR—In Australia.

Dr Kisi—Yes, that is right.

Prof. Gray—Could I add to that something material? I am not sure what the Jervis Bay reference was relevant to.

CHAIR—The point I am getting at is that it was proposed to put it at Lucas Heights, that is all. In other words, people have considered—and one would assume would continue to consider—alternative locations, as Professor McKinnon recommended.

Prof. Gray—That was a power reactor; I work in alternative energy. I am very glad it was not built—that is my personal view. To add something material, the design of the reactor that was put out to tender was specified to be expandable in the sense that a second neutron beam hall could be built, which would at least double the number of instruments. The committees perceived that this would take care of necessary expansion for several decades, essentially for the life of the reactor. So there is room in the plan, in the design of the reactor, in the placement of the beam tubes, to actually build a second neutron beam guide hall. That would take the total number of instruments on the reactor up to above 30. It would then be as big as any institute overseas—it would be enormous for the size of the country.

CHAIR—That is within the life of the reactor?

Prof. Gray—That is whenever you have the money or the need to do it.

CHAIR—Am I correct in assuming that we are talking about 40 years as being the life of this reactor?

Prof. Gray—That is outside my area of expertise, but I believe that it is something like that.

CHAIR—You are saying that there will be scope to expand the facilities within that period of time?

Prof. Gray—It is written into the specification of the reactor that provision shall be made to add a second guide hall with neutron beam guide tubes, wave guides.

CHAIR—Have either of you any comment to make on issues surrounding storage and disposal of either spent fuel, waste or whatever we call it?

Prof. Gray—That is outside our expertise.

Senator GEORGE CAMPBELL—On that question, isn't there some logic about locating the reactor near where you locate the waste storage or the waste disposal unit. The government has put a lot of resources into looking at waste storage in South Australia. It seems to me there would be some logic in looking at locating the two facilities somewhere within reasonable proximity and out of metropolitan areas.

Prof. Gray—I am unable to comment on that. What I can comment on it is that, just as Canberra is located near the centroid of Sydney, Melbourne, Brisbane, there is logic in locating a national user facility like this as close as you can get to the people who are going to use it. From that point of view, Lucas Heights is as good as any other. It has ready access to an airport, it needs to be near an international airport, and from that point of view the Lucas Heights site is fine. I cannot comment on other issues connected with waste.

Senator GEORGE CAMPBELL—But there are many other sites around the country that also meet that criteria?

Prof. Gray—Possibly.

CHAIR—If you have a very fast train too.

Senator CHAPMAN—If the best location for a nuclear waste repository were somewhere in the distant outback because of geological and other factors, where there was virtually no transport and certainly no significant high speed air transport, would that militate against the effective operation of the nuclear reactor?

Prof. Gray—It would introduce, on a smaller scale, the problems we have in working overseas, excepting customs, customs carnets and bank guarantees. It would of course be that much more difficult: you would need that much more travel, you would need to get equipment and people there, and the cost would have to be met somewhere. The cost is usually met by the users themselves, and I believe the number of users would therefore go down.

Senator CHAPMAN—So that effectively rules out co-location of the storage facility with the reactor facility?

Prof. Gray—I cannot comment on the logic of that.

Senator GEORGE CAMPBELL—You could locate it adjacent to Adelaide airport, near where Senator Chapman lives.

Prof. Gray—That is fine. And perhaps Senator Chapman has a fine wine cellar and I could visit him, and that sounds good.

Senator GEORGE CAMPBELL—That meets your criteria and it meets his criteria.

CHAIR—Major research installations are not prevented from being located in remote areas, surely. Otherwise NASA would not be doing what it does, there would not be the space station—

Prof. Gray—NASA is not a user facility.

CHAIR—No, but there are facilities that exist in Western Australia with respect to the space program, people work there and they travel to and from there, both within Australia and internationally.

Dr Kisi—Perth is not a remote area.

CHAIR—No, I am talking about the former US space station.

Dr Kisi—We are talking about high turnaround experiments here; we are not talking about going there for three months and working. You go to a neutron source to do an experiment and,

in terms of actual data collection, it takes between one day and up to two weeks, which is probably the longest, and there is a high turnaround. At 10 o'clock in the morning you have to get off the instrument and the next person gets on and starts their experiment. So there is a slightly different situation. Space based research tends to be longer term.

Senator GEORGE CAMPBELL—Dr Kisi or Professor Gray, do you know whether ANSTO charges you on a cost recovery basis for the use of the facility?

Prof. Gray—I chair the AINSE Neutron Scattering Specialist Committee which allocates beam time and therefore budget is one of the issues that my committee has to deal with. I believe we are given charges for beam time, but I do not believe they are the real costs of beam time. However, you would have to ask ANSTO exactly how they derive the numbers. They are, as I understand it, some sort of a representation of the real cost of providing the beams, but I do not have detailed knowledge.

CHAIR—Thank you for your evidence, Professor Gray and Dr Kisi.

Proceedings suspended from 1.41 p.m. to 2.28 p.m.

CAMPBELL, Mr Stephen Roderick, Campaigner, Greenpeace Australia Pacific

CHAIR—I welcome Mr Stephen Campbell from Greenpeace Australia Pacific. The committee prefers that all evidence be given in public, but if at any stage you wish to give any or part of your evidence in private, you may ask to do so and the committee will consider your request. The committee has before it a submission from Greenpeace Australia Pacific, together with a supplementary submission. Are there any alterations or additions you would like to make at this stage?

Mr Campbell—Not at this time, but I would like to acknowledge the contribution to that submission made by Ms Jean McSorley.

CHAIR—Thank you. I now invite you to make a brief opening statement and we will proceed to questions.

Mr Campbell—Thank you, chair and committee members. Greenpeace Australia Pacific welcomes the opportunity to participate in the public processes that are on offer in relation to the reactor project, but we do wish to state that these processes are in serious disarray at this time. Greenpeace Australia Pacific believes it is clearly arguable that Australia does not need a new reactor. To build a new reactor would prohibit the country from developing alternative infrastructure, technologies, strategies and opportunities. By turning away from these alternatives, Australia will be condemning its future with the mistakes of the past.

Furthermore, pursuing the reactor with such haste has involved ignoring the detail and recommendations of major reviews of the project conducted since the early 1990s. Australia has the opportunity to choose not to be part of the problems of the nuclear industry and of nuclear proliferation and to become a part of the solution by turning away from the nuclear road.

Greenpeace wants to point out that ANSTO has a vital role to play, not just in Australia but globally in terms of its research and development potential; that is, ANSTO can continue to be relevant, dynamic and indeed leading the world in particular technologies without the use of a nuclear reactor. ANSTO can continue to be a healthy employer in the local area and engage in cutting edge research. However, Greenpeace is appalled by the lack of information that has been forthcoming from ANSTO in regard to the tender and the contract process.

I have a few other initial points. There is clear evidence that the supply of radioactive sources and nuclear medicines can be easily sustained without having a reactor in Australia. Many commentators have highlighted the three months shutdown of HIFAR during 2000 as adequate evidence of this. Greenpeace rejects the assertion that it is not possible to have an effective role in international safeguards and non-proliferation work without a reactor, and that possession of a reactor is fundamental to retaining nuclear expertise in this country. If Australia does not proceed with a second reactor, safeguards and non-proliferation work would not have to be stopped. Safeguards and non-proliferation are governed far more through existing treaties and agreements. A new reactor will not make any contribution to this treaty system. This has worked for diplomats and lawyers, and it is certainly not necessary for technicians to be involved at this stage.

In terms of the tender process, there are two available documents on the public record which relate to the tendering process, one from the tender selection review committee and one from the probity report. They run to around six and 12 pages respectively. They contain little information and considerably less that is specific about the content of either the winning bid from INVAP or the losing bids. There is no information available about why any particular decision was made and none about the quality of the information in the tenders. There is absolutely no public information about how economic, environmental and public health impacts were considered, other than vague reassurances from the tender selection review committee. It is impossible for individuals or organisations to determine the quality or accuracy of any information relied on during the selection process. It is to be hoped that this Senate committee will obtain access to a substantial quantity of this information and make a detailed assessment of it and ensure it is placed on the public record.

I would like to talk a little bit about costs at this stage. It is our contention that the government has not included some essential items in its cost projections for the reactor. It has not included whole of life cycle costings for various aspects of the project, and has not been honest with its reporting, to the point that their projections are seriously underdeveloped.

In order to more closely approximate the eventual costs of the project the Senate committee will need to consider the following points. The first point is reactor costs. The government continues to publicly assert that the reactor will cost $286 million in 1997 dollars, yet the budgeted construction cost has been increasing by approximately $10 million per year, presumably due to CPI increases. The 2000-01 budget papers have put the cost at $326 million. Therefore, by the time ANSTO and INVAP commence construction, around 2002, the cost could be around $346 million, and by the time they finish it it could be around $386 million. This is notwithstanding the possibility of cost overruns.

The second point concerns realistic and full capital costing. Greenpeace has always believed that the full costs of the reactor are not included in this budget. This is confirmed in various ways throughout the reactor project's history. For example, the EIS states that there are other potential costs of the proposal, including those that are too difficult to quantify relating to possible externalities. There are also a range of contradictions in relation to the number of neutron beam positions, sources, et cetera, that the project will achieve that will have major cost implications. There is also the issue of facility upgrades in order to deal with new fuel or new waste procedures. Also, changes may need to be made to the buildings there in relation to the current licensing round. So I do not think full capital costing has been involved in the project to date. Project management costs have not been included in that budget. We would suggest a ballpark figure of about $5 million. There are also the costs for the intermediate level waste dump. They are only necessitated at this stage by the government's time line for the reactor. We estimate the cost for scoping studies for the dump to come in at somewhere around $5 million to $8 million.

A further point is that the cost of fuel and fuel management for the lifetime of the reactor have not been included in the budgeted costs, but the EIS have put that at $180 million. This is an unavoidable cost which is attendant to the project, and it is misleading to talk about the cost of the reactor without taking into account fuel costs. So when you include all of those things into the total cost for a reactor—these are all things necessitated by the reactor—we come up with a

figure somewhere between $583 million and $643 million, not including any potential for blow-outs.

On the recommendations of previous reports, it is quite clear that several of the McKinnon conditions have not been met and that several are controversial and still in question. The Public Works Committee expressed concern that a new reactor would cost more than the price stated by ANSTO, although I will acknowledge they did recommend proceeding building it. The Senate Economics References Committee confirmed that the issues raised by McKinnon had not been met. They also recommended that a full public inquiry, as provided for in the Environment Protection (Impact of Proposals) Act, should have been conducted and should still be conducted. The committee recommended that the waste problem be further considered by a public inquiry and that no new reactor be constructed until a permanent site for disposal of the Lucas Heights nuclear waste is determined. Also, the report recommended that a full investigation be made of the technology alternatives by an independent panel and that alternative sites for the reactor should be explored.

In terms of regulation and the hurdles yet to be encountered by the project, there are still formidable regulatory landmarks that must be overcome before a reactor can be constructed and commissioned. It is likely that ANSTO will apply for a construction licence some time in the second half of 2001 or the early part of 2002. At this point, ARPANSA must give the utmost consideration and scrutiny to the project. The grant of a construction licence will be the act which precipitates the greatest amount of public expenditure on the project, that is construction, and at which the safety and environmental issues will require most acute consideration. ARPANSA will assume at this point the greatest need to display its commitment, which it has by legislation, to protect the health and safety of people and protect the environment from the harmful effects of radiation. It will not be acceptable to approve a construction licence without any of the issues about fuel or waste management unresolved. Discovering they cannot be resolved at the point of commissioning, and after enormous public contract, will be too late.

In terms of the contract, prudent commercial practice suggests that the regulatory contingencies affecting the contract should ensure that the federal government has exit clauses if licences are not forthcoming. It will be likely that INVAP require having costs paid for work completed, and there could be some possibility for damages payable for lost profits. If this is not the case, and the contract has made no provision for exit clauses contingent on regulatory failure, then the federal government has arguably been negligent in the exercise of its fiduciary duty to the Australian public.

The contract is not available to the public, so it is impossible for us to comment on substantive contractual provisions. Greenpeace has applied for relevant contractual information under the Freedom of Information Act. ANSTO replied to our request last week, and they are intending to release two pages of 1,300 and impose a prohibitive charge of almost $7,000, with no guarantee of any additional material being released. We believe that this kind of behaviour is intended to avoid scrutiny, accountability and transparency. We can table this document for the committee's perusal if you so wish. Greenpeace urges this committee to gain access to the contract and to submit it to the utmost scrutiny. Because the contract has now been awarded to a single vendor, there is no necessity for the contents of the contract to be protected by claims of commercial-in-confidence.

In conclusion, there are a range of issues that need to be raked over, including the issue of fuel: the contingencies around the fuel for the new reactor, the problems with the silicide fuel with the idea that the reactor can be built with a proposed fuel which is still under development, and because ANSTO has not made its spent fuel arrangements unequivocally clear. One further point is that in terms of waste Greenpeace would like to note that we recommend, and have always recommended, that the current best available technique for the containment of existing nuclear waste is above ground, managed, monitored, retrievable storage at the site of production or use. Because the development of future science and technology is uncertain, the storage option will need to be implemented over an indefinite period. There is no such thing as safe disposal of high or intermediate level wastes. The reactor should not be built without a specific fuel management route unequivocally determined and the costs involved with that being made available to the public. The management route will be subject to international contracts and possibly intergovermental agreements—the most likely parties being ANSTO, INVAP, COGEMA and their national governments.

The return of waste to Australia is of grave concern to many communities, especially in South Australia and New South Wales. Greenpeace believes that, along with the safety, environmental and health issues inherent in reprocessing and international transportation of waste, off-site dumps should never be imposed. I might add that the OSPAR commission in Europe, the body which regulates marine pollution in the north-east Atlantic, has recommended that reprocessing be stopped as a matter of urgency and that all countries be moved towards the dry storage option. Australian spent fuel goes to the COGEMA reprocessing plant at Capta La Hague in Normandy, France, which is one of the most polluting and contaminating nuclear facilities on the face of the planet. We are contributing to the contamination of that part of the world via our use of the reprocessing option. OSPAR is moving towards potentially closing that down. Leading on from that, a determination of the fuel management strategy should be subject to substantial public debate—I urge the committee to put its best efforts into liberating all the information regarding that to the public—and not simply left to ANSTO and the Department of Industry, Science and Resources to determine.

CHAIR—I would like to clarify a couple of things. Firstly, in your written submission, you refer to ASNO, the Australian Safeguards and Non-Proliferation Office. Is that what those initials stand for?

Mr Campbell—Yes.

CHAIR—Secondly, on page 2, you state:

... There is no doubt that ANSTO performs some valuable work, a large percentage of which is performed at facilities other than HIFAR.

You then go on to say:

... A full inquiry into alternative neutron sources and facilities is needed.

Then on page 3, at the bottom, you say:

... Indeed, it is important to note that senior officials have said that the new reactor will not add, in a technical sense, to the safeguards regime.

They are two separate issues. Firstly, could you indicate what you mean when you talk about 'alternative neutron sources'? Secondly, could you comment on what work ANSTO could continue to do and the additional work they could do if they do not get a new reactor? I am putting three questions into one here. Thirdly, which senior officials have indicated that the existence of a new reactor does not add to the non-proliferation issues?

Mr Campbell—I might point out that I am not a nuclear scientist or a nuclear physicist. My belief is that there are a range of alternatives available for producing neutrons, including the cyclotron accelerators and the spallation sources, the synchrotron. These provide a range of alternatives which, if Australia were to invest more of its money into this kind of technology, would open up a range of opportunities which are not offered by HIFAR and a reactor. My understanding is that, if you use alternative technologies, you open up and close down a range of options. It just basically depends on where you put your money. If you put your money into one lot of options, you open up research opportunities and opportunities for commercial and industrial and research processes and you close down some. But that is a substantive choice you make. My understanding is that it is not sustainable to say that one is ultimately better than the other.

I do not think that the Australian science community has had this debate properly. I think that the Australian government and the political sphere has not had this debate properly. I would support the call of Dr Jim Green that there should be a full public debate and inquiry into neutron science and the alternatives before going down the path of building a new nuclear reactor.

In terms of my statement in my submission regarding senior officials, I would have to go back through my notes on that question. I would have to take the question on notice and give that information back to the committee.

CHAIR—At the moment it is in the nature of hearsay evidence that you have put to us. It would be appreciated if you are able to back that up with some specific information.

Mr Campbell—Sure.

CHAIR—Just following on, we have been told by ANSTO that other countries around the world are building or planning new research reactors. We have also been told, both in previous hearings and in submissions to this hearing, that there is a trend the other way for countries to either reduce their reliance on nuclear power and/or involvement in the nuclear sector so that, if reactors are shut down, they are not refurbished or replaced.

What is your understanding of the worldwide position, particularly in regard to which way the trend is heading in nuclear research reactors? Is there another country in the world that is in a comparable position to Australia in terms of the argument that you support—that is, that a First World economy, if I can call it that without being disparaging to others, would not be involved or have a nuclear research reactor but could nevertheless play an important role in issues such as non-proliferation and also provide the radiopharmaceuticals?

Mr Campbell—I think there is a range of answers to your question. Firstly, certainly the nuclear power industry is in decline worldwide. We have recently had announcements by

Germany that it is going to back out of its nuclear power program. The UK has a timetable for closing down many of its old magnox reactors and not building any new reactors.

In terms of research reactors, there are countries around the world that do not have any reactors. New Zealand and Ireland are great examples of that. They do not rely on research reactors in any way, shape or form. They do not seem to have any problem with isotopes and they do not seem to have any problem with research in other ways.

CHAIR—I am sorry to interrupt you but, on that, I would imagine that ANSTO and others would argue, 'Yes, that's okay but let's take the case of, say, New Zealand. They are next to us and they can rely upon what we do. Equally, the Irish could tap into the work done in the European Union.' If we are looking at how we stand in terms of the rest of the world, is there any other nation in the position we would be in if we do not build a new reactor?

Mr Campbell—I think that what we have is an opportunity to explore cleaner alternatives. I do not think that there are many countries around the world that are actually taking that lead and being able to take a leadership role in getting out of nuclear technology and getting into the alternatives. I think that there needs to be more leadership on a global level. In terms of the cyclotron production of technetium, people often say, 'If you're going to spend a few years developing the commercial process for technetium, that means that you have to rely on another reactor somewhere else for the imports of the radioisotope.' That is a sustainable argument if you look at it in the short term. But what we would say, as well, is that if you explore the commercial opportunities in terms of that, then you do not build another reactor in Australia and, once you have that technology, you can on-sell it back to other countries that would otherwise be wanting to build research reactors. You can on-sell that cyclotron technology back to other countries elsewhere in the world, and you would be facilitating the closure of research reactors in those areas. So I think it is a bit of a chicken and an egg question. I think that more countries have to take the lead to explore these alternatives properly, rather than just saying, 'It can't be done; let's put the money into reactors,' because I really think that the opportunities are there.

Senator CHAPMAN—I note that on page 17 of your submission you highlighted the conditions set down in the McKinnon report that needed to be fulfilled before a replacement reactor goes ahead. The condition that you highlighted was the first one that a high-level waste site be 'firmly identified'. According to evidence that Professor Garnett gave to this committee, there is no high-level waste in Australia, so that provision in the McKinnon report is not relevant to any decision.

Mr Campbell—I think that that is a trick with semantics, basically. Long-lived intermediate level waste is simply more diluted high-level waste. In the US, spent nuclear fuel and reprocessed spent nuclear fuel is classified as high-level waste.

Senator CHAPMAN—My understanding is that there are three levels of waste: low level, intermediate and high.

Mr Campbell—Long-lived intermediate level waste has the same level of radioactivity over the same time period. It just has a different heat quotient.

Senator CHAPMAN—But that was not identified as an issue by McKinnon, was it? He only identified high-level waste as the—

Mr Campbell—Our long-lived intermediate level waste is another person's high-level waste. I think it is playing with semantics.

Senator CHAPMAN—When you say 'our', what do you mean by that?

Mr Campbell—Australia's.

Senator CHAPMAN—McKinnon is an Australian; it is an Australian report we are talking about?

Mr Campbell—Sure. I just do not think it is an argument.

CHAIR—Do you recall exactly what Professor McKinnon said? Have you seen that report?

Mr Campbell—I have read that report, yes.

Senator CHAPMAN—What he said was:

... a high level waste site has been firmly identified and work started on proving its suitability.

CHAIR—What he actually did say was that the only way in which you could regard the waste from Lucas Heights is as high-level waste. They were his words.

Senator CHAPMAN—Before treatment or after treatment?

CHAIR—They were his words in the report.

Senator CHAPMAN—Before treatment or after treatment?

CHAIR—Don't ask me; I am just telling you. Ask Professor McKinnon.

Senator GEORGE CAMPBELL—It is not treated at Lucas Heights, so presumably it is high-level waste.

Mr Campbell—We have high-level waste in Australia. It is quite obvious. We have over 1,000 fuel rods sitting at Lucas Heights which are high-level waste.

CHAIR—The debate was going on then about the terminology.

Senator CHAPMAN—Those rods are high-level waste. That is the high-level waste—before they are treated.

Mr Campbell—You have just suggested that spent nuclear fuel is high-level waste and other people suggest that spent nuclear fuel is not waste at all because it has not been reprocessed. We

are talking about semantics here. We are talking about stuff that is highly radioactive, which will put a burden on, and leave a legacy for, hundreds of generations to come. Whether you declare that it is high-level or long-lived intermediate level waste, it is still the same legacy.

Senator CHAPMAN—You refer to allegations about INVAP's negotiations with Robert Mugabe. Do you have evidence to support those allegations?

Mr Campbell—I do not personally have evidence. I would refer you to the reports in the *Sydney Morning Herald* on that one.

Senator CHAPMAN—You are relying on newspaper reports?

Mr Campbell—Certainly.

Senator CHAPMAN—No hard evidence.

Mr Campbell—No.

Senator CHAPMAN—Has Greenpeace apologised to the Shell company yet?

Mr Campbell—I do not know if we have anything to apologise for.

Senator CHAPMAN—What about the scurrilous campaign that you ran in relation to their North Sea platform, which has proven to be totally false?

Mr Campbell—I do not think that is the issue here.

Senator CHAPMAN—It is an issue of the credibility of the organisation.

CHAIR—There is no need to answer that, Mr Campbell. I do not want to get into a discussion about the explosion on the Piper Alpha platform in the North Sea that killed many hundreds of workers.

Senator LIGHTFOOT—You are not suggesting that Greenpeace had anything to do with that, are you, Mr Chairman?

CHAIR—Certainly not.

Senator McLUCAS—Can you give me some understanding of who defines the level of waste. Is there some international body that says, 'This type of waste is high; that is intermediate'? Who makes those decisions?

Mr Campbell—I believe that there are some recommendations that are made at an international level, but ultimately, as you would acknowledge, the final definition of those sorts of things would be left to the bodies with the authority to make those decisions in particular jurisdictions. Ultimately, Australia defines its waste or its spent nuclear fuel or whatever you

like to call it. It has the authority to do that. Whether or not it follows the international recommendations is up to it.

Senator GEORGE CAMPBELL—Mr Campbell, you said at the outset of your submission that you had FOIed ANSTO for some information with respect to the contractual arrangements—

Mr Campbell—Yes.

Senator GEORGE CAMPBELL—and that they had responded setting some prohibitive course on the provision of that material. I think you said you were happy for the committee to have the documentation. Can you table that documentation or make it available to the committee?

Mr Campbell—Yes, absolutely.

Senator GEORGE CAMPBELL—You raised the question of alternative technologies to the reactor. What alternative technologies do you have in mind?

Mr Campbell—The range that I have just mentioned in the previous answer to Senator Forshaw: the use of cyclotrons, spallation sources, accelerators and synchrotrons.

Senator GEORGE CAMPBELL—Which is essentially the position, I think, that Dr Green has put before the committee at the previous hearing.

Mr Campbell—That is right.

Senator GEORGE CAMPBELL—In your submission you refer to your belief that ANSTO, in order to keep the cost to a minimum, had not included a range of necessities in the costing for the project.

Mr Campbell—Yes.

Senator GEORGE CAMPBELL—Do you have a list of those necessities? Do you have a list of the items you think have been excluded from the contract?

Mr Campbell—Once again, I can go back and do more research and make that available to you. My belief is that at different times they have said 17 sources; they have said eight sources. They have said eight sources with an option to build more in the period between 2005 and 2010. I think there is a range of contradictions and prevarications in terms of what commitment they are actually making. We do not know what commitment they have got from INVAP, in terms of the neutron, the sources, beam positions and that kind of thing, under the contract. That is why I am urging the committee to make that material available if they can. But I do believe that at different times ANSTO have made claims that they would like 17 to 18 beam positions, for instance. If the contract says eight and their wish list is 18—and they have said, I believe, in the EIS that there may be some beam positions added in that time period—then those are going to

be additional costs. Those are costs for the state-of-the-art reactor that they want to build which they cannot build with $286 million in 1997 dollars.

Senator GEORGE CAMPBELL—Given that we, as a committee, have not yet been provided with a copy of the contract—and the way things are going we are not likely to be—it would be useful for our understanding of this argument, and I think the council also put it, that it was cost that was determining the quality here and not the quality that was determining the cost. If you could provide us with those lists of necessities which you think are being excluded from the contract then I think that would be helpful.

Mr Campbell—Certainly.

CHAIR—Your costings do not include the ongoing year-by-year maintenance or other running costs, do they?

Mr Campbell—No.

CHAIR—And equally, you do not include any income that might be earned as well?

Mr Campbell—That is true. I am glad you made that point because it is an additional cost that is only necessitated by the reactor project. Certainly those costs could be used. If you took $300 million and you built some of the alternatives you would have ongoing capital maintenance costs for those things as well. But I think the main point of my submission is that $286 million in 1997 dollars does not pan out in terms of the sort of facility that the government is building and it certainly does not pan out in terms of the sort of facility that the government would like.

CHAIR—You talk about a generic rather than a specific reactor design in your submission. I think I understand what you mean by that but could you just explain what it is you really do mean and what is the significance of the point you are making in regard to that?

Mr Campbell—The significance of that is the point—and I think it goes back through a little bit of the history of this project—that the EIS, the $6 million environmental impact study, was conducted on a list of specifications. There was no design. The contract has been awarded on a tender which presumably addresses some of those specifications but does not produce a design. There is no design. There is a list of generic possibilities or generic specifications or a generic wish list but there is no hard design on the table. So that is what I mean when I say that. That has costs blow-out potential. If what you are getting is the sketch of the house but not the detail of the house, you are looking at how it might look on the back of an envelope but you are not looking at the architect's blueprint and then you do not know what you are getting and you do not know what you are paying for.

CHAIR—As we understand it, it is not based upon replicating another reactor elsewhere—off-the-shelf?

Mr Campbell—No, that is right. And I think you can probably see in the submissions from both Siemens and Technicatome that INVAP do not have a record of building the facilities that

ANSTO would like to have built. They have not done so and they do not have an off-the-shelf reactor to provide so they cannot.

CHAIR—Okay. With respect to waste, ANSTO have said that the amount of waste that is produced by Lucas Heights now—whether spent fuel rods or material that comes back from overseas—is minute compared to the rest of the intermediate or low-level waste, or whatever definition one puts upon it, that is produced around the rest of Australia. And it has also stated—and I am going from memory here—that the new reactor will not produce any more really in comparison to what is coming out of the current reactor. At the end of the day they say that it amounts to about five per cent of the total waste generated in Australia that is radioactive waste. Therefore they say that this is not a major problem. Could you comment on that? Firstly, is it true? Secondly, what is your view?

Mr Campbell—To say that it is a very small issue and it is a very small amount of waste is a little bit like saying—and I hope you will pardon the metaphor—somebody has got a small heroin addiction. You cannot talk about small levels of high-level nuclear waste being okay. It is not okay. It is unequivocally not okay. It does not matter how much you make or how little you make. I do acknowledge that the output of the waste from Lucas Heights is certainly smaller than is coming out of the energy program in Germany. However, it is high-level nuclear waste all the same. It is the waste that is being created in Australia that robs the potential of the environment, human health and safety for hundreds of generations. So it does not really matter whether you talk about small or big amounts of nuclear waste, nuclear waste is not okay. What was the second part of your question?

CHAIR—I wanted a comment from you on the ANSTO proposition.

Mr Campbell—Thank you. I think that depends once again on whether you look at volume or radioactive content. Certainly, of the material that is scheduled or slated to be put into the long lived intermediate level waste store in South Australia, only half of it is from ANSTO. However, the bulk of the radioactivity is from ANSTO. So it is like trying to compare chalk with cheese. It depends on whether you are talking about volume or whether you are talking about radioactivity, and the important thing here is the radioactive content.

CHAIR—That is what I was expecting you to comment on.

Senator GEORGE CAMPBELL—You gave some figures previously for the cost of the reactor based on 1997 dollars. Are you aware of what currency the contracts are written in?

Mr Campbell—I am not, no.

Senator GEORGE CAMPBELL—So how do you make that calculation?

Mr Campbell—That is the figure that the federal government has been promoting for the cost of the reactor for some time. That is what they have been saying is the baseline cost, never to be exceeded. But they always put it in 1997 dollar terms, and that is my point.

CHAIR—It is the $286 million that was announced in September 1997.

Mr Campbell—That is right. They always put it in those terms, publicly. For instance, the 2000-01 budget had it at $326 million, in year 2000 dollars. So it is a kind of furphy which is pitched to the public that it is only going to be $286 million. But, as time goes on and the CPI increases, as increases are going to be in the cost, they have to have factored in the fact that by the time construction happens—and there is presumably a range of payments that will be made during the construction of the reactor—the $286 million is not going to be $286 million, it is going to be a lot more than that by the time the payment actually has to be made.

Senator GEORGE CAMPBELL—But you do not know what provisions have been made for the currency the contract is written in, whether it is American dollars, Australian dollars or whatever the Argentinean currency is?

Mr Campbell—No.

CHAIR—Thank you, Mr Campbell, for your submission and your evidence today.

[3.09 p.m.]

PRICEMAN, Mr Michael George, Convenor, Nuclear Study Group, Sutherland Shire Environment Centre

CHAIR—Welcome. The committee prefers that all evidence be given in public but, if at any stage you wish to give any part of your evidence in private, you may ask to do so and the committee will consider that request. We have before us a submission from the Sutherland Shire Environment Centre. Do you have any additions or alterations you wish to make to that submission at this stage?

Mr Priceman—No, not at this stage.

CHAIR—I invite you to make a brief opening statement and we will proceed to questions.

Mr Priceman—Thank you for the opportunity to be part of this inquiry. Whilst the Sutherland Shire Environment Centre believes that an independent public inquiry, as was called for by the Sutherland Shire Council, would have been preferred as a forum, we hope that this committee will be able to flush out the uncertainties, hidden information and contradictory statements surrounding the contract for a new reactor. Should it fail to do so, it would make a mockery of the democratic system that we all profess to support.

The environment centre is a self-funded organisation and not affiliated with any political party or parties. It provides independent opinion and advice on environmental matters that affect the shire. Members sit regularly on a variety of council committees and, within our financial means, we research our opinions and consider ourselves objective and totally independent. We are not ferals. We do not oppose everything, as was suggested by Minister Minchin, when he opened the new section of ANSTO's environmental science unit several months ago. Neither are we anti-science.

We suggest that the Lucas Heights site be run as ASTO—the Australian Science and Technology Organisation, its major tasks being the solving of the world's environmental problems. Professor John Stocker said that this would be the major job for science before the year 2020. Why shouldn't we start earlier? And there was also the eradication of nuclear waste, not only in Australia but as an international project. This would result in an increase of staff that would have the full support of all the local communities.

Our submission has covered a wide area, considering the local nature of the centre, but our main concerns relate to those that could affect directly the communities close to the Lucas Heights site. Are these concerns real or merely psychological? I believe it was Dr Leslie Kemeny, a long-time supporter of the nuclear industry, who suggested in a letter in the *Canberra Times* that we are suffering from phobias because we are not scientists and have no understanding of the subject. Surely this is a cry from the 1950s.

I had a quick scan of the five volumes of submissions which arrived at my home on Friday afternoon. I had not much time to go through them all. It showed that even those who could not be accused of ignorance or psychosis have similar concerns to ours. Mr Tony Wood, a former ANSTO chief engineer, who berated ANSTO for the half truths in its EIS submission, continues

his attack on the lack of absolute liability of the operator. That disadvantages people living in the area with respect to their financial security in the event of an accident, a situation which he says these communities are blissfully unaware of. He also claims that the risks of worst case accident cannot be substantiated and, finally, that INVAP prevents more of a risk than any of the other bidders due to lack of experience. His concern is that ANSTO is not a particularly experienced buyer dealing with a not particularly experienced supplier.

Siemens Transfield refers to the accuracy of the cost estimate. It considered the budget allocated to the project for some bidders to deviate from the request for tender maximum requirements. Whilst it used its experience on the current design and construction of its FRM II reactor to make cost comparisons, only a highly subsidised offer would be able to meet ANTSO's budget, whilst at the same time comply with all the details of the request for tender. It also claimed that the INVAP reactor built in Peru was subject to failures, including corrosion of the main tank. This is very unreassuring to us, the people who live locally.

Technicatome Baulderstone Hornibrook claim that the tenders were mainly assessed on a paper basis. This noticed there was a clear demand from ANSTO for high-performance, prudent solutions with a clear emphasis on the availability and proven record of the reactor design proposed by the tenderers. Little notice was taken of the efficiency and performance of the research reactors that are in operation by Siemens, the Canadian bidder, and itself.

Surprise was expressed that the contract had gone to the bidder with the least experience and one which had not previously built a reactor with the required features including containment. Mr Jim Fredsall, former president of the Australian Nuclear Association and ex ANSTO nuclear engineer, in a lifetime cost estimate of the project shows that there will be an income shortfall of approximately $669 million and that a new reactor would be a constant drain on the taxpayers of this country for the next half century. Professor Barry Allen, former chief research scientist at ANSTO, still maintains that a new reactor, however modern it may be, will be a step into the past and the funds would be better spent on accelerated produced isotopes for therapeutic use. The obvious concerns of local residents can be summarised as: safety, emergency planning, health effects from emissions of radioactive material on a daily basis, long-lived intermediate level waste on-site indefinitely, exclusion from commercial insurance for an accident, and the worry that the government has chosen the most inexperienced tenderer which could exacerbate each of the above problems.

I should like to mention, also, that I am not employed by anybody. As a member of the environment centre I am an unpaid volunteer. The only benefits that have accrued to me over the past three years have been two tickets to ANA conferences provided, thankfully, by ANSTO which allowed me to go as a public representative. At the last one I got this bag from Technicatome, and I can assure you I am not paid by them. It is rather ironic that their submission was next to mine in volume 4.

CHAIR—During earlier evidence—I think it was from the council—there was mention of a report that you had prepared regarding emergency procedures, or whatever they had conducted on the site, and that you had attended. Could you tell us about that?

Mr Priceman—Unfortunately I was not at that particular emergency exercise. I was at the previous one two years earlier. The ANA conference coincided with the emergency operation.

Senator GEORGE CAMPBELL—Perhaps that is why you got the tickets.

Mr Priceman—It could be. I can comment on the previous one but I would have to go from memory. It was two years prior to the last one so we are going back about three years. This was supposed to be an exercise in dealing with an off-site emergency, whereas the one prior to that had been a desktop situation.

We were situated inside the control room at ANSTO where the thing was going to be organised but the telephone information kept on coming in from the controller—I do not know whether that was Keith McPhee or not. As a scenario he had some kind of earthquake which had cut communications and the water supply and they were looking at ways of dealing with it. The first thing that happened was that the communications manager was to go out and do a simulated press release. But his phone was not working. One of the phones inside the control room was not working either.

We were taken to a building, in the centre of the place, which was an evacuation centre. They had a new system at that time involving swipe cards. All the people from a certain section were to swipe the cards to show that they existed and had been evacuated. They finished up six short. We never really got to the source of why they were six short—whether the people had hopped over the fence when they heard there was an emergency exercise or whether the cards were not working correctly. Another part of the exercise, which was obviously a really serious one, was that a tree had fallen over on one of the access roads to ANSTO, which are notorious for transport blockages at both ends. I do not whether senators are familiar with the geography of the place.

CHAIR—We have all visited there.

Mr Priceman—You have one road passing ANSTO and two major roads. If a leaf drops on the road, the road gets blocked. I was there on one occasion in Lucas Heights visiting friends and when I got out on the main crossroad it was blocked in both directions. It took me 2½ hours to get to Engadine, which is about a couple of miles away. This happens regularly. So part of this exercise was the road being blocked at one end. But, of course, in the simulated exercise they soon managed to clear that up. They also checked to see whether there was anybody in the area who might have been exposed to radiation. They actually found two people somewhere near the Lucas Heights tip who were pulled in safely in time, so everything went well.

Senator McLUCAS—Thank you for the commentary that you have made about the community right to know charter. It has been of interest to me. You have given us some history of that. Can you tell me where we are up to, not necessarily with the development of the charter but in terms of condition 24 of the EIS, the need for ANSTO to develop some sort of relationship with the community, and how that is proceeding?

Mr Priceman—The relationship over the years has been up and down. In the early 1980s there was a liaison forum which I believe—I was not present—comprised mainly ANSTO scientists. This collapsed in the end because the community members who attended it felt that they were being talked down to by the scientists at the time. The group meetings, the Negotiated Solutions ones, were the facilitators. That started in November 1994 and continued until last year; then it became one of the conditions, as you point out. The negotiations on the community

right to know charter, which started in about January 1995, were in a state of suspended animation until this condition came up. We advised Negotiated Solutions to write to the minister and we said there was no point in further mediation because we had gone as far as we could go. Then they called in Commissioner Woodward without consulting the group concerned as community representatives. There was some quite strong resistance to undertaking any further negotiations but we did anyway. The strange thing about it was that we were no longer dealing with ANSTO, we were dealing with the Government Solicitor or their representative, Mr Bill Simms. After two or three meetings it was evident that we were not going to get a charter. All we were offered was freedom of information.

Most people outside certain government areas, state and federal, would realise that freedom of information is really a farce. It is a means of enabling important facts to be kept secret from the community. Freedom of information is not in the public interest. In today's *Sydney Morning Herald* article, which Mr Stephen Campbell has just mentioned, it mentions $7,000 for two pages of paper. That really is not good enough. Basically since Commissioner Woodward put in his report to the minister we have not heard a single word from ANSTO on any subject.

Senator McLUCAS—When was that completed?

Mr Priceman—About the middle of the year. They lost their communications manager. I contacted the new one who sent me a very cheery reply by email which said she had some really great ideas for community consultation and we have not heard a word from her since. There is nothing coming out of ANSTO whatsoever.

Senator McLUCAS—In direct contravention of one of the conditions it would seem.

Mr Priceman—Precisely. We have also written to the minister asking him what the situation is. We have written to the minister for health asking him about the missing member of the ARPANSA council. There was supposed to be a person on the council—not one of the committees, but the council—representing the interests of the community. For some reason that appointment has never been made. I have taken that up with John Loy as well but, again, no replies.

Senator McLUCAS—Can I come back to your comment that all you were offered was FOI. They were prepared to waive the fees? I do not really understand what you mean by that.

Mr Priceman—It was not the type of charter that we had put together. We had spent countless hours discussing this. We had got it down to what we thought was fair on both sides. It was about two pages long. When we spoke to Commissioner Woodward he said it was not really good enough in law because we are not legal people. He added a few points. We played around with it and said that was the final thing. During the discussions at the tail end we were talking to Mr Steve MacIntosh from the Department of Foreign Affairs and Trade, who is now employed by ANSTO, and Bill Simms. I do recall Mr MacInosh saying what they wanted to give us is FOI plus, plus, plus. But at the next meeting it was FOI and that was it. We had wasted something like four years of late night meetings on this.

Senator LIGHTFOOT—By way of preamble to my question, I want to read out the names of these eminent physicians and professors. Dr Roger Uren is a consultant physician to the

Nuclear Medicine and Diagnostic Ultrasound in Newtown, New South Wales and also from the Royal Prince Alfred Hospital. Dr George Larcos is similarly disposed in his discipline. He is from Westmead Hospital and a senior lecturer at the University of Sydney. Dr Kevin Allman is the Director of Nuclear Cardiology at Concord Hospital in New South Wales. I am not going to read out a whole list of others. They believe that there is no alternative to reactor produced neutrons that are the subject of the making of radioisotopes. What are the alternatives that you say there are to reactors?

Mr Priceman—Have you read my annex from the Lockheed Idaho research organisation?

Senator LIGHTFOOT—I do not want to disappoint you but I have not even heard of it.

Mr Priceman—This does set out the alternatives.

Senator LIGHTFOOT—Could you give us a brief synopsis of that, then, Mr Priceman.

Mr Priceman—Very briefly, this is a team of nuclear engineers working for the Lockheed organisation, which is an internationally renowned organisation for high-tech science. They have dealt specifically with technetium-99 in accelerators.

Senator LIGHTFOOT—Not with molybdenum-99?

Mr Priceman—I am not sure. They claim that they can produce technetium-99 at one-third of the cost—with quality which is as good as the reactor based material, which is unsubsidised and which leaves no nuclear waste problem—needing a plant which cannot be used for weapons research. The cost of the individual units is about $A5 million. According to their figures, probably three units spread around Australia could supply our entire needs. This information was, I believe, in a paper called ‘Nuclear news’. It was supplied to us by ANSTO. I am not saying that they sent it to us direct, but it came from within ANSTO’s organisation. I was so excited when I read the report because it is exactly the type of science that we were looking for; that we have been kind of advocating for the last few years, ever since the 1992 Research Reactor Review.

Senator LIGHTFOOT—What was the date of that report, Mr Priceman?

CHAIR—Was this the report that is appended to your submission?

Mr Priceman—Yes, that is right.

CHAIR—It is actually from a publication, I think, called *Nuclear Technology*, volume 126, April 1999, but the paper was received on 24 February 1998. It is titled ‘A system of ^{99m}Tc production based on distributed electron accelerators and thermal separation’. Its source is the Lockheed Martin Idaho Technologies Company.

Mr Priceman—That is right.

CHAIR—It is in your papers, Senator Lightfoot.

Senator LIGHTFOOT—*Hansard* should be able to identify that now, Mr Chairman. I thank you for that input. Mr Priceman, how many of these are in operation commercially in, say, the United States?

Mr Priceman—Again, the correspondence is attached to my submission.

Senator LIGHTFOOT—Perhaps you could give us a number without me having to read through this submission?

Mr Priceman—I will give you, from memory, what the correspondence is about. I wrote to the person in charge of the project and said that we were excited. I said, 'How are you going with it? Do you actually build any at Lockheed or what?' He said, 'No, the research has been shelved because the people who would be likely to want to proceed with this were frightened to go in because they feared that the subsidised nuclear reactor produced products would be further reduced in price.'

Senator LIGHTFOOT—That is the ones produced and subsidised in the United States, is it?

Mr Priceman—And in any other country where it is produced in a reactor, including Australia.

Senator LIGHTFOOT—So the short answer is that there is none actually operating throughout the world at this moment?

Mr Priceman—That is right. In my submission, I have suggested that this information was available and on offer in 1992 from Professor Lagunas-Solar of the University of California. At that time, he offered the services of his organisation, and there was interest from the Austin Hospital in Melbourne to take up this. They needed funding of $1 million, which is the cost of half a fireworks display at any festival these days. It was refused by the Labor government at that time. A few years later, the request was repeated and I think the present government turned it down. I am not uncertain of that. It was certainly turned down again.

My point is that Australia missed an opportunity of going forward at that time and looks like missing it again. They could put in a couple of million dollars of research to this and possibly go ahead as producers of the machinery. Why should we have to import basic machinery to Australia? We have engineers here who could make accelerators, I am sure. It is an industry waiting to be taken up.

Senator LIGHTFOOT—When you speak of Dr Laguna, you mean Dr Lagunas-Solar.

Mr Priceman—That is what I said, yes.

Senator LIGHTFOOT—I missed the Solar part. And 197 other countries throughout the world failed to take up the same technology, I suppose.

Mr Priceman—For exactly the same reasons: they are getting subsidised products.

Senator LIGHTFOOT—To shift on then, with respect to the Peruvian INVAP reactor, you said that there was corrosion of the main tank.

Mr Priceman—I did not say it.

Senator LIGHTFOOT—What did you say?

Mr Priceman—I was quoting it.

Senator LIGHTFOOT—You didn't say that; you quoted that.

Mr Priceman—Yes. I was quoting Siemens.

Senator LIGHTFOOT—You were quoting Siemens.

Mr Priceman—The Siemens submission.

Senator LIGHTFOOT—Do Siemens offer any other evidence?

Mr Priceman—Have you read the Siemens submission?

Senator LIGHTFOOT—No, I haven't. I have heard of Siemens, though.

Mr Priceman—It is 1½ pages. It is very brief. It is one of the points that they make. Technicatome's is also a very brief submission which is well worth reading.

Senator LIGHTFOOT—You are aware that that is a joint venture between INVAP and Australian industry, aren't you?

Mr Priceman—All three of them are as far as I know, or possibly all four.

Senator LIGHTFOOT—In your other comments—if I can quote you in a generic sense, not literally perhaps—you said that the Egyptian reactor had only worked for about 10 days on scientific research. Where did that information come from?

Mr Priceman—It came, as I understand it, from an anonymous person working at ANSTO. I did note in there that I had no idea whether this is correct or not correct. We have no means of confirming it and I asked the committee to do this.

Senator LIGHTFOOT—In your submission, you said: that, in regard to the issues surrounding the world's nuclear industry, the question of what to do with the waste is the most problematical. Do you see a solution for that or do you see that as being unresolvable?

Mr Priceman—Totally unresolvable at the moment. Every country in the world is digging holes trying to find somewhere to bury this stuff. The United Kingdom has spent millions of pounds digging holes around Sellafield to put it in. After spending that amount of money, they called it off because it was not viable. The Yucca Mountain project in America has not got as far

as it was supposed to go. That is problematical at the moment. Will it go ahead or won't it go ahead? It is supposed to be a permanent repository. It was downgraded to an interim facility a couple of years ago. The Russians have got no idea what to do with theirs—they dump it into the sea off Japan—and yet at the same time they are willing to import stuff and reprocess it and look after it. Regrettably, it is a stupid argument that they are putting forward.

Senator LIGHTFOOT—Is your pre-eminent concern the one with respect to waste in Australia?

Mr Priceman—No.

Senator LIGHTFOOT—What is your pre-eminent concern with the new reactor?

Mr Priceman—The pre-eminent concern from a local's point of view is the fact that we do not believe the safety guarantees put forward by ANSTO. We do not believe their figures of 6 or 7 billion to one against a single person getting cancer over a certain number of years.

Senator LIGHTFOOT—Do you think they are lying to you or is that just a miscalculation on their part?

Mr Priceman—I would not say that they are lying. I just think it is a total exaggeration. As I say, Tony Wood does not believe it either. He worked for many years on the HIFAR reactor. He knows what that is capable of. He is quite happy to work with reactors. He would like to see a new one but he says that ANSTO's figures are ridiculous. Not only that, the commercial insurance industry obviously thinks they are ridiculous otherwise they would give us commercial cover.

Senator LIGHTFOOT—Given the alternative of proceeding with the present HIFAR reactor or installing a new reactor, what is your choice? Which is the lesser of the two evils? Which one is your choice?

Mr Priceman—That is Sophie's choice—that is, it is not a choice. The HIFAR reactor will have to be closed.

Senator LIGHTFOOT—Why do you say that it will have to be closed?

Mr Campbell—It was technologically obsolete in 1975. The Nuclear Safety Bureau said they would not approve it for operation past 2002. When it was discovered that we could not build another one until 2005 they extended it out, and ARPANSA has gone along with that. But HIFAR has got to go unless they spend something like $150 million, and that is in 1990 figures. That is what was estimated during the research reactor review. Obviously, HIFAR has got to go, and it should not be replaced. If it were replaced, certainly it should not be at Lucas Heights.

Senator LIGHTFOOT—So you want to see the HIFAR reactor at Lucas Heights closed, and you do not want to see another one built there?

Mr Campbell—Yes, that is correct.

Senator LIGHTFOOT—Let me just get on to your contribution with respect to earthquakes. On page 9 of your submission you refer to earthquakes and you express your strong reservations about the figures that were used. Once again, you say that those figures are wrong. I concede that it is not geologically as stable as the Yucca mountains in Nevada in the United States, but nonetheless it does enjoy at least a significant measure of geological stability there. What is your problem with respect to that when it is not in an earthquake zone? It may be in something that gets some sort of tremors, but there have been nuclear reactors—and I do not agree with it—built over earthquake zones. There are plants in the Philippines, and some were planned in Indonesia. In fact, I think they were proceeded with. Others are in Peru. What is your problem with the figures that were produced to show that it was not a geologically unstable area?

Mr Campbell—First of all, I did not say that the figures were wrong, I just said that they had been working on a figure of 0.23 ground movement. This, as I understand from reports from the Nuclear Safety Bureau over the past few years, has been a contentious subject. As Dr Gary Smith mentioned earlier, when they did the probabilistic risk assessment on HIFAR they decided that they would have to have a further inquiry. The inquiry came up with a figure which was almost twice as high. Is the area geologically stable? Does it have earthquakes? I think it was mentioned this morning that there was one about two or three weeks ago at Liverpool. Liverpool is about 12 kilometres from HIFAR. If it can happen there then it can happen further in.

Senator LIGHTFOOT—Was there any damage done at Lucas Heights?

Mr Priceman—Of course not because it was 2.2 on the Richter scale. Who is to say that the next one might not be double that?

Senator LIGHTFOOT—Is there any evidence or historical records to say that there has been some geological movement there that would constitute greater than 2.2 on the Richter scale?

Mr Priceman—I am unaware of that.

CHAIR—There was a specific study done by IGNS, which was a New Zealand organisation as I understand it, and they determined that there was a specification that should be the benchmark in terms of earthquake probability for any development on the site, including the existing reactor.

Mr Priceman—That is right. The whole thing was relating to the existing reactor, but obviously that should have been built into whatever contract has been signed and the specification that ANSTO is expecting. We have no idea whether this is being done or not.

CHAIR—And that figure, according to what you said and what I understand the report said, was twice what had been previously understood to be the specification they had relied upon.

Mr Priceman—This is one of these cases where, as time moves on, knowledge moves on and standards change. The other thing on this earthquake issue is when the government in its wisdom fixed a figure of $286.4 million, in 1997 figures, what was that based on? If they have to increase the specification to withstand a greater earthquake, then presumably the cost would

go up. In discussions that we had as a community group with ANSTO probably 18 months ago this question was raised: how fixed is this figure, this magic $286.4 million? We were told, 'It is fixed—that is as high as we can go.' We said, 'Supposing there were safety aspects which had to be built in and it was going to cost more? Or, if it did turn out to look like costing more, what would be sacrificed—the safety of the unit or the technological capabilities?' And we were told, 'Certainly not safety.'

This point was picked up by Professor White—who I believe may be giving evidence; he has certainly put a submission to this committee—who was quoted in a *Bulletin* article a few months ago. He was worried about whether the technological capability of a new unit, if it was fixed for financial reasons, might finish up being a toy. All these factors—earthquakes, safety design, the amount of money that the government is willing to spend on it—are vital aspects.

Senator LIGHTFOOT—So you believe in closing the reactor and not building a new one and we could source those radioisotopes quite easily from another source?

Mr Priceman—On a temporary basis—we are talking about importing on a temporary basis.

Senator LIGHTFOOT—Until these cyclotrons that you mentioned earlier can be justified?

Mr Priceman—That is right. ANSTO has always put forward the position that unless they can see these things actively in production, churning out these medical radioisotopes somewhere else in the world, they will not take notice of it. What I am saying is that Australia should take the lead here. Why should we just be followers?

Senator LIGHTFOOT—Australia could take a lead if we could get access to this technology that you mention, if it is not used by the United States or Canada or France or Sweden or any country, for that matter.

Mr Priceman—It takes a phone call, or an email these days.

Senator LIGHTFOOT—With respect, Mr Priceman, it might take a little more than a phone call, but I thank you for your contribution.

Senator GEORGE CAMPBELL—Mr Priceman, one issue I raised this morning with the council was whether or not there had been an epidemiological survey in the local community of the health effects of living in that region. They said no, there had not been, but that there was a facilitative study being done or being funded by the state government looking at whether or not they could conduct a survey. They said that your organisation had been doing some work on health effects. Can you enlighten us as to what that is?

Mr Priceman—I have not been actively involved in that. I know that a community committee was set up. They have been talking to the New South Wales Department of Health for the last nine months, trying to get terms of reference for a feasibility study. About a week ago, the department did advertise a request for tender for somebody to take up the task.

Senator GEORGE CAMPBELL—Has your organisation done any independent work in terms of the health effects on the local area?

Mr Priceman—Only by talking to people in the area. That is not a scientific study. It is meaningless. It is only a matter of knowing what is happening in your own street. The only people who can do this, and do it properly, are the New South Wales health authorities. They are the people with the facilities and they know where to look.

CHAIR—You mentioned insurance. From what I understood you were getting at, residents are unable to get insurance on their residences—their houses.

Mr Priceman—On anything. It is a standard exclusion in every Australian insurance policy. At the last Senate committee hearing that I attended, this question was raised. It was suggested that it is a normal exclusion. When I looked at it again, it is the only industry which is excluded. Whether you like it or not, Lucas Heights is an industry. They produce and sell things—an industrial product. If I lived 100 yards from the Caltex refinery, which I assure you I would not—

CHAIR—Some people do.

Mr Priceman—It is a horrendous place. I do not know how they do it—they see this thing every day. But you can get insurance. It just does not make sense.

Senator GEORGE CAMPBELL—Are you saying that people in the local community have got an exclusion in their insurance policy?

Mr Priceman—Everybody in Australia is excluded from taking out insurance against radiation or nuclear accidents.

Senator GEORGE CAMPBELL—Is it a general exclusion in every insurance policy?

Mr Priceman—That is right. When ANSTO came up with its figures of six billion and seven billion to one against certain things happening, we sent this information to a variety of insurance companies and the Insurance Council of Australia and said, 'This is what they say. How about changing your policy, because we're now assured that a new reactor will be perfectly safe?' They said, 'We've got no comment whatsoever on the accuracy or otherwise of ANSTO's claims but we won't insure you.'

CHAIR—Do you know whether ANSTO have insurance over their facilities? In other words, in the event of an accident, fire, explosion or the destruction of part of their facilities from whatever cause, do you know whether they are insured?

Mr Priceman—I do not know whether you would call it an insurance policy but they have been covered by deed of indemnity by the government. This came up during the last two years. Because of the criticism that we have been making to them about lack of insurance, they signed this deed of indemnity with ANSTO. We were told at one of the negotiated solution meetings that this was even better for the community than commercial insurance, which we deny, and so does Tony Wood.

CHAIR—My point was about the actual facilities—the asset value, if you like, of the ANSTO Lucas Heights establishment, and whether or not they had access to either insurance

coverage underwriting or an indemnity. In other words, if something happened to one of those buildings or plants, ANSTO could then recover for that loss.

Mr Priceman—It is an interesting question.

CHAIR—I have asked ANSTO. I just wondered whether you knew.

Mr Priceman—It is a good question to ask then because around 1993 they had this huge fire in one of their laboratories. It had nothing to do with radiation but it cost them $500,000 just to clean the place out. It would be interesting to ask them whether they were covered for insurance on that. I do not know.

CHAIR—My question is not predicated on it being a radioactive or nuclear accident of any sort.

Mr Priceman—They sent it off to the laboratory that time.

CHAIR—I will pursue that with ANSTO. As there are no further questions, Mr Priceman, thank you for your evidence and your submission.

[3.56 p.m.]

BARRY, Dr Jerard, Elected Delegate, Community and Public Sector Union, Combined Australian Nuclear Science and Technology Organisation Unions

MATTHEWS, Mr Howard, Staff Member, Union Delegate, Automotive, Food, Metals, Engineering and Kindred Industries Union, Combined Australian Nuclear Science and Technology Organisation Unions

MORRIS, Mr Stephen, Site Delegate, Automotive, Food, Metals, Engineering and Kindred Industries Union, Combined Australian Nuclear Science and Technology Organisation Unions

STORR, Dr Greg, Member, Combined Australian Nuclear Science and Technology Organisation Unions

WATT, Mr Geoffrey Chalmers, Group President, Association of Professional Engineers, Scientists and Managers, Australia, Combined Australian Nuclear Science and Technology Organisation Unions

CHAIR—Welcome. The committee prefers that all evidence be given in public but if there is anything you wish to put to us in private you may request to do so and we will consider your request at that time. The committee has before it a submission from the CPSU Professional Division, ANSTO Group. That is on behalf of the combined unions, is it?

Dr Barry—Yes.

CHAIR—Are there any alterations or additions you wish to make at this stage?

Dr Barry—Not to that submission, no. We have an oral submission.

CHAIR—I now invite you to make some opening comments to the committee and then we will proceed to questions.

Dr Barry—I make this statement on behalf of the combined unions at ANSTO. I would just like to make one comment that Dr Storr, my colleague from the CPSU, has had, and is directly involved in, some aspects of the replacement reactor project.

We would like to submit to you today that the union members at ANSTO reaffirm their support and enthusiasm for the replacement reactor. We believe that the replacement of HIFAR will benefit this nation through the research and technological applications it will engender through the continuation and expansion of radiopharmaceutical production, in its research, and in serving the strategic needs and interests of Australia by helping to keep Australia current in nuclear science and technology.

The members of the combined unions consider that the replacement of HIFAR is necessary to maintain their ability to function in nuclear science and technology at an appropriate level. Further, the combined membership considers they are adequately prepared and capable to

continue making valuable contributions in nuclear science and its application as a result of HIFAR's replacement.

The committee may not be aware that many of our members have been involved in the preparation of the environmental impact statement, the pre-qualification of tenders, the tender preparation and in the evaluation of those who responded to the tender. We believe that, throughout the entire process, the members involved performed their duties in a professional manner and we have full confidence in the propriety, diligence, objectivity and integrity of their contribution. Further, we consider that they are competent to continue with the project to operate the replacement reactor in an appropriate manner and to undertake future nuclear science technology projects that will benefit all.

The members of the combined unions provided immense technical input and examination of the details concerning each tender proposal. Our members prepared and produced reports which were supplied to the project management group. This information was subsequently used to check for compliance against the tender specification and to evaluate the risk and the performance of each tender. We have no reason to believe that ANSTO management did other than assess the information provided on its merits. This process eventually led to the selection of the successful tenderer. Any suggestion that the tender evaluation was flawed could unfairly cast doubts on the professional contribution made by our members in this process.

The members are proud of their contribution to ANSTO's radiological safety record and the operational safety of HIFAR. They believe from their evaluation of the tendered reactor systems that the high safety standards will not only be maintained, but be evaluated to even greater heights following the commission of a reactor meeting stringent safety standards.

We believe that the replacement reactor will contribute to the retention of highly skilled positions in Australia. We fear that, should the opponent's view ever prevail, and Australia imports all reactor produced radiopharmaceuticals, an opportunity to be part of the new economy would be missed. Further, we consider the loss of a nuclear reactor and associated research facilities would lead to a loss of high-tech jobs, hundreds of man years of technical and professional expertise, some of which would depart overseas forever. Further, the absence of a nuclear facility would contribute to the drain of future talent from these shores. When we speak of job losses, we are referring to full-time jobs with career paths, not casual or contract labour. The committee could be expected to agree that it should be the aim of any government to encourage the development of high-tech jobs befitting a first world economy.

The building of a modern replacement reactor will stimulate upper level job growth in the construction phase through the involvement of private sector firms and their workers. Obviously, it will continue to further develop technology and skills within the ANSTO work force itself. The replacement reactor will produce a technological shift through the introduction of the latest technology in many of the tasks carried out by ANSTO staff. The acquisition of a modern reactor will have significant flow-on effects into the scientific and technological institutions of the nation. It will be an important focus in attracting students and researchers, particularly in our immediate region, to Australia and will provide a scientific underpinning for a variety of technological endeavours.

Our members have provided us with information, obtained through their frequent interactions with local communities, that there is no strong opposition to the government's decision to build a replacement reactor at Lucas Heights. As previously stated, the members have strongly supported the government's decision to replace HIFAR. However, it would be inappropriate not to sound a warning on the current government policy of outsourcing of information technology, as it affects the functioning of science and technology at ANSTO and other science agencies.

Computation will play a vital role in the operation and design of the replacement reactor. It will also be key for the design and analysis of all research and experimental procedures as well as any equipment to be built and deployed on the replacement reactor for the whole of its operating life. It is the key to underpinning safety analysis of operations and procedures. Members consider a decision to outsource information technology will be detrimental to the industries of science and technology. That is as much as we wish to say in our opening statement without appearing repetitious. On behalf of the union members at ANSTO, we thank you for your attention.

CHAIR—Thank you, Dr Barry.

Senator McLUCAS—You explained the role of your members in developing a lot of the specifications of the tender documents, and I say that in a broad sense. Prior to that, was there any assessment of the use of alternative technologies to come up with the same outcome, a neutron source? I am trying to take you back a step further. Did we go through a process of assessing whether or not there was a way to give you the same scientific outcome without using the reactor?

Dr Barry—The members have constantly followed developments in these fields over a long period of time. The considered opinion—we are talking particularly about technetium production here—amongst the members has always been that they have evaluated every nuke scheme that has been proposed and that the schemes, on closer examination, were not viable schemes to be proceeded with.

Senator McLUCAS—We had evidence previously suggesting that we are missing an opportunity to be at the leading edge of new technologies, that instead of continuing to follow other nations we have an opportunity to get out here and develop these technologies ourselves. Do you have a comment on that?

Dr Barry—No, other than to reiterate what we have said. The members have examined the claims—and they are in the reports which were given to me and from other discussions inside the organisation—and they are not viable technologies and we should not be detracted from our fundamental aims by going down those paths.

Dr Storr—It is important to realise that the *Nuclear Technology* journal paper that was referred to before was essentially a research project. As such, it studied at lab scale the possibilities of using cyclotrons to produce technetium-99 using those types of machines. It happens that the main author of that paper is known to me. I also emailed him, as did Mr Priceman, after I saw the paper in the literature. I asked him—

CHAIR—Could you say who that main author is because there are a number of persons we are talking about today.

Dr Storr—The main author is Dr Ralph Bennett. The information that he came back to me with was that, indeed, the research had been shelved, as Mr Priceman said. The inference I took from that was that, if the Department of Energy in the US had thought that research project had merit to produce commercial quantities of technetium-99, they would have funded it. The fact that they have not funded it—and this is my personal inference—would suggest to me that it is probably a very difficult commercial prospect and a very costly one.

Senator McLUCAS—So that is your inference; it is not what Dr Bennett said?

Dr Storr—No.

Senator McLUCAS—Thanks for that. On another matter, in terms of the location of the proposed reactor, was there a process in which your members were involved in having any sort of assessment of the location, or was there a fundamental decision made that, if we were going to have a reactor, it would be located at Lucas Heights?

Dr Barry—No, I do not think any of our members had an input.

Mr Matthews—Our members did not have an input, but I believe there is a cabinet-in-confidence document that outlines a number of other sites. We have never seen that document.

Senator McLUCAS—The final issue that I wanted to talk about was that I was a little concerned about the commentary we had before from Mr Priceman regarding the history of community discussion between Lucas Heights, ANSTO and the broader community in this area. Is that an issue that concerns the combined unions and, if so, what is your response to those comments that Mr Priceman made?

Dr Barry—Many of the members live in this local community, as I think Senator Forshaw would be aware, and they are active in all sorts of community groups. I am a typical example. I hear absolutely no criticisms of ANSTO's performance or the fact that ANSTO is even there. I think that is reiterated to me by so many other members—that the local opposition, or what is contended to be local opposition, is not significant.

Senator McLUCAS—Do you think it would be useful to try to develop some sort of structure of formalising communication channels so that this situation that we have now can be somewhat avoided?

Dr Barry—Yes. I think on all occasions communication is a key to good relationships. I do work in the community. I go out into the schools and I regard that as part of the communication process.

Mr Matthews—Under ANSTO's act, they have a body which staff members attend which is called a peak council. The peak council is there to provide communication between ANSTO and elected people from the staff—normally five or six. One of the agenda items is an item on community relations. They present on a regular basis the reactions of the community and the

discussions they have had. My understanding is that ANSTO has a lot of trouble getting the community to attend these things. They get the people who normally turn up for these sorts of things but they have some problems in getting people to attend.

Senator McLUCAS—I am not quite clear on what you are saying. ANSTO initiates events?

Mr Matthews—They have a committee which is called the local liaison forum committee. They call meetings in various places which people can attend. There are standing members of that committee from the council, and there are others. I believe they are open to the public or to those who wish to turn up.

Dr Storr—I am also aware of meetings that are being held within ANSTO at management's direction to get input from staff to help with community liaison projects. As was suggested by another submission, there is a new communications manager and she is looking at those issues. So I know for a fact that those things are going ahead, within the staff at ANSTO, anyway.

Senator CHAPMAN—You mentioned that a number of members of your union who work at the site live in the area. Would you have any idea of the proportion? Firstly, how many of your members are employed at the site and what proportion of those live in the local area?

Dr Barry—Of the total ANSTO work force, something like 80 per cent would live in the council areas that immediately surround the site.

Senator CHAPMAN—You are quite confident they have no concerns about the safety of the new reactor?

Dr Barry—Are you talking about my members at the moment?

Senator CHAPMAN—Yes.

Dr Barry—They certainly have not expressed any concern to me. In fact, we have had several meetings of the members at which they have continually endorsed the support for this replacement reactor, right from the word go when it was initially mooted.

Senator CHAPMAN—Earlier today we had a submission from several members of the Sutherland Shire Council, including the mayor, who indicated to me that the attitude of the council had changed because the personnel had changed since the last election. They attributed that change of personnel to the campaigns that various groups of them waged against the reactor. Would you have a response to that claim that that was the issue that determined the local government elections?

Dr Barry—I think it is highly unlikely. But, if you want to look into political claims of that nature, you might care to observe that in the previous federal election Mr Hill ran on ostensibly an anti-replacement reactor ticket and, contrary to in the rest of the country, the ALP sustained quite a big swing against it in Hughes.

Mr Morris—In the following state election, the issue of the reactor was not raised by either the Labor or Liberal candidates; it was a non-issue.

Senator CHAPMAN—What happened in that election?

Mr Matthews—Labor won the seat.

Senator CHAPMAN—When they did not oppose it.

Senator LIGHTFOOT—It is a pleasure for me to sit opposite you gentlemen and find out that we have something in common. It is not often that I can do that.

CHAIR—It is not often he talks to union members. This is a first.

Senator LIGHTFOOT—This afternoon has been made a lot easier by knowing that I have something in common with you on this at least, and I am sure there is much more. Are your members aware of the basic difference, not the scientific evidence, between a power reactor—one that produces electricity—and a research reactor?

Dr Barry—Yes. Most of them have been working in a nuclear organisation for quite some time and it would be highly surprising if they were not aware of the differences.

Senator LIGHTFOOT—I have been fortunate enough to visit nuclear power stations in several parts of the world. Among those has been one at Calvert Cliffs, literally on the edge of Chesapeke Bay. It has two 1,000-megawatt generators. It is just outside Maryland, one of the highly populated areas in the United States and just outside the national capital, Washington DC, and, as I said, it is on the edge of Chesapeke Bay, which is arguably one of the most sensitive environmental areas in the United States, yet there has never been an accident. I have visited others in the United Kingdom and, fairly recently, at Kaohsiung in southern Taiwan.

The Sutherland Shire Council included an attachment in its submission that spelt out the dangers of nuclear reactors, without a defining difference between a power reactor and the HIFAR research reactor and proposed replacement of one by INVAP. The article said in part:

> ... meltdown for a research reactor is substantially over within eight minutes, but for a power reactor it will take about 43 minutes. If a research reactor experiences the worst case accident of a power surge, the accident will occur in less than one second, with no warning and no opportunity for operators to avert the consequences.

It goes on to cite a case in the United States, at power station SL-1 at Idaho in 1961, which it says blew up, killing all the operators. In my travels around the world seeing power stations, which included nuclear power stations, I have never heard of this particular one. I have never heard of any accidents other than the Chernobyl accident which caused the tragic loss of life. Perhaps collectively it may have been some top-level secret that was kept in the United States. You might be able to enlighten me on this one that blew up killing all the operators concerned.

Dr Storr—Three operators died. It was a research sized reactor. It was caused by what was called a reactivity excursion. It was caused by one of the operators deliberately withdrawing one of the control rods—that is one of the pieces of material which controls the neutron reaction—and that action sent the reactor to what they call superprompt critical. When it went

nd that action sent the reactor to what they call superprompt critical. When it went superprompt critical, there was a large increase in the temperature in the reactor core, the water boiled and it caused a water hammer effect which accelerated the slug of water above the core up in to the pressure vessel. The pressure vessel broke and it accelerated up and hit the roof, pinning one of the operators to the roof. The two other operators died later from radiation exposure. That is the SL-1 accident. It was in the 1960s in Idaho.

Senator LIGHTFOOT—It was in 1961, about the time that this reactor was built here.

Dr Storr—Correct.

Senator LIGHTFOOT—What was the difference between that particular reactor and the one that is currently operating, the HIFAR?

Dr Storr—There are very significant safety differences. In SL-1 it was possible to withdraw the central control rod and send it into this very unstable state, making it superprompt critical. In HIFAR that is impossible. You cannot physically withdraw one of the control rods to start with. If you did lose one of the control rods through an accident and the reactor protection system worked, the reactor would shut down. You would not get the sorts of consequences from even a very severe accident of that type in HIFAR as you would have done in SL-1.

Senator LIGHTFOOT—Was that a design fault or was it in fact human fault?

Dr Storr—A combination of both. There were several significant design faults in the SL-1 reactor. The fact that the operator could pull the control rod out meant that it put it into that unstable state.

Senator LIGHTFOOT—You are aware that there are 103 power reactors in the United States. Roughly how many research reactors are there in the United States? Could you tell the committee?

Dr Storr—I would have to take that on notice.

Senator LIGHTFOOT—What about the decommissioning of the HIFAR plant here? Is that something that would be undertaken by your combined union?

Dr Barry—At the end of the day—as you are probably aware, that will be some time off yet—our members would be involved.

Senator LIGHTFOOT—Would you be involved exclusively in that?

Dr Barry—In the present industrial climate, I imagine we would be, but one cannot foresee what new unions might enter into the field.

CHAIR—I am sure Senator Lightfoot will tell you you won't be.

Mr Matthews—My understanding is that the technical ability to decommission HIFAR will remain with ANSTO. Obviously, they are going to need some specialist help, as they need with all these things. That will come as an employee type contract basis or by importing the person, but the general work will be done by ANSTO. The preparation of material, the documentation and the letting of contracts will be done by ANSTO.

Senator LIGHTFOOT—I do not disagree with that incidentally, in spite of the chairman's comments. I think that you have built up an enviable record of expertise and there is no reason why we should go outside that expertise, all things being fair. Will that be undertaken in conjunction with the commissioning of the INVAP facility, or is that yet to be decided at the beginning of the dismantling process?

Mr Matthews—I can only speak on industrial terms. We have asked ANSTO and they say to us that currently industrially six years is a bit far out to know what is going to happen to our staff. But they have told us that they expect that those reactors will run for a short period of time together and that there will be a seamless transfer from producing the radioisotopes from one reactor to the other.

Senator LIGHTFOOT—During the decommissioning process, does that present any danger of any kind to the residents of the Sutherland shire?

Mr Matthews—It is my understanding that several of these reactors have been decommissioned. I am not a reactor expert. From the report that I read on them some time ago, it seemed to me that it was not particularly a complex undertaking. In other words, it requires some highly technical skills and it takes some care, but it did not provide any risks that you would consider to be abnormal.

Senator LIGHTFOOT—Does that mean that a lot of the radioactivity or the radioactive elements that are associated with the generation of reactors there now would be removed prior to the decommissioning?

Mr Matthews—I do not know what ANSTO's intentions to that are because I read the report only briefly. My understanding is, judging by other decommissions, that the only parts that are going to be radioactive for a long period is the RAT, reactor aluminium tank. Someone else might like to answer this question.

Senator LIGHTFOOT—The P&C president of that Lucas Heights community expressed some concern, which is undoubtedly genuine, for the welfare of the children. She was particularly concerned about what she perceived as the inadequacies of emergency planning in the case of an accident. Is that with some foundation?

Dr Storr—I do know something about emergency planning, but I do not think I would be competent to give you a coherent answer on emergency planning. It is really a safety division person's area.

Senator LIGHTFOOT—Would you like to take that one on notice?

Mr Matthews—I can make a short statement on it, which may satisfy you. If you go back to the peak council again, the conduct and the execution and the results from the emergency exercises do come to the peak council. From my review of them and what I can remember from the last time we talked about it, I did not think there were any significant issues that came out of the exercises that came to the union's attention. There were some things that caused concern mainly about signage and things like that. In recent times, those issues have been addressed—that is, signage for staff on which way to go, where to park their vehicles, et cetera.

Senator LIGHTFOOT—There has been some apprehension recorded in a submission to the committee about too much of the safety factors being placed into the hands of INVAP. Is there proposed to be a transfer of any of those safety factors to INVAP during the construction or is that going to be held by ANSTO and by your union?

Mr Matthews—As far as that is concerned, we have an industrial agreement with ANSTO. This project will mean the transfer of technology from the vendor to ANSTO. Talking about safety, I have heard nothing of it. But as far as we are concerned, at all levels that my union covers to the professionals, we expect there will be technology transfers to our staff and to ANSTO from within.

Senator LIGHTFOOT—I think what was said inter alia was this:

> ... ANSTO now only has a small team of dedicated reactor professionals most of whom are operating HIFAR and they are fully extended.

It went on to suggest that ANSTO was going to be very much in the hands of the vendor in this regard. Is there any credibility attached to that?

Dr Storr—There is a significant program that is planned and in place to enable what is called technology transfer, which Howard mentioned. That will mean that staff at ANSTO will interact with INVAP to learn what this particular reactor system will be able to do, how it is designed and what its safety features are. That will be done in such a manner so that ANSTO can operate the replacement reactor safely and efficiently.

Senator LIGHTFOOT—Has there been an exchange with INVAP, with respect to the current research reactors, with any ANSTO people to date or is that envisaged?

Dr Barry—Yes. There are some people in the Argentine at the moment as part of the technology transfer. I would like to make a comment regarding what you read out about the number of people involved as it relates to safety. That specific reference was to our reactor physicists such as Dr Storr. ANSTO has a separate division outside nuclear technology called the safety division. That division has quite a number of people and our members who are also responsible for safety. Our safety is handled by considerably more than that report indicated.

Senator LIGHTFOOT—But collectively, gentlemen, are you all satisfied at the level of safety currently operating and the level of safety that is envisaged when the joint venture arrangements actually start with the construction of the new facility?

Mr Matthews—We previously stated to the Senate committee in April last year that our members are undertaking the safety role at ANSTO. There are technicians, professional engineers and professional scientists that actually provide the safety role. We have an industrial agreement with the organisation in relation to safety. The organisation and management understand that we are monitoring very closely the safety on site. It is our members that are actually carrying it out, as I have already stated. We are more than satisfied with the safety aspects at ANSTO.

Senator LIGHTFOOT—To project to the future, you will be concerning yourselves with safety aspects once the construction has started. Are you happy with that as proposed?

Mr Matthews—We will endeavour to ensure that ANSTO satisfies us, through our members who will be undertaking this safety role, that the new reactor is working safely and within safety guidelines—following guidelines set either by ARPANSA or by the International Atomic Energy Commission. If they do not, they can expect that there will be industrial consequences.

Senator LIGHTFOOT—My last question is associated with sourcing experts, particularly engineers. We only have the one facility in Australia of any kind that performs a nuclear reaction. From where do you propose to source experts that you will undoubtedly need in addition to the ones that you already have?

Mr Watt—We have already recruited some from overseas to operate the present HIFAR reactor. The reality is that there is a lack of suitable tertiary courses in Australia; this is one of the deficiencies of our education system, I guess. We did have a nuclear engineering course in New South Wales which was terminated some years back. Consequently we have to recruit far and wide to operate our reactor in particular. We had a recent almost market survey type of recruitment, expression of interest type of exercise, and I believe over 1,000 names were received for reactor engineering positions at ANSTO.

Senator LIGHTFOOT—Where did they predominantly come from, Mr Watt?

Mr Watt—Many were from the UK, some were from the US and other countries were less obviously represented.

Senator LIGHTFOOT—The bulk of them came from the US and the UK?

Mr Watt—I think the bulk came from the UK, but I could stand corrected.

Senator LIGHTFOOT—The UK and the US.

Dr Barry—I would like to add that we also have taken on quite a number of young people on the longer term developmental process and we are training them up internally.

Senator LIGHTFOOT—Tertiary graduates, I assume.

Dr Barry—Yes. I know some of them work for Dr Storr. He is responsible for a number of these younger people who are building a career in the organisation. They are locally grown.

Dr Storr—Apart from engineers and physicists who would come into the division that I work in, there are also the extra benefits of attracting high quality scientists who would use the reactor facilities. There is at least one example that I know of who has come from a lab in the US. He would not have come here without the replacement reactor project. By attracting high level scientists like this, we can envisage that we would have very good research science and developmental science done because of the reactor in the future.

Senator LIGHTFOOT—Excellent. I appreciate your input this afternoon, gentlemen. Thank you.

CHAIR—How many employees are in the combined unions group at the ANSTO sites?

Dr Barry—Do you mean the total union membership?

CHAIR—No, at ANSTO. How many of the employees at ANSTO, at Lucas Heights, are covered by the union?

Dr Barry—I will have to do a quick sum, but I would estimate off the top of my head about two-thirds, about 600.

CHAIR—This is not a question about levels of unionisation; friends at the other end of the table might want to pursue that. We have been told by ANSTO that they have about 800 employees at the site. How does that compare with, say, five or 10 years ago? Has the number of employees increased or decreased?

Dr Barry—It has fluctuated over the years. When we were the Australian Atomic Energy Commission, I think at one stage we were up to over 1,000 employees. The organisation was restructured and some hundred or so went to join CSIRO as some of the functions were transferred. I think the number dropped a little bit below the current level in the early 1990s, from memory, but not terribly much lower than that. So it has hovered around that mark, I think, for most of this decade.

Mr Morris—It started to increase slowly over the last three or four years. It dropped to about 720 about four or five years ago and now we are touching 800.

CHAIR—How many CSIRO employees are on site now? Maybe you can take that on notice or ANSTO could supply it. We were also told during a visit that they do have contractors coming in and out on to the site and we also know there are students and visiting scientists and what not. If we could get an indication of the number of CSIRO employees, that would be good. I understand, and you might confirm this for me, that some of the work that was previously done at the site by CSIRO has moved off site to other CSIRO locations in Sydney and elsewhere. Is that correct?

Mr Morris—Yes, it is even a bit more drastic than that. They just came in and said we are no longer doing that kind of research. They have actually stopped the research and people have either moved to other locations or been made redundant.

CHAIR—We can pursue that elsewhere. I know Senator McLucas wants to ask you another question about outsourcing. I probably cannot let your remarks go about the level of support and so on within the community.

Senator CHAPMAN—You were the Labor campaign manager, weren't you?

CHAIR—Fortunately, I did not quite have that illustrious position, but I was involved in the campaign which is why I can ask the question with some degree of knowledge. Dr Barry, you are not suggesting, are you, that the reason that David Hill did not win the seat was because he was on the record as opposing a new reactor at Lucas Heights, if indeed he was? Is that what you are suggesting?

Senator CHAPMAN—Absolutely.

CHAIR—I am not asking you, Senator Chapman.

Dr Barry—I was put a question in the first place about council elections.

CHAIR—But this is an assertion that you have made here and you have made previously. What I am trying to get at here is this: are you trying to tell this committee that the 1998 federal election campaign in Hughes was a plebiscite or a referendum—or a vote, if you like, for or against the reactor?

Dr Barry—You have to examine the fine details of that campaign. I am just making a very—

CHAIR—I have, don't worry.

Dr Barry—simple observation that was apparent to our members.

CHAIR—Let me just put it to you, for the record, that in fact David Hill's campaign had very little at all to do with the reactor. Indeed, I think I probably was a bit stronger on that issue and I actually did better in regard to the vote. I do not believe, from memory, that Danna Vale, the successful member, went out and campaigned openly and publicly in favour of the reactor. Do you know?

Dr Barry—She certainly did not appear on the anti-reactor platform.

CHAIR—That was not the question I asked you. Are you aware that, prior to the election in 1997, Mrs Vale was on the public record as opposing a reactor at Lucas Heights?

Dr Barry—Yes, I am quite aware of that.

CHAIR—I have one other question so the record is complete. This morning we had Councillor Rankin, who is an independent councillor from the riding in which the reactor exists. You would agree with me, wouldn't you, that she has been campaigning for a long time against the reactor, both the current one and the new one? She was re-elected to the council as an independent rather than as one of the two major political parties on the council. That is correct?

Dr Barry—Yes.

CHAIR—I thought that should be put on the record. In terms of this issue of community opposition, if it were demonstrated through a survey or a poll of the community that there was strong opposition to the reactor, do you believe that would be something that the committee or the parliament should take notice of, or do you believe that the arguments in favour of the reactor should outweigh a strong view in the community against having it at Lucas Heights?

Dr Barry—If that were to be the case, you would have to consider the economic costs of relocating it somewhere else and weighing that up against community interests.

CHAIR—Mr Matthews, did you wish to comment?

Mr Matthews—I was just going to say that the question is a furphy, the reason being that you know as well as I do that the general community could quite happily go and say you should hang every murderer, but that may not necessarily be the best solution and may be not in the community interest. If you go and run a campaign around Lucas Heights, whether it is an emotive campaign or whatever, you could quite easily go around shopping centres saying that there are terrible accidents, putting half-truths, and get community support. Whether that community support is a result of that type of campaign or based on true facts would be the issue at the time of us making our decision and the government making a decision.

CHAIR—I appreciate that, but what about just a straight-out question to the residents asking: 'Do you support or oppose a reactor?'

Mr Matthews—There is no such thing as a black and white question on whether or not there should be a reactor. This comes back to the David Hill business. Is the Liberal candidate laid flat? I think you would even agree with that. In certain parts of the electorate David Hill was a little bit more anti the reactor. If you go by poll by poll distribution—and I will stand corrected—

CHAIR—I think the water supply had something more to do with the result in Hughes than—

Mr Matthews—through the electorate it clearly showed that the polls that had less impact in winning votes were those around Bardon Ridge in Menai.

CHAIR—The biggest swing was actually in Bardon Ridge. I do not want to debate this but you are saying that you experience no opposition or very little opposition out there from the community from your contacts.

Mr Matthews—I can only say that, as far as my union is concerned and myself personally, I went to numerous meetings. I did not see people jamming roads getting to the meetings. I saw a number of people who turned up at the same meeting time after time, whether they were pro or anti. Who knows whether that was a true reflection of what the community sees?

CHAIR—But does it mean that they support it? Does it mean that they are apathetic or ambivalent or they do not know?

Mr Matthews—At the Heathcote Public School meeting I think it was clear from the community reaction in the hall there that the number of people who supported it was equal to the number who did not support it. That was so much so that the meeting deteriorated to a shambles because of the inability to hold the line, as there were people there who were prepared to speak against and for the reactor. You were one of them.

CHAIR—I was there. I did not speak, you will recall.

Mr Morris—David Hill was there as well, I believe.

CHAIR—As a visitor. I do not believe Mrs Vale or Professor Garnett were there.

Senator McLUCAS—I want to come back to the issue you raise in your submission about outsourcing of IT. I think your comments are well made. You say that it is not possible to be more specific on the impact of outsourcing IT on ANSTO operations and the details of where we are. Has that changed since the time of writing that submission?

Dr Barry—No. I was hoping that I might be in the position today to be more definitive than that. There was a meeting of OASITO on Thursday of last week. There has been no further firming up of what is in scope for outsourcing and what is out of scope. My only comment would be that the preferred line OASITO seem to be pushing is that they want as much in scope as they can possibly get into scope to outsource.

Senator McLUCAS—What impact do you think that would have on the ability to manage either the current reactor or a new reactor?

Dr Barry—The loss of IT is basically a loss of control over one of your fundamental tools. IT supports computation. Computation today has become the third arm of science. We are familiar with theory and experiment. Now it is theory, experiment and computation—the three of them go hand in hand. By removing control of IT, you destroy your control of computation or you lessen your control of computation. The members feel uncomfortable about any sort of diminution of this type of control and of their ability to contribute the way they wish to contribute.

Senator McLUCAS—So that it is clear for the record, when you are talking about IT, you are not just talking about a help desk and how to use Microsoft Word, you are talking about scientists who are computer scientists, very talented people.

Dr Barry—When scientists are trained in a primary discipline—chemistry, physics, engineering, whatever—that training these days also involves a huge amount of what you might regard as computer science. Today, you cannot say, 'That person is a physicist and that person is a computer scientist'—they are intermixed. The danger with outsourcing IT is going to be that, when jobs go—and that is what will happen if IT is outsourced—there could well be skills of science lost in that outsourcing process because people are performing dual roles.

Senator McLUCAS—Given that you have people who are scientists and computer scientists, is it possible to give us an indication of how many jobs are IT jobs at ANSTO?

Dr Barry—There are very few jobs that you could say are IT jobs. The point I am trying to get to is that virtually every scientist does a combination of science and a bit of IT. In some cases, IT is a major component of their scientific work and at other times it may be restricted to just using Microsoft Word. If the guillotine is to drop, it is going to be a big cut, and someone would have to make the decision as to who goes and who stays. Inevitably, skills are going to be lost in that process, and those that remain would then have lost control over a lot of the decision making processes—for example, over what sort of computer is going to be the next one to serve my function. They could potentially be told by an outsourcing supplier, 'You are going to have X, whether you like it or not, because that is in the contract.' When the person says, 'I need Y for my job,' they will be told, 'Bad luck, it is not in the contact.'

Senator McLUCAS—In your view, is there capacity outside of ANSTO to provide those services anyway?

Dr Barry—I raised this question with a potential scientific supplier, as opposed to a potential IT supplier, some years ago when these sorts of things were first mooted. They were probably one of the few people that could possibly supply some, not all, of the expertise and they indicated they did not want anything to do with it because they were not interested.

Mr Watt—The very expression 'IT' suggests there is an artificial distinction between computing and everyday office work. There is not. As Dr Barry says, there is a continuum of some roles which have very little IT component and others where it has a substantial role. It is very difficult to actually chop off this so-called IT component as a separate part of work.

Senator McLUCAS—I think that point is well made. If anything were to happen and you would like to give us some further information on this issue, which I think is fairly important to the whole inquiry, we would be happy to receive that if you find out what is to happen to you.

Dr Barry—I will certainly be happy to keep you informed.

Senator McLUCAS—Thank you.

CHAIR—Could I just ask one other question which I should have done earlier. It has been said before, and indeed it was a key recommendation from the McKinnon review, that there should be a public inquiry as a specific frame of reference under what was previously the EPIP act. Dr Smith of the council referred to this this morning, calling for public hearings within the ongoing process of the design and construction of the reactor. Do you have any objection to that?

Mr Morris—Are you talking about now that the contract has been let?

CHAIR—Their submission says, 'Council requests that the Senate supports a call for a public hearing process to occur as part of the reactor design licensing process under the ARPANSA act 1999.' They are still calling for it. The question as to whether or not you can have a public inquiry into the whole issue is a debatable one. It is not impossible, given as I said earlier that the government could change its mind, as it appears to have done on things like Badgerys Creek. The council here, and others, are calling for public hearings as part of the process rather than it all being seen to be done internally within ANSTO, within the government

and within ARPANSA. Is that something that the union would object to? If I can paraphrase what the opponents and council are saying, they are saying it is fundamental to public scrutiny. Indeed, on a previous hearing of the previous inquiry I remember Mr Priceman was asked whether, if a public inquiry were held at that time and the decision said, 'Go ahead,' he would accept it? His response was that he would because at least they would have had the public inquiry. Do you understand what I am asking?

Mr Matthews—Is it not right that the stable door is open and the horse has bolted and ANSTO and the government are going to build the reactor? Part of that process is that ARPANSA will do an inquiry into the suitability of the contract, the design, et cetera. My understanding of that is that it will lead to the construction permit being granted. The need for a public inquiry about whether we need a reactor is gone.

CHAIR—The request at this stage as I read it is into specific stages of the process. In other words, before the licence to construct would be issued there would be a public hearing process to look at the design and that would enable people to examine issues as to safety and so on.

Dr Storr—Who do you trust? Do you trust the experts?

CHAIR—I am asking the question. Do you have a problem? The fact of the matter is that there are provisions for public hearings within legislation, both federal and state, into projects like this one. We are told that this is an integral part of the process in the United States. What has happened on this occasion is that the government made a decision to build a reactor subject to an EIS, but the decision was already made. The EIS was predicated on a decision to build. The question I am asking is: does the union have any objection if there was to be a broader public hearing process undertaken as part of the ongoing process for the construction of the reactor?

Mr Matthews—I will just take you back to when this union that I represent made a decision on whether we are going to support or not support the construction of the reactor. The council that I addressed and the internal safety people passed a motion saying that they agreed to it as long as there was a proper EIS and safety study done. In my view, that meant that what would happen with building this reactor at all stages would be transparent. If you are saying to me that ARPANSA should do a review and go through these things and go through a public process, I have no problem with it. I think it should be transparent. Whether or not the general public or even the unions can come to grips with high level technical argument is another issue, but the process should be transparent. That was—in my view, as I was the one who sat there and talked to a left-wing union about building a reactor—the agreement: that it be transparent and the results of inquiries would be open to the public.

CHAIR—My final point—and I suppose it is a comment more than a question—is it may well be that we would have avoided a lot of this angst and these subsequent parliamentary inquiries, if you like, if Professor McKinnon's proposition that there be a public inquiry held prior to the decision had been followed. In other words, you would have had the McKinnon review mark II and then a decision. Anyway, that is just a comment. Thank you, Dr Barry and other colleagues from ANSTO.

[4.56 p.m.]

WOOD, Mr Tony (Private capacity)

CHAIR—Welcome. We do prefer that all evidence be given in public, but if at any stage you wish to give any evidence in private, you may ask to do so and we will consider the request at that time. We have a submission and a supplementary submission from you. Are there any alterations or additions that you wish to make to those submissions?

Mr Wood—No, there are not.

CHAIR—In that case, I would invite you to make a brief opening statement and then we will proceed to some questions.

Mr Wood—Before I start on my brief presentation, I would just like to correct one matter. An earlier speaker, Mr Priceman, quoted me; in fact, he misquoted me by quoting half of what I said, which gave the opposite impression from what I actually did say. I do not know whether you have this problem at times. What he said was that I had problems with the level of risk that ANSTO nominated in the EIS and that, as a consequence, I shared his safety objections to the reactor at Lucas Heights. It is true that I do not believe the very low level of risk that appears in the EIS, but it is not true that I have safety objections. I feel that if a more realistic figure were prepared that, in all probability, the reactor could be quite safely located at Lucas Heights.

If I had to sum up my concerns in one sentence, it would be that for the first time in my long association with the AAEC and ANSTO I do not feel comfortable with what the organisation is telling the public and its own staff. I am not saying that I believe that a 20 megawatt pool reactor could not be safely built and operated at Lucas Heights. On the contrary, I think it could, but it is not encouraging to hear the reactor being presented as completely innocuous when my experience and training tells me that this is not the case.

Whether the government is justified in spending that sum on the new reactor is another matter. I think it is and I would be happy to explore that in more detail in question time if you wish. You should be aware that I claim no special insight into the justification part of the proposal. A new reactor offers an opportunity for great benefits, particularly in biological research and other areas as well. However, I would not take this favourable view if I had ever heard a convincing technical argument that the reactor and its associated radioactive waste could not be safely and effectively managed here.

As to the suitability of INVAP, I think most options were closed off with the signing of the contract. I have no knowledge of the details of the contract or of the capability of INVAP, but the literature does not support the minister's claim that INVAP has a 'solid track record'. It is not that it has a poor track record. It has no track record on the reactor of significance—that is, a 20-megawatt reactor. My fairly long exposure to the engineers of Technicatome, Siemens and Atomic Energy of Canada Ltd leads me to the view that the INVAP choice, though possibly a good choice, was a risky one. When considered against the backdrop of the Collins submarine project, where we again chose to forsake experienced vendors in favour of the new boy on the block, I might even suggest that the decision was courageous. More on that later, if you wish.

I would like to concentrate now mainly on the two questions of 'nuclear liability' and 'the worst accident', because these two items are still both open to the committee to influence change, should it choose to do so. First, on nuclear liability, in our society, if we feel exposed to some risk of financial loss from the activities of some third party, we have two options: we can take out insurance, or we can accept the risk, knowing that if we are damaged later we may exercise our common law right to seek damages through the law courts. However, it would be prudent to check first on the financial status of the party we intend to sue—it could be a man of straw and not worth suing.

It is little different with respect to possible damage from nuclear installations, as Mr Priceman mentioned earlier, because we all know that we are not insured against this risk. He mentioned in Australia; I say around the world, because nobody around the world these days is insured against nuclear risk. For the last 20 years or so, all of our insurance policies have had nuclear exclusion clauses. This does not worry most of us because we are not exposed to the risk. But let us consider the people living near the reactor, who are exposed to the risk. Let us think the unthinkable: say there was a reactor accident at Lucas Heights and the affected people wanted to sue ANSTO for damages. There are no worries about ANSTO's ability to pay—the Commonwealth owns ANSTO. However, you may be aware that it is a common law requirement that, for a damages claim to be successful, the claimant must be able to establish not only that he has been damaged, but also that the damage arose from the defendant's negligence. This last part is the tricky part, because the classical defence is to show there has been no negligence. It would be claimed that either all reasonable steps had been taken or that someone else was to blame. There is no doubt that this would happen. If it did not, the crown lawyers would be in breach of their ethical duty to their client.

In the USA, this is what the Presidential Commission on Catastrophic Accidents had to say in 1988 on the effectiveness of common law in nuclear accidents, and I am quoting from the OECD report, *Liability and compensation for nuclear damage*:

> The Commission expressed the belief that applying the common law principles of actions for damages would result in an outright denial of recovery or a difficult and protracted process.

That is quite unambiguous. Other nations have recognised this too and responded, through conventions or other means, by waiving the requirement to prove negligence. They did this through legislation based on certain conventions in which the plant operator was declared absolutely liable. This removed fault from the basis of liability, just leaving causation. The citizens of Britain, USA, Canada, Japan, Germany, France and the Netherlands all enjoy this concession.

Given that the Australian government is looking for public support for the project, and given that the EIS tells us that the worst accident would have trivial consequences and hence a close to zero pay-out, one would think there would be a rush to offer this concession to Australian citizens. But no, the government has refused to offer absolute liability. As a consequence, Australians seeking compensation would have to prove negligence. Recall that the American commission said that this may amount to outright denial of recovery. You might ask: why would the government take such an extraordinarily negative position on this matter? I tried to pursue this in Canberra, with conflicting responses from two ministries. Finally I think I have a clue. It comes from a letter I received from Senator Minchin's head of science and technology policy, Dr Tucker, which says:

You have raised the issue of absolute liability. I understand this means the liability irrespective of intention or negligence. It is apparent that the issue of absolute liability has financial implications well beyond the risks associated with research reactor operations at Lucas Heights. I am informed that the Commonwealth, as a matter of financial policy, does not accept such liability.

What does this mean? I think that the lawyers and advisers in Canberra are not familiar with the concept of absolute liability and are worried and suspicious that if this is offered to the nuclear industry others will want it too. My response to this is that the lawyers in North America, Japan, Britain and other places have managed to negotiate this hurdle. Their world has not fallen in. Perhaps our people need a little shove from this committee.

Now I come to the worst part of the liability story and that is the deception part. A not so well known aspect of the nuclear liability problem is that no reactor vendor around the world would build a reactor here or anywhere else without receiving indemnity. The government's response was to produce the so-called deed of indemnity, which we heard about earlier, which indemnifies ANSTO and its officers and agents against loss. There is nothing wrong with this and the vendor was satisfied but then someone had the idea of misrepresenting the deed of indemnity as being something that it is not. ANSTO said in its submission to the parliamentary works committee:

The deed therefore ensures residents are adequately protected in terms of nuclear compensation claims.

And Senator Minchin said in a letter dated 18 February 1999, which justifies the absence of absolute indemnity, that the same ends will be achieved by alternative means. He then went on to describe these means as being the deed of indemnity. This invites us to believe that offering the assurance that ANSTO will pay its bills provides adequate compensation protection to residents and somehow this is equivalent to waiving the legal obligation to prove negligence in a court of law.

I do not know whether you would believe this but I cannot. I seek the committee's support in influencing the government to offer absolute liability then the deed of indemnity can go back to being what it truly is and that is just a means of indemnifying INVAP. The residents could then enjoy the degree of protection offered to their overseas counterparts and this at no cost to the government.

I would like to talk about the worst accident. I must say at the beginning that this has nothing to do with the safety of the particular reactor INVAP will build and its propensity to be accident free. It applies to any generic 20-megawatt pool reactor. It has nothing to do with any particular security arrangements that ANSTO may have or may implement at Lucas Heights. The issue is whether ANSTO is entitled to claim that the worst accident to which the public could be exposed would have the trivial consequences described in the EIS and even this would not be likely to occur more than once in a million years.

This claim almost invites you to identify an accident which is more likely and has worse consequences. I select the sabotage event because this has the potential to have much worse consequences and the EIS admits there is no way of assessing its likelihood. The EIS says: 'Sabotage is not amenable to quantitative assessment.' Actually this sentence is not correct because there are two parts to this question. The first concerns its probability of occurrence

which cannot be quantified. The second, about its consequences, is amenable to quantitative assessment and I believe this should be undertaken.

Let us deal first with the probability of occurrence. There is no doubt that this is very low. That is not the issue. The issue is whether a major sabotage event is impossible. I can readily recall major sabotage events which some of the world's top security services have failed to detect and prevent. I can describe lesser sabotage attacks in Australia which our own security services failed to detect and prevent. One of these was at Lucas Heights. Details of these are all in the open literature. I am not reflecting on the competence of these security services but merely on the magnitude of the task, given that the attacker can choose the timing. The world has changed over the life of the present reactor. Once a saboteur might have been a disgruntled employee or an idealist amateur crank but now we have the phenomenon of state-sponsored terrorism. Middle East oil money has funded the formal training of terrorists and equipped them with the best of weapons and most powerful explosions. Richard Butler, our ex-ambassador for disarmament, says Australia could be targeted by terrorists.

We know some people in the Indonesian army do not like us and we have trained some of them. Anyone having any doubts about the nature and extent of the worldwide threat might visit the web site of the US State Department on global terrorism. The supplementary EIS makes the following remarkable statement:

> The consequences of the Reference Accident are expected to bound those of any realistic maximum release from a credible threat scenario successfully executed.

That is a bit tortuous but I think I get the meaning. I question whether the author of this statement has ever seen a pool reactor. Pool reactors have a free water surface and this very feature, which is desirable for flexible access to the core, also makes it vulnerable. The EIS claims credit for the massive reinforced concrete block of the pool but this is the very thing which would direct the force of an explosion into the reactor core and expel fuel and water.

What am I seeking, or rather, what am I not seeking? I am not seeking a major improvement in security arrangements—I acknowledge that the risk is low. I have confidence that the security arrangements will match the perceived threat. 'Perceived' is the critical word here. Good security can reduce the probability of sabotage but not eliminate it. That being the case, the public is entitled to know the consequences of sabotage and be confident the evaluation is of a worst case. I believe that, when evaluated, the consequences would be acceptable.

I seek the committee's support in having an assessment done and the results published of a true upper-bound event based on major sabotage. Details of the analysis need not be made public. When it comes to the confidential assumptions about types and quantities of explosives which could realistically be used I would like to see input from SAS or other military experts because I believe, in the light of what has been said on this topic in the EIS, a degree of realism is missing at ANSTO.

Call this a maximum hypothetical event if you wish and let the reference accident remain as a maximum in plant accident. This might help to remove the present anomaly where we have a disaster plan called a DISPLAN while at the same time claiming there is no possibility of a disaster. Thank you for listening to me. I would be happy to answer questions.

CHAIR—Thank you, Mr Wood. I just start off by taking you to the issues surrounding the awarding of the contract to INVAP. In your written submission you state that you are a little concerned that Argentina was announced as the preferred bidder. You said that you are not in a position to be too critical. But then in reading your submission I detect that you have some serious concerns based upon your experience about both within ANSTO and with regard to INVAP that the level of expertise and the track record are just not there.

Firstly, could you just elaborate on what your major concerns are about INVAP? Secondly, one of the difficulties that this committee could have is being able to get inside the process if it is all treated as commercial-in-confidence and so on. How do you believe that the public could be assured that everything that is promised is delivered and that it is all okay? Is there a means that we can pursue to do that?

Mr Wood—There is a group of people out at Lucas Heights at ANSTO who are operating HIFAR at the moment. They are a dedicated group and I think they are doing a good job. The whole profile of the establishment has changed over the years from where it was a reactor oriented site many years ago to now when it is not. There is nothing wrong with that. Times change and policies change. But the fact remains that there are very few hard-nosed reactor engineers at ANSTO at the moment. Furthermore—

CHAIR—Why is that? Is it because they are involved in radiopharmaceuticals?

Mr Wood—No, it has nothing to do with radiopharmaceuticals. It is to do with the fact that 20 years ago the mission of the site was to develop a reactor so we had all sorts of skills available there. If those skills were available now there would be no worries. In fact, they could probably build the reactor themselves without any help from anybody. But because times have changed, and government policies have changed, those skills have mainly gone, or at least the large backup. There are physicists out there. I saw one of them here a little while ago. I know he is a good physicist. There is just not the depth of technical expertise that there used to be. I am not condemning that. I am just saying that is the way things are now.

So what happens is that when you go to buy a reactor you are in the hands, to a fair degree, of the reactor vendor—the man who is supplying the reactor. I was a little bit concerned. When I say 'concerned', I am not saying that I think this is going to collapse in a big heap. I use the word 'risky'. It is risky because this company that we have signed a contract with has not had very much experience in building 20-megawatt reactors. They have built one, but it has only been going for a short time and you would not really know. When HIFAR was first built, within a year or two the heat exchanges failed, and all three main heat exchanges had to be replaced.

CHAIR—So whilst it may not be necessarily a direct safety issue, what you are also saying is that it goes to the efficiency and the quality; that is, at the end of the day you do not want to get a product that is either a dud or is just nowhere near what you are expecting to get.

Mr Wood—I would not like to be misunderstood here. What I am saying is that, if you do not have a lot of in-house skills yourself, the safe way is to go to somebody who does have these in-house skills. The French and the Germans and the Canadians do. The French have built superb reactors and they have been operating them for years and years and so they have the technique, for example, from that point of view. I can well understand ANSTO's position.

Another contractor comes along, INVAP, who is a new boy on the block. He is dying to sell a reactor to Australia because Australia probably would be seen as being an intelligent purchaser, and this would make his name. So he will do anything to get that contract.

It may well be that Australia is better off dealing with some enthusiast like that than one of the old experienced hands, but it is risky because we do not have the in-house skills to be able to properly assess what is happening. They will put up a proposal and we have to say that we do not like this because of so and so. The people that we have at ANSTO at the moment are busy trying to operate the reactor. Some of them have been busy on this reactor project so far but only on the contractual side and the tender assessment side. They cannot be expected to operate HIFAR and do these other things as well. They do not have the skills anyhow because the site is so light in this area.

CHAIR—What about ARPANSA? They are the body that is supposed to be the check, if you like, that is charged with issuing the licences on the basis that everything is okay.

Mr Wood—That is a very good question you have raised. The answer to it is that ARPANSA have an important role to play on the safety side and it is not the role that I am talking about. They would examine the proposals of the contract and the specification and so forth. The people who have actually built and operated reactors for years and years have got a great depth of in-house skills which would prevent things happening where, as I mentioned with HIFAR, the heat exchanges failed. Not only the heat exchanges, in HIFAR, the thermal shield cooling system failed after a few years. These are systems which, if you are dealing with the experienced vendor, you do not expect to get; if you are dealing with an inexperienced one, you may well get a better price. There may be all sorts of benefits associated with dealing with the inexperienced one who is really highly motivated to help you, but it is risky. That is the only point I make.

CHAIR—Let us assume that what you are saying is a fact. Who could undertake this task? What do you suggest that we recommend to do with that issue—because this is some sort of peer review, isn't it?

Mr Wood—I think ANSTO needs to get some hard-nosed engineers. At the moment, my criticism is that, from where I sit, there is a group of people running the project who are competent in their own field, but it is mainly theoretical; they are mainly scientists. I would like to see some hard-nosed engineers who understand fatigue, corrosion and things like this which do not come up in probabilistic risk analysis.

CHAIR—Would it have been a possible approach to go and, in effect, purchase a reactor off the shelf?

Mr Wood—That is what we are doing.

CHAIR—Maybe I have a different meaning to yours. As I understand it, ANSTO put certain specifications to the tenderers and were looking for innovation. What I am getting at is that rather than undertake the process in this way—where you select a tenderer, sign a contract and say, 'Now, you design us a reactor and then build it'—could we have said, 'We want a reactor like the one that exists somewhere else.' That is what I meant by 'off the shelf': something that

already exists and could be built here, either replicated or adapted. Would that have been an option?

Mr Wood—Quite right. We could have said to Siemens, 'We want one just like the one you recently built in Indonesia.'

CHAIR—Would that have been a sensible proposition, as an alternative to what we have done?

Mr Wood—Not necessarily. I told you a while ago that I was a supporter of the project. One reason I support the project is that I see one field of science which has got a great future, which is going to expand largely in the next 20 or 30 years—from the point of view of not only prestige and advancement but also financial rewards—and that is biological science. One of the best tools for promoting biological science is the slow neutrons that are produced in the cold source in the reactor. I am not too sure now—I am a little bit removed from the Indonesian reactor—but I do not really think that this feature is being promoted in that one.

CHAIR—So what you are saying is that there is nothing out there at the moment that would deliver all we want.

Mr Wood—No; I am not saying that either. I am saying that, had we gone to the Germans or the French and said, 'This is what we want,' I am sure we would have paid more for it—which might have meant we could not afford it—but we would have ended up with the expertise that they have developed over the years built in to the thing. Do you see what I mean?

CHAIR—I understand what you are saying. How long had you been at ANSTO before you retired?

Mr Wood—I joined ANSTO in 1960, and I was one of the first shift supervisors on HIFAR when it first went to power.

CHAIR—It was built in the mid-fifties, wasn't it?

Mr Wood—It was built in the 1950s, and went critical in 1958. They spent two years on low-powered runs; then they decided they needed to get some professional engineers to run the shift, and I was one of those appointed.

CHAIR—In those days, the area was less developed than it is now. I have two questions. If we were proposing to build a new reactor today, and there was no establishment at Lucas Heights, do you think it would be appropriate to put it there? I ask you to answer that question in conjunction with this question: if the decision had been to put this new reactor not at Lucas Heights but at another suitable location—away from residential areas but still within a reasonable transport link distance and so on—would that have caused any problems for those in Australia who rely upon using a reactor?

Mr Wood—Not at all. Prior to HIFAR being sited there, the Atomic Energy Commission wanted to build a reactor at the Maroubra rifle range. They hired an expert from the UK, Dr Marley, who came over here and had a good look. He said, 'I really wouldn't build it there; it is

a bit too close to the population centres.' Because the chairman at the time was an ex-military man, they went out to the Holsworthy area and picked on the Lucas Height site. I will be quite frank with you, Lucas Heights is not my preferred site.

CHAIR—Would you like to tell us what is?

Mr Wood—I could tell you, yes. The reason it is not my preferred site is that although I believe there is an extremely low level of risk to the population of Lucas Heights and Menai, and what have you, it is a risk I do not think they really needed to take. For the same argument that Dr Marley used with the Maroubra rifle range, I would prefer to go a bit further. But the critical question was: would you get another site? Would it be politically acceptable to go to another site? I think the government decided that it was not. The next question you have to ask is: would Lucas Heights be an acceptable site even though it might not be your preferred site?' I would say, yes. I say that a reactor could be built—I am not saying it would be built—at Lucas Heights and operated mainly quite safely as far as the population was concerned. But you need to be careful on the difference between could and would.

CHAIR—If you do not ask the question in the first place, you do not have to worry about the answer.

Senator LIGHTFOOT—Mr Wood, you said that to some degree the purchasers are in the hands of the vendor, but you always are with any major engineering project, aren't you?

Mr Wood—That is true.

Senator LIGHTFOOT—Siemens would have had at some stage built their first reactor.

Mr Wood—Of course, yes.

Senator LIGHTFOOT—And the French and there was one CANDU built first.

Mr Wood—It is just that these people have built reactors, operated them and ironed the bugs out.

Senator LIGHTFOOT—Yes. One would assume that some nuclear engineering devices, facilities, even those that have patents on them are transferable and that makes them far easier and safer to build today than, say, the old Magnavox of the 1950s that Britain built, and which I have seen. Isn't that true? You are not trying to give the impression that this is virtually a new science for INVAP, but it may be construed that you are giving that impression.

Mr Wood—When Ford bring out a new model car, there are usually a few bugs in it. And how many years have they been making cars?

Senator LIGHTFOOT—But there are less bugs now than there were in the model T?

Mr Wood—Yes. I have never said that I do not think INVAP could do the job. I am just saying it is risky.

Senator LIGHTFOOT—Yes, that is what I did not want you to say. To go back to your analogy of the motor car, even though there are still bugs in the motor car today, Henry Ford put them on a chain and mass produced them and there are not the bugs today that they had back in those model T days. If you wanted to build a car today, you would probably get Ford, but I am sure that Nissan, Kia or other producers from developing countries have a look at Ford and use their technology. You can produce a car today that is much safer than it was back in the 1920s when Henry Ford built his. That is really the point I am trying to make. There may very well be some bugs, but as far as I know, there are three or even four of these INVAP reactors operating now. There is one in Egypt, one in Peru, one in the Argentine and I think there is one in Morocco.

Mr Wood—I don't count those little ones.

Senator LIGHTFOOT—These are Third World countries, or developing countries, which I think is the politically correct term today. Notwithstanding that, I am sure that there would be some, and you would have knowledge of some, given your lifelong interest in the nuclear industry. I have not heard of anything personally. I mean, I am on the mailing list of the Uranium Institute and they send me things once a month or whenever they find it interesting, and I appreciate that.

Mr Wood—Can I make one point? When I say 'risky,' I am not talking about risky from the safety of the public point of the view, I am talking about financial risk. In other words, I think that you might find that some vital part corrodes, or you might find that in your safety system, for example, some components keep failing and something does not do quite what it should do and you have got to go back and refit, or you might want to make some modification and you find you cannot do it because of something that the vendor has done. I do not think for one moment that a reactor that INVAP would build would pose a great threat to the public that a reactor that Siemens might build would not, but I am saying that if you want to be on the safe side then you buy something from somebody who has been doing it for a long time, and if you can get a good deal like a lower price or a large local content or something, you might decide to take the risk. We have probably all done this with our houses. When we get the contractor to come in to do something we might take the cheapest quote, knowing that we take a bit of risk with this bloke but his price is so good that we cannot pass him up. That is the sort of thing that I see happening here.

Senator LIGHTFOOT—But often the first step in life means that you can go on a great journey without making too many mistakes. Mao Tse-tung said that the Great March began with a single step. I do not often quote Mao, but on this occasion I thought it appropriate. But the deal here is not the fact that we are buying a reactor 'off the shelf', not like we could have bought a submarine off the shelf instead of the billion dollars plus that we are now paying for submarines, it is that we are doing a joint venture with Australia, with ANSTO engineers, and with your colleagues who have built up 40 years of experience. There will be few of those, but there will be some. I hope they call on people like you if they look for some expert advice, and I am sure you would be a great addition and a great fillip to the safety factor in this INVAP reactor. So it is not merely transfer of the knocked down version of a nuclear power plant and we are going to put it together here with a socket wrench and a shifting spanner, it is going to be a joint venture. That means that the expertise is combined with that of the Argentine and the Australians. Do you accept that?

Mr Wood—Not really, no.

Senator LIGHTFOOT—Tell me what you accept.

Mr Wood—It is a joint venture up to a point. It is a joint venture in so far as INVAP has made some arrangement with some Australian companies to do civil engineering work, and I have got no worries about that.

Senator LIGHTFOOT—And ANSTO will not be playing any part?

Mr Wood—ANSTO will be playing a part, but—

Senator LIGHTFOOT—They will be playing a significant role, won't they?

Mr Wood—ANSTO is really buying something off the shelf. It is not a joint venture in so far as ANSTO and INVAP are working together for the development of this reactor. ANSTO has written a specification, there is a fixed price, and there is a fixed time. It is up to INVAP to produce the design, get the approval for the design, and build the reactor with some Australian companies. ANSTO's only role is to comment on the design or whatever and say whether they agree or whether they have some problems with it. I am sure INVAP would try to address those problems.

Senator LIGHTFOOT—My understanding was that, in rounded figures, 50 per cent of the cost of the reactor would be sourced from Australia.

Mr Wood—That's right, because that is where the money is, in the civil work.

Senator LIGHTFOOT—It could almost be described as a 50/50 joint venture then if 50 per cent is going to be sourced from Australia.

Mr Wood—Yes, okay, but not from ANSTO. ANSTO's contribution is going to be fairly small in terms of money. However, and I have forgotten now the name of the Australian civil engineering company—

CHAIR— Transfield, is it? We will check that.

Mr Wood—Whoever it is; I think they are all good Australian companies. I have got no worries about whether, when they pour the pool, there is going to be the right amount of rebar in the pool and the stress analysis will be done well. I have got no worries about that. In that sense it is a joint venture.

Senator LIGHTFOOT—And the reinforced steel will be the right tensile strength?

Mr Wood—Yes, sure.

Senator LIGHTFOOT—And it will be of a certain age, it will be a specified diameter and it will be so many kilos per square metre, and the concrete itself will be tested and so on.

Mr Wood—Yes. A reactor is more than that.

Senator LIGHTFOOT—I understand. Mr Wood, I am not trying to beat you—that is your game, it is not mine and I would not dare try that. It is, nonetheless, an integral part of the facility?

Mr Wood—Of course, yes.

Senator LIGHTFOOT—It could not function, possibly, without it?

Mr Wood—No, quite.

Senator LIGHTFOOT—I think I have made the points that I really wanted to. Incidentally, you would be aware that there are ANSTO people here. The evidence we have had today from ANSTO is that there are some of their senior staff in the Argentine overseeing this now, and that other expertise is being sourced from the UK and the USA. This is the evidence we have had this afternoon; I do not know whether you were here.

Mr Wood—All I am saying is that ANSTO is thin on the ground when it comes to experienced reactor engineers. We have got plenty of scientists out there, because science has been the field, but now we are talking about procuring a reactor. We need engineers, but we are thin on the ground with engineers because the site has changed its whole mission.

Senator LIGHTFOOT—Yes, and it has been 40 years now since engineers have participated hands-on in building a reactor, for the most part. There are some people that come from overseas, for whom it is a much shorter period since they have had hands-on experience with new reactors.

In the short time still available to me, could I get back and perhaps use your particular knowledge, which is extensive, with respect to the liability and the insurance of reactors throughout the world. I did not catch everything you were saying—I was pretty preoccupied with a phone call and other sorts of things—but I have a few notes here that in the US the Price Anderson Act gave US$10 billion or something like that inside the US and $10 billion outside the US. I am not too sure whether that is the liability on the operator, or whether that liability in the United States is with respect to the United States government. Are you aware of that? I think it is the operator.

Mr Wood—The US system is a little bit more complicated than some of the others. I think private organisations building reactors had to take out some insurance, but the Price Anderson Act ensured that there were sufficient funds available, up to a certain amount. I have forgotten the numbers now. On this question of the absolute liability, that does exist in the United States. It is done in a little more roundabout way than elsewhere. In those countries in Europe, for example, that have signed the Brussels agreement and what have you, and have brought in their legislation in that way, it is all straightforward. The Americans have done it in a slightly different way, but they do have this absolute liability which I think the Australian government should give to the people that live out at Lucas Heights. It would cost our government nothing to do it, but for some reason they do not want to do it. It is part of the American system. It is a more complicated system, but the operator has absolute liability.

Senator LIGHTFOOT—But there are conventions that we are signatory to. I am not sure whether we are signatory to the Paris convention or the Vienna convention, but I think we are signatories to the maritime convention which forms part of this insurance—

Mr Wood—I have got a letter in my bag over there from the minister for the environment, who says that we have signed some supplementary treaty but we are not going to actually ratify it until two-thirds of the other signatories also ratify it. He said, 'When that does happen, then we will bring in enabling legislation in Australia and then absolute liability will be provided.'

Senator LIGHTFOOT—By whom, the government?

Mr Wood—By the government. That is what he says. Senator Minchin says something quite different. I do not know whom to believe, but if the first man, the minister for the environment, is right, then I cannot see why they cannot do it now.

Senator LIGHTFOOT—And ratify it.

Mr Wood—Whether they ratify it or not, there is nothing to stop them right now bringing in an act—and they might not even have to bring in an act—which offers absolute liability to the Australian people. It will cost them nothing. I hope that your committee will give them a bit of a nudge and help do it because it seems so obvious.

Senator LIGHTFOOT—But that does not mean that in the most unlikely event of an accident—which you qualified your statement with—there could not be other claims such as common law claims or class action claims, does it?

Mr Wood—I am saying that there would normally be common law claims. That is what you would hope would happen. I have heard the government talk about ex gratia payments. I think that is a really bad idea because you get inconsistency. The recipient is down on his bended knee hoping for the best whereas, if you have the normal legal system, you go into the court and you produce the case and the judge awards something. But the judge is not allowed to award you at the moment unless you prove that ANSTO was negligent. There are so many ways in which the defendant here can avoid the negligent claim. If you cannot prove negligence, you do not get it.

Senator LIGHTFOOT—But there is still the class action: the Papua New Guinea class action.

Mr Wood—If it is class action it is still common law.

Senator LIGHTFOOT—That is right.

Mr Wood—The common law has this—

Senator LIGHTFOOT—That cannot be legislated away though.

Mr Wood—Yes, you can. All you have to do is to say—

CHAIR—Can we move on, Senator.

Senator LIGHTFOOT—I thought it was important.

CHAIR—It is important. I do not want to truncate proceedings.

Senator LIGHTFOOT—Mr Chairman, I see no reason why you should change now. That is all my questioning, Mr Wood. Thank you very much.

Senator McLUCAS—We have heard all sorts of things about the Egyptian INVAP installation. Do you have any information about how successful that project has been or otherwise?

Mr Wood—No, I do not. I am aware that INVAP has built a reactor. Our reactor here operates all the time except when it is down for refuelling. I have heard that that has not been the case there. Whether that is true or not, I do not know. If it is true, I do not know whether it is due to some mechanical problems. Sometimes, of course, these people do not use their reactors just to save fuel because it costs so much to buy fuel.

Senator McLUCAS—The Sutherland Shire Council has suggested that, as part of the design licensing process, there be some type of public hearing. It would be, I dare say, some sort of technical review that allows broader participation in assessing that design. Would that process assist in that notion of project management that you were talking about with Senator Forshaw before?

Mr Wood—Do you mean a public hearing at the time when the design is approved?

Senator McLUCAS—Yes, approval through the licensing of that design.

Mr Wood—It could. At the moment, I would like someone to tell ANSTO to go and get some experienced engineers. They would not take any notice of me if I asked them to do it but they might if there was a public hearing and some committee asked them to do it.

Senator McLUCAS—I think the recommendation from Sutherland Shire is not a hearing of this nature but a hearing that is more technically focused but allows public scrutiny.

Mr Wood—Once you have built the reactor, if this is before you operate it, by this time you have committed yourself to a large sum of money and there is a limit to the number of things you can do. Most of the people who would be making suggestions probably would not be technically qualified to make the suggestions anyhow. This is the point if it is a public hearing.

CHAIR—But in that context, ordinarily in respect of any other developments the council is able to have its officers, and any experts that it engages, go onto a site and check progress and monitor—

Mr Wood—Did you say the council can do that?

CHAIR—Yes. This point has been raised by the council, that under what is happening here it is shut out of the process because it is a Commonwealth project. As I understand it, they would see that that process would enable them as a council, with the expertise that they can call on both internally and externally, to be able to question and to raise issues that they otherwise can only raise—

Mr Wood—I am all for ANSTO interacting with the community and interacting with the council. But once you start getting into the technical areas, it is not just like building a house. Even when you are building a house, the council officers are ex-builders so they know something about building houses. But we already have a technical organisation, ARPANSA, that is supposed to be looking at that and being able to do exactly that on the safety side of things. It is Commonwealth policy. They cooperate, but they do not permit a council officer to come in and say, 'You have to tear that thing down because it is too close to the fence.' I think ARPANSA has a role to play. Whether they will play it or not we do not know yet, we have not seen them in action. But as far as the council is concerned, I think the organisation should try to bring the council into its confidence. That public committee that existed in the old days, the AAEC or ANSTO, worked quite well. There might have been some people who did not like it, but by and large people got to know each other. At the meetings I attended the ANSTO people there were very cooperative and friendly. There was a friendly atmosphere and a good exchange of information. I am all for that.

Senator McLUCAS—I have a question that we have touched on earlier today, the role of ARPANSA. It joins the process when we are halfway down the road. They have the responsibility for licensing the design. Have we put ARPANSA in such a difficult position that they will find it almost impossible to do anything other than license the design?

Mr Wood—I do not think I can answer that one. I have not seen the contract so I do not really know what the deal is. I really do not know.

Senator McLUCAS—It goes through my mind that the way that the whole process has been constructed, by releasing a design and construct contract, it means that it loses those checks and balances that you have been referring to earlier.

Mr Wood—I can tell you of my experience in the refurbishing of HIFAR some years ago when I was in charge of the project. One decision we made, which I think was a poor decision, was to separate the design from the construction. We hired one company to do the design and then we thought we would hire an Australian company to do the construction. I do not think that worked nearly as well as it would have if we had just hired the one company to do the design and the construction because it is so easy for each one to blame the other when something goes wrong.

Senator McLUCAS—Did you have the capacity within ANSTO at that time to provide that project management?

Mr Wood—For the job that we were doing at the time I think we did. We had a team of engineers. But, as I say, we left a gap there between the man who does the design and the man who does the construct. The man who does the construct says it is a lousy design and the man that who does the design says the other person did not build it to my design.

CHAIR—Just a final question, given your long history of involvement with ANSTO: what happened with the decision to build the nuclear power plant at Jervis Bay? As I understand it, a decision was made, work was commenced and then it stopped. I cannot recall why. Can you tell me?

Mr Wood—I think I can fill you in on that. I think it was another problem, in a way, a little bit similar to what we have here: it was a cost problem. The old Atomic Energy Commission gave the government what it estimated to be its cost figure, and in the meantime it started work on building the road to take the heavy equipment down to Jervis Bay, to Murrays Beach. But what happened was that the bids came in higher. It would have been a bargain if they had actually built that reactor, from the point of view of what it would cost today, but the bids came in a bit high and there was a change of government.

CHAIR—When was this, do you remember?

Mr Wood—It was 1971 or 1972, somewhere around that time. The Atomic Energy Commission people here did not play their cards too well, I think. They were a bit aloof and they got the Treasurer, Billy McMahon, offside. Then Gorton went and sacked himself—he voted himself out of office—and McMahon got in, and that was the end of the project. The easy way out was to say that the bid came in too high. It was not that high, but it was high enough.

CHAIR—Thank you very much, Mr Wood, for your evidence and your submission. It has been a long day, and I thank everybody for appearing and I thank Hansard.

Committee adjourned at 5.52 p.m.