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JOINT COMMITTEE ON PUBLIC WORKS

Reference: Replacement nuclear research reactor, Lucas Heights, Sydney

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JOINT COMMITTEE ON PUBLIC WORKS

Friday, 14 May 1999

Members: Mrs Moylan *(Chair)*, Mrs Crosio *(Vice-Chair)*, Senators Calvert, Ferguson and Murphy and Mr Forrest, Mr Hollis, Mr Lindsay and Mr Ripoll

Senators and members in attendance: Senators Ferguson and Murphy and Mrs Crosio, Mr Forrest, Mr Hollis and Mrs Moylan

Terms of reference for the inquiry:

Replacement nuclear research reactor, Lucas Heights, Sydney

WITNESSES

Committee met at 9.03 a.m.

CAMERON, Dr Ronald, Director, Safety Division, Australian Nuclear Science and Technology Organisation

GARNETT, Professor Helen, Chief Executive, Australian Nuclear Science and Technology Organisation

HORLOCK, Mr Ken, Director, Nuclear Technology, Australian Nuclear Science and Technology Organisation

SEABORNE, Mr Garry, Project Manager, Australian Nuclear Science and Technology Organisation

CHAIR—Good morning and welcome to this public hearing of the Parliamentary Standing Committee on Public Works. I now recall officers from ANSTO. I remind witnesses that they are still under oath and I invite ANSTO to make a brief opening statement.

Prof. Garnett—Thank you, Madam Chair. ANSTO welcomes the opportunity to meet again with the Parliamentary Standing Committee on Public Works to consider outstanding questions and issues that no doubt were raised during the public hearings last week. I appreciate the opportunity to make a brief statement. We would like to cover a few issues.

A large number of issues were raised in the public hearings last week covering all facets of the replacement reactor project, including the initial decision, justification for the project, environmental assessment, tendering process, reactor design, construction, commissioning, operation and decommissioning. There were also some specific issues raised about public consultation, public liability, health impacts, operational history at ANSTO and waste concerns.

These issues were examined in detail in the EIS and in particular the safety related submission by ANSTO, and its consultant was subject to international review by UK and US consultants, by the International Atomic Energy Agency and by Environment Australia. The additional issues raised by public submissions to the draft EIS were also put out for independent assessment by Environment Australia. These reviews have been unanimous in their conclusion that the potential health and safety risks are extremely small and that ANSTO's emissions are well within international standards. Indeed, these conclusions are in this regard completely in accord with those from the Research Reactor Review in 1993.

In relation to atmospheric emissions and liquid emissions from the Lucas Heights site which were raised by a number of environmental groups and members of the community, I would restate a statement that I made last week: ANSTO has never breached its allowable emission levels and there have never been any incidents with public health consequences over the 40 years of site operations. The emissions at ANSTO are indeed minimal and on a scale—living a normal life around ANSTO gives a member of the public 1,800 units of dose from radiation. The maximum dose additional to that 1,800 from ANSTO is 10 units. Living in Canberra or living in the Blue Mountains normally gives a dose of 2,100 units, a

significantly greater amount. And with a return flight to Melbourne from Sydney, every flight gives 10 units. I use this to put in perspective the impact of the Lucas Heights operation.

The EIS was reviewed by the Minister for the Environment and Heritage and a number of representations have been made, including recommendations to ensure that best practice is a feature of ANSTO's forward environment management—a principle that is already espoused in our health safety and environment policy. Over the past few years, we have worked hard to enhance the safety culture of ANSTO in the organisation even more. This requires that all events, no matter how small, be reported upwards to enable appropriate judgments to be made about impact and lessons that can be learnt. This practice extends to the top of the organisation as ANSTO has reported events to the Safety Review Committee, the Nuclear Safety Bureau, ARPANSA or state authorities, depending on the event, even when there has been no requirement to do so—a practice consistent with the development of an open and transparent safety culture.

I would like to comment on two other issues. In relation to the estimated cost of the replacement reactor, I would like to restate some issues that were raised last week. The costs were based on estimates provided by a range of reactor vendors. Given that 50 per cent of the content—essentially civil engineering works—will be Australian, the appropriate Australian construction indices were used for the assessment of the cost of this component. The resulting estimates and the derivation of them were reviewed by a consortium with civil and nuclear expertise. The resulting projected costs align well with the published costs for recently completed facilities and those for which construction is imminent overseas. I have referred previously to facilities under construction or planned in Canada and elsewhere.

The contract will detail what is to be delivered, and contract variations are not to be considered. The reference to rise and fall made last week was only in respect of any adjustment within the department of finance parameters for CPI adjustments, which is normal practice for a project of this nature. I also have the requested advice on GST which I will provide. ANSTO wishes to reassure the committee that it intends to remain within the January 1997 baseline costing, adjusted only in accordance with the Commonwealth Department of Finance and Administration parameters.

Another issue is in relation to operational costs for the replacement reactor. The $12 million which we have identified covers all reactor operations and associated safety. It includes maintenance, including preventative maintenance, and upgrading on a regular basis which minimises the need for one-off large expenditures. It covers waste management and it includes the cost of fresh fuel and the management of spent fuel—including shipping, reprocessing and return of intermediate level waste to Australia in qualified storage containers.

In relation to waste management, the committee will be aware of Minister Minchin's announcement on the commencement of drilling in South Australia in relation to the national waste repository to which the low level and short-lived intermediate level waste stored at ANSTO and elsewhere around the country will go. Thank you.

Mr HOLLIS—Can we just get that one clear: that repository is only for low level waste, that it is not for high level or however you defined it.

Mrs CROSIO—It is not for intermediate either.

Prof. Garnett—It is for low level and short-lived intermediate level waste.

Mr HOLLIS—So that means gloves, watch faces and all that sort of thing?

Prof. Garnett—It is for low level and short-lived intermediate level waste. The intent is for collocation of a store for the longer lived intermediate level waste.

Mrs CROSIO—Has that decision been made?

Prof. Garnett—I understand an in-principle agreement was reached at meetings that it would be investigated for appropriateness, but that was what was desired. That was a result of a meeting that included Commonwealth and state department officials.

Mrs CROSIO—I stand to be corrected, similar to my colleague Mr Hollis, because following a question I asked at that same time about a decision being made in South Australia, I went out and further investigated that. A decision at this stage has only been made for very, very limited waste that is nothing to do with what ANSTO is now storing.

Prof. Garnett—That is not true. All of those drums that you saw at ANSTO, all of that material will go to the repository in South Australia.

Mrs CROSIO—And you classify that as low level waste?

Prof. Garnett—That is all low level waste.

Mrs CROSIO—What is the life of that in the drums?

Dr Cameron—It is very difficult to give one figure because—

Mrs CROSIO—Could you tell me what is it? It is more than heavy water, it is waste product that comes from the actual reactor over the years it has been operating, is it not?

Dr Cameron—It is waste products that come from all the activities on the site.

Prof. Garnett—We can provide you also with some figures as to the proportion of waste at the new facility compared with the overall waste arisings in Australia will produce.

Mrs CROSIO—Could you provide the committee with a copy of the decision that was made that instructed or informed ANSTO that they could now have that type of waste go when this repository is put in place?

Prof. Garnett—We do not have such an instruction. What we have is the national committee that is working on this. There are clear definitions internationally on what is

meant by ‘low level’, ‘short-lived intermediate level’ and ‘longer-lived intermediate level’ waste. The only wastes which exist in Australia—and I restate that ANSTO is not the major holder of wastes in Australia, contrary to popular opinion.

Mrs CROSIO—It would have to be the major holder of radioactive waste—

Prof. Garnett—No, that is not true.

CHAIR—Didn’t I hear somewhere that you had 1,400 rods stored?

Prof. Garnett—No, the rods will go to—

CHAIR—But they are at the moment, aren’t they?

Prof. Garnett—They are there and they will go to France and be processed. They will come back as—

CHAIR—Providing there is no legal impediments to COGEMA being able to—

Prof. Garnett—There is no prosecution against COGEMA. An issue has been raised by an environment group, and there is what is called an inquiry into the issue. It is not into their operations, not into what they are doing, not into any of their emissions. The charge has simply been that they held, in the view of these opponents, some rods for longer than maybe they should have before they reprocessed them. It is nothing to do with the quality, efficiency or safety of COGEMA’s operations.

CHAIR—In one of the first and earlier reports—I can’t recall the name of it—which looked at whether we should have a new replacement reactor, the recommendation to government was that yes, we should but providing certain things were done. One of those things was to ensure that we could provide for the disposal of the waste product.

Prof. Garnett—The management of the waste.

CHAIR—And that seems far from being settled at this point.

Prof. Garnett—I think we would disagree on that. The issue of low and short-lived intermediate level waste which will go to the national repository—

Mrs CROSIO—In South Australia.

Prof. Garnett—In South Australia.

Mrs CROSIO—At the site that has now been chosen?

Prof. Garnett—In the location that has been chosen.

CHAIR—What if during the deliberations it is decided that that site is not suitable or there is sufficient public outcry—

Mrs CROSIO—And the South Australian government will not accept it.

CHAIR—that the South Australian government rejects that site. Where do we go from there?

Prof. Garnett—I appreciate, Madam Chair, that that is a concern or issue that people might raise. But my understanding is that they have gone through a three phase process of identifying this location. They have had extensive consultation, and I think you could find that out from the Department of Industry, Science and Resources.

CHAIR—I realise it is something for the government to resolve.

Prof. Garnett—The location has been chosen and the drilling has commenced. Of the current estimated volumes of waste to be accepted at the repository, ANSTO currently has 1,080 cubic metres; the states and territories, the Department of Defence and the CSIRO between them have well over 2,000 cubic metres. So the arisings from ANSTO are probably less than one-third of the what the current arisings in Australia are.

Mrs CROSIO—I don't think 1,080 cubic metres is one-third of 2,000 cubic metres.

Prof. Garnett—A third of the total: we are one-third and the other is two-thirds.

CHAIR—I want to go back to something in your opening statement about the strict guidelines for testing of water and air emissions and the fact that you have never been in breach of the guidelines. But, as I understand it, there is no independent body doing those tests. That is done by ANSTO. So the public has to take the word of ANSTO on that.

Prof. Garnett—That is not correct.

Dr Cameron—That is not correct.

CHAIR—How often does some independent body test, and who is it?

Dr Cameron—The process which is currently in place is that both the techniques we use in measurement are regularly audited by the Australian Radiation Laboratory in Melbourne, who are now part of ARPANSA. Likewise, on a regular basis they take samples from us and they crosscheck our measurements against theirs.

CHAIR—What is a regular basis?

Dr Cameron—They essentially do that on a random basis. It turns out that about once a month they would take liquid samples. They would request them. They do not give us any notice of when they will take the samples. They ring up and say, 'Please provide us with the samples for a particular day.' In addition to the samples which we test, we have to retain samples for them.

CHAIR—They do not come in and actually take the samples themselves: you provide the samples?

Dr Cameron—We provide the samples, because the samples are out of the tanks prior to discharge. As we make a discharge from the tanks, we retain part of that for testing purposes by the Australian Radiation Laboratory in Melbourne. They provide a regular report on all of those measurements. They have been able to confirm over the years they have been doing this that there is no disagreement between their measurements of the activity in that discharge and the measurements which we are making and which we report in our annual environment report.

CHAIR—It is possible though for you to provide any water, isn't it, technically? I am not casting any doubt on your credibility. We have a situation where we have a fair body of the public concerned not so much about the safety of the nuclear reactor but about the waste products from that, emissions into the air and into the water, and also how we manage the waste products in the longer term. I think there is an issue here. We need to be able to assure the public that there is some separation and that there is a proper watchdog, if you like, on both air emissions and liquid emissions.

Prof. Garnett—In addition to what Dr Cameron has said, clearly, once the material leaves the Lucas Heights property it goes into facilities that are administered by the state—

CHAIR—Yes, I appreciate that.

Prof. Garnett—There are Sydney Water sampling points. Sydney Water does sample.

CHAIR—But how would anyone know if someone from your facility just went and got any sort of water from anywhere and sent it and said, 'This is the sample'?

Prof. Garnett—No, they sample themselves. I am talking about what goes off.

CHAIR—You send the sample though?

Prof. Garnett—I am saying that the normal practice of what happens on-site consists of three things: all of our instruments and the methodology is audited to make sure that the assessment, the tests, are appropriately undertaken. We are involved in standardisation and crosschecking of that on a regular basis. In addition to that, we take samples every time something is discharged, and they are appropriately labelled and recorded. If that has not happened, if somebody does make a mistake or does not do something, I honestly believe that it would be found out, because the safety culture in the organisation is for people to make sure that that sort of thing is done properly.

CHAIR—But, in a worst case scenario, anyone could put anything in that vial and send it off—

Prof. Garnett—If I could finish, when the material goes to ARL—or ARPANSA as they are now—but ARPANSA has the right to come in at any time and take samples themselves. They have done that in the past.

CHAIR—How often?

Prof. Garnett—They do not do that on a monthly basis but they certainly come and do it.

CHAIR—How often would it have been done last year?

Mrs CROSIO—They have only been in existence officially since February.

Prof. Garnett—No, that is not true, with all due respect. ARPANSA has been formed as a merger of the Australian Radiation Laboratory and the Nuclear Safety Bureau. Both of them existed before and both of them had rights.

Mrs CROSIO—So it was them that came and took the samples?

Prof. Garnett—Correct.

Mrs CROSIO—But that is now ARPANSA?

Prof. Garnett—They are now ARPANSA. Both of those have merged. In fact, there is a carry forward of the responsibilities that were previously NSB and the responsibilities that were previously ARL.

Mrs CROSIO—So you are suggesting that we get the information from them on how often they have gone and taken samples in their records. You have not got it on record.

Dr Cameron—They produce a report of all their activities with regard to the verification of our discharges.

CHAIR—Can we go back to know how many times, for example, last year they would have independently come onto the site and tested the quality of the water being discharged?

Dr Cameron—I am not sure exactly.

Mrs CROSIO—Could you take it on notice and bring it back?

Dr Cameron—There was certainly one major audit which they did about a year ago and that involved the whole process, including verifying sample taking.

CHAIR—But the other body has been—

Mr Horlock—Can I give an answer on radiopharmaceuticals?

Prof. Garnett—I think I would like to finish on the testing, with all due respect. Once the material, the emissions, leave our site, it then goes into state—

CHAIR—I understand that.

Prof. Garnett—Those are able to be tested, and Sydney Water has taken tests. When it goes to Cronulla, the treatment plant, the material—

Mrs CROSIO—Professor Garnett, I know all about Sydney Water and the testing there. I think we have to confirm on public record, as the chairman said, for the verification of all citizens who are expressing concern that not enough checks are done, who does them, how they are done, how they are handled, and are they done independently? I think that is the information.

Prof. Garnett—I understand what you are saying. I am just trying to say that there is a system—

CHAIR—There is a system. But is it a satisfactory system?

Mrs CROSIO—Is the system sufficient?

Prof. Garnett—That is what you are questioning.

CHAIR—It seems to me that there has been, if I may say so, some kind of breakdown between ANSTO and the public. There seems to me not to have been good communication. There is a lot of people out there who are suspicious. I think that by having a more open, accountable and independent system we could dispel a lot of that unnecessary suspicion and angst that the public feel about the waste product.

Prof. Garnett—With all due respect, Madam Chair, a large number of the public are very supportive. We publish that environment report every year. Many of the opponents do not even acknowledge that that open report, plus the past ARL reports that are published annually, even exist. There is a large amount of information on the public record. And in any industry sector—

Mrs CROSIO—But with that public information you could publish how many times an independent assessment is done—

Prof. Garnett—Of course we could.

Mrs CROSIO—And that could be provided to this committee?

Dr Cameron—Could I just add to that: we are currently going through a new process with ARPANSA, which is a licensing process that has to be completed by 5 August. The licensing process will actually license all those discharges separately, independently and new—

Mrs CROSIO—What have they been doing up to date then?

Dr Cameron—Up to date we have had the process that ARL have been providing that service to us. But ARPANSA want to now put in a regime that fits into their regulations and the terms of their act. That licensing process will stipulate the conditions under which they will give us a licence for a discharge. Those conditions will include regular inspections and random audits for that process. So they already have in train a process to provide that level of independence. Furthermore, their reports will be available to parliament on a regular basis.

That is part of their act. So the licensing process that they are currently going through will have in all those levels of verification.

Mrs CROSIO—So I can go back and have a look—if you cannot provide the answer to me—at previous reports before they became amalgamated and that will show me how many times they have done that.

Prof. Garnett—Correct. Yes, it will.

Mrs CROSIO—I would prefer if the committee has it available as well.

Prof. Garnett—I appreciate that.

CHAIR—There is the water issue which you have explained, but what about air emissions? What is happening in terms of independent testing of emissions—I presume from the stack?

Dr Cameron—The process that will apply there is a similar licensing process—

Mrs CROSIO—Excuse me, you said 'will apply'. What has applied?

CHAIR—What has happened?

Dr Cameron—For example, if we take the reactor as a case, the process that applies there is that they have looked carefully at what they consider to be an appropriate off-site dose, and from that they have then determined what each stack should be allowed to emit. For example, with the HIFAR stack, they have laid down a very clear requirement of a level at which we have to notify, if it goes above that, and a level at which we would have to do corrections or shut down—

Mrs CROSIO—This is the replacement reactor?

Dr Cameron—No, this is for the existing HIFAR reactor. That is part of the authorisation for the operation of our existing reactor. There is a regulation written for the HIFAR reactor from the Nuclear Safety Bureau that gives a limit on what can be discharged from that stack.

CHAIR—But no-one actually comes and independently tests what is being emitted from that stack; is that correct?

Dr Cameron—What they do on a regular basis is that they come and watch the process taking place.

CHAIR—But they do not actually come out and take a sample of the air?

Prof. Garnett—They are there when the samples are taken.

Dr Cameron—They are there when the samples are taken. They actually watch the process. In the past they have required that those samples also go off to the Australian Radiation Laboratory for independent verification.

CHAIR—How often would that occur?

Dr Cameron—In fact, there is an officer from the NSB on site nearly every week and nearly every day of every week.

CHAIR—How often would you have notified that the emissions were higher than the acceptable level?

Dr Cameron—There has never been a case.

Prof. Garnett—We have never breached them.

CHAIR—Right. These are important points so that the public can be assured. Thank you.

Prof. Garnett—There was the NSB and there was the Australian Radiation Laboratory. HIFAR, the reactor, has operated what we called an authorisation with the NSB—where they have had powers, they have come on-site, they have tested emissions and they have done all these sorts of things. What they did not have was what you might call regulatory clout where you could fine people or shut them down, et cetera. That did not have that previously.

Mrs CROSIO—Similar to the Commonwealth environment act. It does not have any clout either, quite frankly.

Prof. Garnett—And the same with ARL. The Australian Radiation Laboratory undertook a function but it did not have what the public might consider regulatory teeth. The creation of ARPANSA, which has merged the functions of the two and supersedes them, is now a regulatory body. What Ron was referring to is that there have been certain practices in the past which, in essence, have been agreements between us and them where they have stipulated emission levels, et cetera, but it has not been a regulated emission level. But, again, the emission levels are not any different. They have been in accordance with National Health and Medical Research Council guidelines.

What we are moving to now for the replacement reactor is that we will have a stringent regulatory environment with agreed emissions. Ron is indicating that, given that environment, it would be reasonable and anticipated by us and expected by them that there will be a greater degree of monitoring, checking and documentation. It certainly has gone on in the past. When samples are taken, they are not taken just by Joe Soap; there is a process in place for the sampling so that it is more than one person, et cetera. When you have that kind of operational environment—I think you have heard how ANSTO staff used to have to sign allegiance—there is a code of ethics.

Mrs CROSIO—Madam Chair and Professor Garnett, I do not want to be rude but I have to go in just under two hours. I have about five pages of questions that I want to bring up and, when I bring them up, I would like just some answers without explanation all the time.

CHAIR—Just quick, short, sharp answers. I have one more question before I finish on the emergency procedure side of things. From evidence we have taken it seems that there are not sound emergency procedures with the rest of the community, with the shire, with the schools. Would you like to explain what arrangements have been made with the community?

Prof. Garnett—ANSTO's emergency plan is developed with all of the state emergency services. We have our site plan. That site plan rolls into the Sutherland shire plan, and the Sutherland Shire Council acknowledges that it exists and agree to it. That plan then rolls into the district plan and into the state plan. There is a very clear emergency planning system, and all of our plans are approved by the relevant state authorities.

CHAIR—Is that communicated well to parents at schools—

Prof. Garnett—All of the schools.

CHAIR—How is that done?

Prof. Garnett—We are not allowed by New South Wales Department of Education rules to go into the schools ourselves. We have to work through the schools and through the state emergency services. We have run briefing sessions for schools. We had one last November and another about a year before that where we invite all of the school principals and schools to come along. The schools are well and truly briefed.

We have also advised the parents and citizens associations and such organisations of the existence of the plans. The plans are in the Sutherland shire library. There have been two letterbox drops. I can give you a copy of the leaflets that went out in those letterbox drops of what to do in any emergency and the existence of the plans. One was two years ago, and a revised one went out about six months ago. Those were distributed to every household; they were distributed to schools because we realise some people live in flats.

CHAIR—Is the Sutherland shire cooperative in this process?

Prof. Garnett—The Sutherland shire is part of the local liaison working party which formulates it.

Dr Cameron—In fact, they have agreed that all the emergency plans will exist in local libraries in the shire and that our leaflets on what to do in an emergency will be available in those libraries. As has just been said, the process of informing the schools was taken away from us when the New South Wales act changed. It is now a responsibility of the Department of Education to provide that information. But a number of times we have made available a number of opportunities for us to provide briefings and for them to coordinate it. As Professor Garnett said, at the last one we had 18 schools which came to that briefing, and we do these about twice per year.

CHAIR—Thank you.

Mrs CROSIO—We have received a representation from the parents and citizens association representing all the Lucas Heights community schools, predominantly primary schools. They are concerned that effective sheltering would be essential, that signs be placed behind doors in classrooms—I know that is the state education area—outlining the fire drills and requirements for warning sirens, et cetera, to be clearly written for permanent and casual teachers to follow.

One of the concerns the P&C had was that, if anything were to happen, no-one would be aware of it. But you are saying that has now gone out to all the schools. Perhaps we might inform them that that information is available.

Another area they are requesting as a parents and citizens association is that, before the nuclear reactor is operational, they would like to see an independent assessment of the risk analysis carried by the department as to emergency procedures to be implemented if any risk is determined. That is another concern. I understand, as you have just said in your previous answer, that would have to go through the State Emergency Service or through the Department of Education.

We also received a list of questions from a parent representing other parents. Seeing that they were there for the two days of the previous hearing but did not come forward as a witness, I think their questions should be put on the record. The first question reads:

Of the 250 research reactors around the world, how many ALSO produce radio isotopes for medical use?

Prof. Garnett—I do not have all that information on me, but I can tell you that many of them produce isotopes for medical use.

Mrs CROSIO—Do we know where they are?

Prof. Garnett—The University of Missouri reactor is in the city. There is a very large reactor closer to the centre of Paris than we are close to the centre of Sydney, which has very large-scale radiopharmaceutical production facilities.

Mrs CROSIO—And they are close to communities?

Prof. Garnett—Correct.

Mrs CROSIO—The next question reads:

Was a reference accident from these reactors used in the EIS for the analysis of risk?

Prof. Garnett—No, because the reactors are different. The reference accident was appropriate to the proposed design of the replacement reactor and the scale of radiopharmaceutical production facilities on our site.

Dr Cameron—I should add that most of those did not require an EIS process. They had a licence to construct and they provided a safety case as part of that licence which went to the regulator. They did not do an EIS process as well as a licensing process.

Mrs CROSIO—As I said, these are questions from somebody else but she represents all the mothers in that school, which is the closest school. I believe it is only about two kilometres away.

Prof. Garnett—Lucas Heights Community School is about 2.4 kilometres away. Actually Engadine West, which has been there for a very long time, is about the same distance away.

Mrs CROSIO—You have just told us that even six months ago information went around to every household, but she asks:

Why isn't our community provided with information about emergency procedures when they purchase property, enrol in a new school or as a tenant?

Prof. Garnett—In fact, when every property that is purchased goes to the council, the Sutherland Shire Council provide an advice about the existence of the facility and the emergency procedures. That has been in existence for many years.

Mrs CROSIO—The next question reads:

Given the expected increase in production of Iodine 131, and the recent Cancer Council Study of thyroid cancers which outlines high rates for the southern suburbs, will this increase of production have any impact on the local communities

a. Daily emissions?

b. In a severe accident?

c. Are children more likely to be effected?

I suppose they are questions mothers with young kids want answers to.

Prof. Garnett—I can understand that. First of all, the Cancer Council has indicated that Sutherland shire itself is not abnormal and is not significantly higher. A lot of Sydney, with the socioeconomic and dietary factors, is on the high end of normal. That is what the study shows. The Cancer Council has indicated very clearly that there is no evidence there is a point source for this. There is absolutely no indication that Lucas Heights is the cause.

Higher production—I think you will be aware that one of the recommendations made by the minister for the environment and a commitment that we gave in our EIS is that there are emerging procedures now which improve trapping of gases, et cetera. And, as a norm, we would be introducing improvements in those trapping facilities so that the emissions will remain within the commitment of that 10 units of dose that I mentioned early on. So we have no intention of exceeding that whatsoever. We believe the technology exists. We will certainly be making sure we comply with that.

Mrs CROSIO—The last question on behalf of the mums reads:

Has ANSTO had any personal injury claims/litigation during its operation where employees, contractors, members of the public have claimed personal injury as a result of accidental radioactive emissions or any activity associated with the establishment?

Prof. Garnett—I cannot give the answer off the top of my head, unfortunately. I am not immediately aware of any.

Mrs CROSIO—Perhaps you could take that question on their behalf. We are talking about information for the public.

Prof. Garnett—My instant recall does not go back for 40 years.

Mrs CROSIO—No, I know that. But it is information for the public, because without information you have rumours. In order to put rumours to bed you have to provide the answers to them. Could you investigate that particular question for them? At the same time, they have also asked: how many and at what cost to the taxpayer? If you would not mind, could you take that on board?

CHAIR—Can we give them a copy?

Prof. Garnett—We were provided with a copy of those questions.

Mrs CROSIO—You have that on notice. I would like to return to what we first started to talk about, and that was the disposal of waste. I would like to refer to the minister's media release in clauses 26 and 27 under the heading 'The advice and recommendations under paragraph 931 of the administrative procedures under the Environment Protection (Impact of Proposals) Act' which states:

Reactor construction should not be authorised until arrangements with the management of spent fuel rods from the replacement reactor have been demonstrated to the satisfaction of ARPANSA and of the Minister for the Environment and Heritage. The Minister for Industry, Science and Resources and the minister for health should give timely consideration to strategies for the long-term management and eventual permanent disposal of Australia's long-term intermediate level nuclear waste and associated issues.

From our first questions following your introduction, Professor Garnett, you are really saying that both of those have been met by what is now going to be constructed eventually in South Australia, as well as the contract with the United States and the contract that you have with The Hague?

Prof. Garnett—Correct. I would also like to come back to talk about this issue of long-lived intermediate level waste. I think you are probably aware that there is a lot of longer-lived intermediate level waste that was at the ADI site at St Marys and at other sites and that is in storage. If you look at the percentage of even long-lived intermediate level waste that will be contributed by the replacement reactor overall, it is about 10 per cent of Australia's long-lived intermediate level wastes.

Mrs CROSIO—But whether it is only two per cent, it is part of the contract or the EIS conditions that the minister has put on for the replacement reactor?

Prof. Garnett—Correct. And those strategies are in place.

Mrs CROSIO—So those strategies are in place with the construction of what eventually is going to happen in South Australia?

Prof. Garnett—With the repository and the appropriate way of handling the fuel and its return in an appropriate form and in appropriate casks.

Mrs CROSIO—And the storage facility in South Australia?

Prof. Garnett—Yes, correct.

Mrs CROSIO—Clause 29 reads:

ANSTO must report to the Minister for the Environment and Heritage on measures taken to be taken to implement the above recommendations, including the undertakings and the commitments referred to in recommendation 1.

When are you obligated to do the report? I could not find it anywhere—is it in the EIS?

Dr Cameron—That is the six-monthly report.

Prof. Garnett—If I can explain—

Mrs CROSIO—I see now that it says, 'Initial written report commencing and thereafter six monthly'.

Prof. Garnett—Correct. What we have to do is to give the plans to address the recommendations and thereafter six monthly on the implementation of those plans.

Mrs CROSIO—So each six-monthly report. It then says, 'These reports must be made publicly available by ANSTO following their acceptance by the minister.'

Prof. Garnett—Correct.

Mrs CROSIO—If they have to be made publicly available, in 26 you were talking about the spent fuel rods which are now clearly demonstrated with contracts you have in France at The Hague. Why can't we have a copy of the contract?

Prof. Garnett—I appreciate that question.

Mrs CROSIO—There are going to be a lot more. Are you saying it is commercial-in-confidence and that you cannot block anything out that may be commercial-in-confidence so we can have a look at the rest of it; or are just saying it is instructions from the minister? I put you in a very difficult situation—I do not like to do that—but I believe the information has to be on the record.

Prof. Garnett—The contract allows us to disclose information to the minister. It does not allow us to disclose information to other parties, except if there are problems or issues associated with the execution of the contract.

Mrs CROSIO—How could the public or this committee in giving a report on costings—because it will all come down to costings as well—but particularly the people of Australia have confidence that:

Reactor construction should not be authorised until arrangements with the management of spent fuel rods and the replacement reactor have been demonstrated to the satisfaction of ARPANSA and the Minister . . .

ANSTO is now going to report on a six-monthly interval to the minister, and those reports are going to be made public. Yet at the very beginning we do not have what was a contract put together with an organisation that is basically involved in—what I read into it as being—the conditions of approval of having a replacement reactor. In other words, if you cannot put this in place and that cannot become public knowledge so that we are all satisfied with it, it is actually one of the conditions.

Prof. Garnett—First of all I would like to indicate that, with the spent fuel contract, the dollars that are there well and truly cover that. We have indicated that. It has been accepted by the minister and by the minister for finance as far as the costings are concerned.

Mrs CROSIO—So there is no problem with the costings.

Prof. Garnett—And available money.

Mrs CROSIO—What is so private about it?

Prof. Garnett—The contract includes a lot of issues to do with the kind of wastes, et cetera. There are conditions in there that go on for a long time. That contract took an enormous amount of appropriate negotiation, and I am afraid I am not at liberty to disclose that contract. But we certainly will be able to indicate our plans as far as proximate schedules for removal of material are concerned. All of that will be able to be provided.

Mrs CROSIO—If we can get a plan on the removal of material, we know the quantity of material, we know the cost of the material being moved, we know to whom the material is being sent and we know how long the processing is going to take by that particular country before they ship it back to us—what else is in there that could be commercial-in-confidence? We will know what the costing is, because it has to be a budget item where you are going to have to say, 'I want X number of dollars.' We already know that $80 million has been given as a supplementary budget for you to overcome the problems in the past.

Prof. Garnett—Correct, and that is the full costing of everything for HIFAR.

Mrs CROSIO—Fine. If that is the full costing, what else could be so confidential—

Prof. Garnett—With all due respect, what is not in that is the differential between what is for the US payments, what is shipping costs, what are reprocessing costs and all of those.

Mrs CROSIO—That is what I would like to come to now, if I can use this as an example. As you realise, we were provided with a copy of a contract that was signed with Germany, with the same company that Australia has now committed their nuclear waste processing to. Let us look at a couple of individual areas here which I think the Public Works Committee would be very concerned about. You are looking at option 1 and option 2 as far as fuel discharging is concerned, how it is going to be handled and how it is going to be done—

Prof. Garnett—That is a standard nuclear power reprocessing—

Mrs CROSIO—Well it was provided to us.

Prof. Garnett—I appreciate that, but it is not consistent with conditions in our contract.

Mrs CROSIO—You do not have it in your contract?

Prof. Garnett—I have not actually read that contract, so I cannot comment.

Mrs CROSIO—So we do not know how the responsibilities are going to be handled in our contract: who is going to be responsible for transporting at times, whether the company is going to be responsible for accepting deliveries of certain flasks, unloading, transport, loading of fuel, decontaminating—we do not know unless we have seen the contract.

Prof. Garnett—I can provide you with a statement of a flow chart. The way that we operate, in essence, allows that the material, that the normal process for the spent fuel—

Mrs CROSIO—But is it in our contract?

Prof. Garnett—Appropriate handling of all material is covered for.

Mrs CROSIO—What the company is going to be responsible for and what ANSTO is going to be responsible for?

Prof. Garnett—Absolutely covered.

Mrs CROSIO—What happens with any minor hiccups on either side—either the company cannot do the processing on time or ANSTO does not provide what they require on time, what happens to costings then? Is there a rise and fall in that contract?

Prof. Garnett—I do not have those details with me. I could look at that. But I believe that there is—

Mrs CROSIO—Could you take that on notice to see if there is a rise and fall?

Prof. Garnett—I will see if there is anything I can provide on that.

Mrs CROSIO—Also, do we have in our contract specifications regarding how transport has to be carried out?

Prof. Garnett—ANSTO would not have entered into, and we would not been approved to enter into, any contract by the minister unless all the transport arrangements complied with international maritime law and international transport arrangements. I think you are aware that we have already shipped fuel to America and to Europe. All of those transport arrangements have been in full compliance with international maritime law and the transport of nuclear materials. We would not enter into a contract with anything other than that in place.

Mrs CROSIO—So we may have talked about clause 7 of the contract, I suppose, if it is similar to what is this existing one that we were able to get a copy of—bearing in mind it is another country's contract. In clause 7 titled 'variation' of this particular German contract it states:

. . . Reprocessor's current best estimates of such conditions.

Then they are talking about the actual operating expenditure and experience. Going down further it says that, as a rule, if there are going to be changes—basically doing a synopsis of it—it could have financial consequences. It goes on:

In the event there would be financial consequences, the parties shall meet together in order to determine the best course of action to minimize such consequences . . .

Of course, the key word there is 'minimise'. Do we have a clause like that in our contract?

Prof. Garnett—I cannot comment. I do not believe so.

Mrs CROSIO—Could you have it checked?

Prof. Garnett—I believe that, in essence, ours is very tight with regard to financial provisions.

Mrs CROSIO—I want to put a question on notice. Could we have a look at any variations to our contract, such as costs in the short term and the long term? You have said that there is no legal action being taken against The Hague. If that were to occur and they could not go ahead with our particular contract, how are we covered as a nation? How are we covered as a condition of our EIS, bearing in mind that is one of the principal concerns and conditions before we can have a replacement reactor?

Prof. Garnett—With all due respect, COGEMA is not the only international reprocessor.

Mrs CROSIO—But it is the one that we have the contract with.

Prof. Garnett—Correct. I am simply saying that there are other international reprocessors.

Mrs CROSIO—I know that, Professor Garnett. But at this stage, from both the information in your submission and all the other evidence we have received, we have signed a contract with COGEMA. America has made a commitment in 2007 to take their spent fuel rods and all the technical terms associated with it. We have no other evidence before us

stating that, in the event both of those collapse, we can go somewhere else. We have already seen one that has collapsed.

Prof. Garnett—That is not quite true. There was not a collapse of a contract. We did not have a contract.

Mrs CROSIO—No, not a contract but you could not send your waste there.

Prof. Garnett—We had a number of other options then as we do now. We have a contract with France, but there are reprocessing facilities in Britain at BNFL. There are other processing facilities being developed.

Mrs CROSIO—But you can see what I am saying in my question.

Prof. Garnett—I understand that.

Mrs CROSIO—We have an EIS that is going to give you the consent to go ahead with a replacement reactor. We have as a condition of the EIS that waste has to be looked at. In clause 26 of the minister's statement, he says:

. . . and the agreement that the spent fuel rods are going to be properly processed.

Every bit of questioning says that has come about because we have a contract with The Hague; a contract that we cannot see.

Prof. Garnett—It allows us to meet that now because we have a contract with The Hague, because that was the company we negotiated with to achieve a successful outcome within the price range and within the time that we needed to do it, but there were other options.

Mrs CROSIO—But we did not take those options.

Prof. Garnett—No, we did not.

Mrs CROSIO—I have many ways of getting home today. I am not flying; I am driving. The option I have taken is to drive. It is no good me driving, having a smash on the way home and saying, 'I should have taken the other option of flying.' At the moment, I have a car and I have to get home. ANSTO has a contract that is in existence, and I am concerned with the variations in that contract, such as the costing and the long-term implications. I am still concerned that that contract which we have signed is part of a condition of the replacement nuclear reactor. It is not your fault, but I believe we should pursue it further. As a committee, we should at least have it to read.

I was going through the evidence before, and I was trying to get into my mind what cost benefit study the government has done or ANSTO has done to say that we need a replacement reactor. I have read and read and read, and I cannot find it anywhere. If it has happened, we have not got it here. Has a cost benefit analysis been done on this replacement reactor?

Prof. Garnett—A number of analyses were undertaken of different kinds.

Mrs CROSIO—A cost benefit one?

Prof. Garnett—There is cost benefit and there is cost effectiveness analyses, and a number have been undertaken. There is the issue of the contributions from ANSTO projects and what they are contributing to the economy. I indicated when you visited Lucas Heights that we had had an assessment of five or so activities over the previous number of years and what they were currently contributing to socioeconomic benefit. I indicated to you that those were producing socioeconomic benefit to Australia of the order of $200 million annually. That was from a limited list of activities. In terms of determining cost effectiveness, we have done some analyses of cost effectiveness of nuclear medicine procedures in certain areas against others, and there is evidence to show that nuclear medicine procedures are very cost effective. So that is part of the picture.

Remember that this is a facility that will exist for 40 years or so. We have given you the operational costs. When you start looking at those socioeconomic returns on a cost benefit analysis of over $200 million per annum from a limited number of activities, you can start looking at the potential return for the future. Guesstimating for the future is economics, and it is probably an art rather than a science, but there have been a number of studies done. If you look at what has happened in Japan and in the US with new reactors, with cold sources and the involvement of industry and the benefits that have flowed, all of that says that there will be even greater benefits from a replacement reactor than we have had with the existing one.

CHAIR—One thing that does not seem to have been built into this is the decommissioning cost both of the existing HIFAR reactor and the new reactor. That is a cost that has to be looked at in such an analysis in my view.

Prof. Garnett—I appreciate that. Recognising that the decommissioning cost of HIFAR will go ahead anyway—

CHAIR—We know that it will go ahead, but in looking at a cost benefit or a cost effective analysis, surely that is an integral part over the life—

Prof. Garnett—I agree, but the cost of decommissioning the replacement reactor, again, looking in economic terms and economic parameters, given that that decommissioning will occur 45 to 50 years from now, is a very small dollar cost. In the parameters and in the analysis, it virtually has no impact because of the net present value of those dollars. If you look at the cost benefit of the replacement facility, it is the cost of the facility now. On the NPV calculations, it is virtually zero.

CHAIR—But you would not be factoring in that cost on present day values.

Prof. Garnett—That is right. When you factor it in on an MPV basis of the future, it is virtually zero. It is a very, very small figure. It impacts on the figures in the cost benefit analysis in a very, very small way.

CHAIR—It was included then?

Prof. Garnett—We did some MPV calculations which were part of the original cabinet submission, and it was included.

CHAIR—Yet we have not been able to get those.

Prof. Garnett—Because they are estimates based on—

Mrs CROSIO—Commercial-in-confidence?

Prof. Garnett—No, they are estimates based on the existing decommissioning strategies. With an NPV value out 45 to 50 years, they are virtually negligible in dollars. That is the issue when you go onto a cost benefit analysis. When you come back to the decommissioning costs of HIFAR, clearly that expenditure is required and will go ahead. There is a need regardless. But those figures, again, in current day dollar terms are quite small. The strategy is, as I think you are aware, to remove the fuel and the heavy water to allow it to sit and then basically, after a period of 30 years, to do something. There were figures provided in our EIS on the cost of that decommissioning in taking account of discount rates, et cetera in the MPV terms. That was publicly provided in the EIS documentation.

CHAIR—There were some submissions which questioned those discount rates.

Prof. Garnett—Well, we were advised to use those discount rates. We always take advice—

CHAIR—Where was the advice coming from?

Prof. Garnett—The department of finance. We always take advice on appropriate discount rates to use from the department of finance.

Mrs CROSIO—Lies, statistics and figures. In terms of costing, I know you said that something like 50 sites were originally looked at, but were they also looked at with relevant costings?

Prof. Garnett—Yes. It is clear that you have a number of parameters and you can find appropriate sites elsewhere in Australia. There are a limited number of sites because of the need to be—as you will find with all research reactors—close to major centres of population. The issue is not just that of the replacement reactor but that of the facilities that would need to be duplicated that exist on the Lucas Heights site. I emphasised last week that we were not reproducing facilities but making the maximum use of existing facilities, and that includes hot cells and a vast amount of infrastructure.

Mrs CROSIO—So we are not going to have hot cells in this replacement reactor?

Prof. Garnett—There will be one or two hot cells in the reactor building for handling fuel issues in the building, but the other existing hot cells would not be reproduced.

Mrs CROSIO—So there will be just one or two that will be inside the building?

Prof. Garnett—That is correct. The estimates of cost were depending on the location two to three times the cost of the facility itself.

Mrs CROSIO—I want to come back to the long-term side of the storage, particularly the reprocessed fuel or the rod waste when it is returned to Australia. Until last week I did not realised that when we send it over to get reprocessed we get back the same amount basically.

Mr Horlock—You don't. The radioactivity of the fuel decays rapidly with time. You probably read that after a thousand years—I am taking the extreme here—it is back at the same level as the original uranium was in the ground.

Mrs CROSIO—I think the generation I am representing would be interested in the next 50 years.

Mr Horlock—I understand, but there is a very large reduction in radioactive content in 20 years.

Mrs CROSIO—You would have the *Hansard* that we have, but Professor White was very supportive of the ANSTO reactor.

Prof. Garnett—He is from the Academy of Science.

Mrs CROSIO—It was either him or the other person who was previously an employee of ANSTO. Both were supportive of ANSTO. You are talking about reprocessing, but I thought in evidence it was said that once it comes back they just reload it again, and you are getting back as much radioactive material.

Mr Horlock—No, absolutely not.

Mrs CROSIO—Well, it is on the record.

Mr Horlock—Well, they are wrong.

Mrs CROSIO—Now you can answer that. You are saying categorically, 'After we have spent all this money to have our fuel rods reprocessed, we do not get back the same amount of radioactive material.'

Mr Horlock—Precisely.

Prof. Garnett—Because of natural decay. We do not get it all back because some of the other materials are reduced, but if we had left the fuel—and I think it is important to clarify this—sitting for 20 years at Lucas Heights, which we have no intention of doing, or left the fuel sitting somewhere else in Australia, it would naturally decay.

Mrs CROSIO—Where is it going to sit?

Prof. Garnett—We are not; we are sending it away.

Mrs CROSIO—I know, but even without the natural decay. We have sent it over to France, we have had it reprocessed, and America has taken theirs. What happens to it when it comes back?

Prof. Garnett—It comes back, first of all, in a very small volume. The total arisings from the HIFAR operation in its 45- to 46-year life will be six cubic metres. That is the total amount we get back. That is all—six cubic metres.

CHAIR—But it is the radioactivity that is the issue.

Prof. Garnett—Correct, but it is a small volume.

Mrs CROSIO—A small volume or not, where is that going to go?

Prof. Garnett—It will come back in an appropriately qualified storage container, and all of that is included in the cost. They are qualified for 50 years.

Mrs CROSIO—I do not care about the cost now. Where are you going to store that for 50 years?

Prof. Garnett—That goes to the storage facility which we have talked about earlier today to be co-located—

Mrs CROSIO—In South Australia? So we classify that as low level intermediate waste?

Prof. Garnett—No, that is the repository. That is what goes in the ground.

Mrs CROSIO—So consent is also for fuel rods as well?

Prof. Garnett—No, it is not fuel rods. It is no different in composition to the hundreds and hundreds of cubic metres of long lived intermediate level waste that already exists in Australia from Defence activities and other activities. The clean-up of the St Mary's site resulted in a very large volume of long lived intermediate level waste going to storage.

Mrs CROSIO—For the record, when our reprocessed fuel rods come back, they will be deposited eventually in South Australia.

Prof. Garnett—Yes.

Mrs CROSIO—So that takes over what was requested in the research reactor review of 1993 where it must be resolved before any new reactor is built. The resolution of that is that we have a contract to have it reprocessed. When it comes back, we are sending it to South Australia.

CHAIR—Then it costs us money again.

Mrs CROSIO—I tell you what, we may be in for a big problem in South Australia.

Prof. Garnett—No, because what it comes back in is qualified storage containers. It comes back in stainless steel qualified storage containers.

CHAIR—For the record, there is no cost to Australia once that product is returned.

Prof. Garnett—For the kind of storage facility that would be required, there would be no additional cost.

Mr HOLLIS—There would be a cost because it is ongoing. There are things like looking after it and having it guarded.

Prof. Garnett—You are correct. I guess I am trying to indicate that we have in Australia a volume of intermediate level waste of this nature which will have to be managed anyway. What will come from the replacement reactor will include the projected expanded isotope production and waste returned from overseas and reprocessing at the end of the life of the reactor. Only 10 per cent of the intermediate level waste that will exist in Australia at that time will come from the replacement reactor.

Mrs CROSIO—Still on waste, in previous evidence Madam Chair asked Dr Hardy:

At what level would you classify these spent rods when they have been returned from France . . .

Dr Hardy said:

They are not spent rods any more; they are completely different.

Madam Chair then asked:

What sort of waste would you classify that as?

This is on page 32 of the *Hansard*, and you probably have a copy. I then asked whether we could come back to what spent fuel rods are. In answer to a question from Madam Chair, Dr Hardy states:

They are spent fuel rods. Unfortunately, there has been a semantic difference between ANSTO and the research reactor review in 1993, who said, We recommend, ANSTO, that you should not keep calling these spent fuel rods; you should admit they are high level waste.' ANSTO has disagreed with that on conceptual terms.

You still disagree; they are not high level waste.

Prof. Garnett—Correct. The international designation of it clearly differentiates between waste and reactors—

Mrs CROSIO—Dr Hardy did say:

I think, to be fair to ANSTO, spent fuel rods are spent fuel rods which are highly radioactive. The words 'high level waste' have commonly became known as referring to waste after spent fuel from a power reactor or a research reactor has been reprocessed and separated out into high level waste.

Yet we are calling it intermediate waste.

Prof. Garnett—Because we are not getting high level waste. There is a difference between power reactor and processing.

Mrs CROSIO—He also mentioned a medical reactor.

Prof. Garnett—And radioactivity and the heat loading. There is a series of international definitions, and we are complying with those international definitions.

Mrs CROSIO—If we have international definitions, why in evidence we have received do they keep on saying that ANSTO refer to their waste at one level as intermediate waste where America would classify that same waste as high level waste? Why are we different?

Prof. Garnett—America is the one that is different. America has not yet adopted the internationally agreed definitions. Dr Cameron is on the committee. He is also involved in the International Atomic Energy Agency. My director of materials, Dr Jostsons, whom you met, is also on relevant committees, and at this stage America is not conforming with the internationally agreed definitions.

Mrs CROSIO—So they are being a bit more cautious.

Prof. Garnett—No, I don't think so. In fact, their low level category is quite different from the international one as well.

Mrs CROSIO—I turn now to monitoring. I know that I have asked a number of monitoring questions, and we know what ARPANSA is going to do with the provision. But what actual provision do we now have in place different to what is going to be in place? I am thinking more of external monitoring. We went over and physically saw the area. We were able to look at 1.6 kilometres. Do we have external monitoring points for both air and water in and around those perimeters? Do we have it in the areas where schools have raised questions? Are there monitors there?

Dr Cameron—In terms of air born exposure, we have a system of monitors around our site fence. We have a system of monitors off our site fence. In addition, we have monitors placed in residential houses in the local area and at various distances from the local area. We are able to measure the exposure that results from our site in Barden Ridge, which is our nearest residence, in Woronora, which is further away, and in Engadine. In addition to that, we have our site monitors and we have air sampling stations just off our main site that will measure the activity in the air.

Mrs CROSIO—That is an answer. If it does not get to two kilometres, it cannot get to five or 10, can it?

Dr Cameron—That is exactly the point. Our air sample is just off our site, and the measurements are reported in our annual report every year. Therefore, even though we place these monitors further out, if we are not detecting it closely, we will not be measuring it further out.

Prof. Garnett—They are not only our monitors; ARL and ARPANSA place their own monitors. That again comes back to independence. All along we have had those monitors. I remembered that after we were talking, and I was waiting for the opportunity to indicate that they exist.

Mrs CROSIO—When people are concerned with radioisotopes, in other words, they are talking about iodine escaping into the atmosphere and thyroid cancer, we believe quite clearly all of that is covered with the monitors that are in place and will continue to be in place and checked on a regular basis?

Dr Cameron—Yes. Because the levels are so low that they cannot be measured, we use a very conservative computer modelling code that says, if the worst case happened, if someone was on our fence for 24 hours a day, 365 days a year breathing all this in, what would they get? Those calculations are independently checked by the regulator ARPANSA and ARL. They repeat all those calculations and make sure they agree with them. The process was repeated again in the EIS process by an independent consultant from the UK, and they have verified that the models we use are very conservative. In fact, their models were less so than our ours.

Prof. Garnett—I said to you earlier that we put 10 units; they said that we were putting three. They said that we are overconservative, and conservative means that you are already giving the benefit of the doubt—

Mrs CROSIO—Is that measurement done by a sensor? How is the measurement of air done, for example? Excuse my ignorance. I am just thinking of wind that is coming through, and maybe something is coming up through the stack and it takes it to the left instead of the right.

Prof. Garnett—That is why we have a number of them.

Dr Cameron—That is why you have to put the sensors where you know the main wind directions blow, and clearly we concentrate them towards where people are living. Those air samples work by sucking the air through and measuring the radioactivity in the air that is sucked through on a continuous basis every day all year. Then we can take those measurements away and ask what they mean in terms of radioactivity.

Mrs CROSIO—Another question raised in the evidence is questioning the reliability of supply of overseas medical isotopes. I think in evidence provided from ANSTO originally in our first hearing that you said there was no reliability for medical isotopes from overseas. Some of the questioning also came back and said, 'Well, you would have to prove that because in all the checking we did there has been reliability.'

Prof. Garnett—We have clearly indicated a significant number of instances when we have had a need to import some isotopes. Again, when you visited I indicated that we produce a range of isotopes. Some of those we cannot import because of their short half lives. For instance, samarium-EDTMP product that we now produce for bone pain palliation cancer patients, we cannot import. When there is a shutdown of the reactor for maintenance purposes—and they do occur—there are products that are simply not available to the Australian community.

Mrs CROSIO—So it is not only reliability; we are also unique in what we are manufacturing here in our level of isotopes.

Prof. Garnett—We are unique. It is about reliability. We are at the end of a supply chain, and this is where the issue comes. In the last major shutdown—and we have continuously provided this information to the people who wish to challenge us—between 25 and 30 per cent of product did not arrive in a form that was able to be used.

Mr Horlock—You also have the instant availability of product too. If you are making the isotope and manufacturing it, and someone rings asking whether you can send something in the next two hours, the answer is yes.

Mr FORREST—I have seven questions, but the burning one for me is to be convinced that, if we make an investment of $300 million for this new reactor, will taxpayers get a return? I was looking for some business plan from ANSTO that it could pursue the $40 million opportunity for pharmaceuticals in Australia, particularly the $150 million export. I am not convinced that we can harness more than a market share of those. So why would ANSTO be so convinced that it can get a good return on its investment here? Where is its business plan on the largest market share of $150 million?

Prof. Garnett—First of all, the $150 million figure is the component of what you would call the hot product and the cold product. With radiopharmaceuticals, some of them are coupled with a molecule and the radioisotope on site, and the one I mentioned, samarium for pain palliation, is in that form. In other cases, the isotopes are provided and then there are ligands, and just before it goes into the patient they mix vial A and vial B, and it goes into the patient. So the $150 million export market includes that hot and cold products side. The hot product is about 57 per cent of that $150 million export market, so we have to be careful. We are providing some products and more and more that are both, but on the conservative side you would say that it was 57 per cent of that $150 million export figure per annum.

Mr FORREST—Where is the business plan? Why have you not submitted it to us to convince us that this is going to be a good investment; a good return on taxpayers' money?

Prof. Garnett—First of all, the statement on the need for the reactor and the justification were based on a number of parameters. Radiopharmaceuticals and the supply and availability in Australia was one, and the potential for export is clearly part of that. We are moving into Asia, and we are having discussions with companies about partnering from the cold product site so that we can jointly market. The other part of the reason was that of the research side and the underpinning of enabling technologies that would allow Australia to capture niche

areas of materials technology, biotechnology and a wide range of areas in the future where, with all due respect, what one can only do is go back on history. We talked a little bit before about the Access Economics study we had had which showed that there had been $200 million of economic benefit annually to Australia that is now accruing as a result of a certain list of projects, and that comes from research. There are other benefits, such as the irradiations that are done for mineral analysis, environmental samples, et cetera. The other issue is that of the national interest on the safety and training. Again, putting a business case that includes that is extremely difficult.

Mr FORREST—So you rely very heavily on the Access Economics report.

Prof. Garnett—I think it is fair to say we rely on the Access Economics report because, with research activities and activities where you are providing services to industry, virtually the only way that you can get a really good handle is what you call a retrospective analysis of the projects. You have completed the projects, the processes and technologies are being implemented. What is the impact and the projected future impact? That is not easy to do in a prospective sense with a lot of these projects.

Mr FORREST—I understand that, and I know there are intangible benefits. I have a science background, so I understand all that. But you still need to be able to convince us there is a monetary return for such a substantial investment. That is the position that I am taking. Madam Chair, is that report from Access Economics part of evidence yet?

CHAIR—I do not believe so.

Mr FORREST—Have we asked for it?

Prof. Garnett—We could give you part of it, but we would have to white-out company names and various things.

Mrs CROSIO—I do not mind if you white-out the names, as long as it is not commercial-in-confidence. Again, that is a word we are not going to use here. It is going to be a dirty word in future.

Prof. Garnett—There are parts of that that we have provided to other parties.

Mr FORREST—Let me be blatant. You need to convince me that there is an economic return for this investment. It is a large amount of taxpayers' money. I want to be convinced that there is a return on it. One of the witnesses described that report as shonky, so I need to read it to be convinced myself.

Prof. Garnett—The witness said that a certain other person had described it as shonky, and that other person, if you go to the television program, said that he did not describe it as shonky.

Mr FORREST—I am not placing a lot of weight on that comment.

Prof. Garnett—Again, I come back to the fact that this is a $300 million investment, but it has a lifespan of 40 to 50 years. We have given the operational costs of the reactor, and we offset the operational costs of the reactor by the irradiations that we do with silica, the irradiations that we do for radiopharmaceuticals, et cetera. The projected values are that around 40 per cent of the operational cost of the facility will be offset on an annual basis, which means that all of the research in the national interest is being offset by those financial returns.

Mr FORREST—But there are other options. There was a suggestion about the importation of molybdenum.

Prof. Garnett—That is not—

Mr FORREST—Wait until you hear my question before you answer it. Your only defence on that particular issue was that there were too many delays in shipping and so forth. Could you document why that is not an option for you?

Prof. Garnett—It is in the EIS documentation. We can refer you to the relevant parts of it that was examined extensively as part of the EIS—the needs, the benefit, et cetera. All of that information is available, but molybdenum is not the only product. There is a wide range of products which we produce which are available on demand and are available to Australia. Again, when you come down to cost benefits, one of the problems is how do you cost a life? It is extremely difficult. This is where we come into this problem. We certainly can provide you with the figures for projected radio pharmaceutical needs. There is certainly a growth in that. I think I showed you a graph when you visited ANSTO of the growth in radiopharmaceuticals and production.

Clearly, if there is a growth in production, there is a growth in our production costs but also a growth in what we are getting back—the revenue. We have those predicted figures. You go to a certain distance and you have confidence, but beyond that they begin to get a bit woolly. The fact is that Australia is still catching up, to some extent, in its use of nuclear medicine compared to the North American countries. That is why the figures from the department of health show a continuing 10 per cent per annum growth. They suggested 14, but we have placed our modelling on 10 per cent until around 2004-2005, and then we have placed it on a five per cent growth in Australia.

Mr Horlock—We have used less than 10 per cent in our calculations. We have been quite conservative. The American use of nuclear medicine is double the Australian use per capita. We keep thinking we are catching up, but they keep moving ahead as fast as we catch up. The growth is very strong, despite competing modalities. There is nothing else which gives you the functional image of what is happening in the body as well as nuclear medicine does.

Prof. Garnett—Again, our market projections as far as what we would hope to achieve in the Asian region is concerned—and I said earlier that about 50 per cent of the market is the so-called hot product sales—we have really based our predictions conservatively on returns on our capturing not all of that market because we recognise that we will not. But at the moment we are exporting to Indonesia, to Malaysia, to the Philippines and to Thailand.

In fact, for some products because of our location and because of the one-stop flights between Sydney and some of these locations we are able to get product into Seoul in a much better state than they can import it from either North America or Europe because of the flying times. Also with the flying schedules, sometimes something happens with a product and it does not get shipped. Sometimes that happens at the airport. It simply does not get put on the plane. It is not our fault, it is the guys at the airport. The guy is at the other end, and somebody realises there is another flight. So our market into Korea, even though it is a 10-hour flight, is the shortest flight and it is expanding.

Mr FORREST—These are all the things that I would expect to see in a market plan. I represent a horticultural region in Australia. It is the big opportunity. Half of the world's population is within an eight-hour plane ride. I know all that, but you have not convinced me with any documented business plan how you are going to go in there and capture it and ensure taxpayers get a good return on this $300 million. If the Access Economics report provides that, with all of the other privacy stuff whited out—

Prof. Garnett—It does not provide all of that. I have tables in front of me, as you can see, that I am reading from, but while we would be prepared in this case to sit down with the committee, they could not be published and would have to be treated absolutely in camera because this is our business, and I cannot afford to have that distributed and dispersed. On our predictions for radiopharmaceuticals that is our own documentation and our own predictions, we would be prepared to provide you with a brief document and summary of those predictions.

Mr FORREST—I am happy for you to organise that. I respect the need for why you have to do that. I need to ask this question because it has been put in other evidence. In section 2.3 of your response to us on 28 April it says that 'neither spallation sources nor cyclotrons could support the full range of users which a multipurpose service reactor would support'. I need to have clear in my own mind what this extra full range of resources are.

Prof. Garnett—We have produced a table which is in the final EIS document which tries to summarise that. Cyclotrons do not produce as many isotopes as reactors do, despite what some people might say.

Mr Horlock—Some 85 per cent of all nuclear medicine procedures use reactor isotopes, not cyclotron isotopes.

Prof. Garnett—I showed you the graphs of the growth. We have got a cyclotron.

Mr FORREST—I suspect that is only because no-one has tried.

Prof. Garnett—No, it is the laws of physics.

Mr FORREST—It is a science issue, is it?

Prof. Garnett—It is a science issue.

Mr Horlock—It just can't be done.

Mr FORREST—I will have to go back and read my science books.

Prof. Garnett—It is the laws of physics of what happens when you bombard things with a neutron versus a proton. It is quite different. The issue with a spallation source is that a spallation source is a pulsed source of neutrons. It does not provide you with a continuous flux of neutrons.

Let me indicate the reference to the pages in the EIS. It is in section 6.3 of the supplement to the draft, which is in essence the final, where it says 'Response to issues related to alternatives'. There is a detailed explanation on what spallation sources are and how they work, the difference between targets that you might put in front of a spallation source. If you have a spallation source, you can put a target in front. If you can produce the isotope, you can produce one at a time. In a reactor you are producing many isotopes at one time, and that is a very big difference when you are talking about production for commercial purposes. There are answers in this section in the supplement, and there is also table 6.3 in the original document. So it is section 6.3 in our draft environmental impact assessment and response to issues about 6.3 in the supplement.

Mrs CROSIO—What undertakings have we got that the power output of the new reactor is going to be there? Is it going to meet the contract?

Mr Horlock—Sorry?

Mrs CROSIO—I have written it in my own terms, and excuse my layman's terms. What undertakings do we have about the power output of the new reactor? How can we be sure that it will live up to the expectations of the contract? In other words, you are telling me that it is going to be 20.

Prof. Garnett—A maximum of 20.

Mrs CROSIO—But we do not know until we switch it on.

Prof. Garnett—No, that is not true.

Mr HOLLIS—How do you know before it is switched on?

Prof. Garnett—There is a lot of science, a lot of physics, a lot of engineering and a lot of computer models. Mr Horlock will explain.

Mr HOLLIS—Has it not been the case overseas that some have not lived up to their expectations?

Mr Horlock—Let us go back to the fundamentals, first of all. If you design the cooling system for a reactor to allow it to operate at a certain power level, then it will operate at that power level, because the qualification of the fuel used includes the capacity of that fuel to generate a certain amount of heat and a certain number of neutrons. When you put these fuel elements together, you will have a reactor core capable of delivering the power that you design it for. If the cooling system can take away that heat, you can proceed on that basis.

Mrs CROSIO—So all of that will be in place before we finish the contract?

Prof. Garnett—Correct.

Mr Horlock—We will know that it is capable of achieving the 20 megawatts power output. Come the day, you have to run it and demonstrate it, but the confidence you have in it achieving that power is extremely high.

Mrs CROSIO—Why were these problems encountered overseas?

Mr Horlock—There are two issues. In Indonesia, they are not running at full power—and this is a complexity that we are going to avoid—because the Indonesians participated in the design to a large extent. When the top of the pool water system was designed, it was not designed sufficiently well to form a barrier for radioactivity getting from the core of the reactor to the surface of the water. Therefore, they are not running at full power. They are undertaking modifications to improve the control of the water layer so that they can run at full power.

Dr Cameron—The big issue in Indonesia is that their economics are such that the cost of fuel is a problem for them.

Prof. Garnett—Yes, but there is an issue, and it was because the Indonesians insisted on doing some of the design themselves, rather than letting the contractors—and the Germans were the contractors—take the specifications.

Mrs CROSIO—So they did not have any rise and fall in their contract. They had a lump sum contract, did they?

Prof. Garnett—Rise and fall is not to do with contract variations, with all due respect, Mrs Crosio.

Mrs CROSIO—No, but we were told that we only have a pocket of money, and all these four people are going to be interested in tendering. The four companies will come in with that one pocket of money.

Prof. Garnett—Reference was made to Indonesia. We have had experience of operating a 10-megawatt reactor which we know all about. We have experts. Cooling is something that, if you know how much heat is generated, you can model it. I think there is a lot of Australian civil engineering expertise to be able to test that.

Mrs CROSIO—I am happy with that. There were no other examples given in America, were there?

Mr Horlock—None in America.

Mrs CROSIO—I understood that there were some overseas that had problems.

Mr Horlock—There were two. There is one in Indonesia, and the Korean reactor is also running at lower than full power. The Koreans are making they their own fuel. Their regulator is asking them to do a demonstration of fuel performance which is at the far end of conservatism, but that is something between the fuel maker in Korea and the regulator in Korea. We are not going to make our own fuel. We are going to use fully qualified fuel. That is part of our EIS condition.

Mrs CROSIO—I am happy with that. One point that Dr Green raised—and I realise he may not be the flavour of the month with you at the moment—which I thought was a reasonable point, and there are a few others he has raised too. He said that the office of the chief scientist was not consulted before a decision was made to replace the HIFAR reactor. Is that true?

Prof. Garnett—We were not the people who were making that decision. I believe the department has acknowledged that the chief scientist at the time when the actual decision was made was not consulted but that the duties of the chief scientist at that time were of a part-time nature and had changed significantly from before. Certainly, previously ASTEC on which the chief scientist sat had agreed that a replacement reactor was one of the seven facilities that Australia should acquire. Access to those facilities has been provided.

Mr HOLLIS—Mr Forrest has a question regarding Dr Green. He asks, 'Who is Mr P. Ripley, whom Dr Jim Green alleges has prepared a report on the corroded spent fuel rods incident?'

Prof. Garnett—I do not know who a Mr P. Ripley is because I do not even have a staff member called Mr P. Ripley.

Mr Horlock—We have checked, and we have not got a staff member with that name.

Mrs CROSIO—Professor Garnett, I asked whether the nuclear reactor will generate any extra rods. You responded and then went on to state:

That is the major difference in the different models. The number of rods will vary, but we do not expect that to be significantly different than the current generation of 38 to 40 per annum.

Can I have a definition of 'significant'? Does it mean 68, 58, 37, or do you just not know?

Prof. Garnett—In talking and looking at potential core design—and Mr Horlock was talking about it—the number of fuel elements in the core will almost certainly be smaller than the number of fuel elements currently in the core. That means they will be replaced slightly more often than currently. But the predictions from potential vendors, et cetera—and currently it is about 39—are that it might vary up by about 10 per cent, or it might be the same.

Mrs CROSIO—So it would not exceed 50?

Mr Horlock—I do not think so.

Prof. Garnett—I do not think there is any expectation—

Mrs CROSIO—If it is smaller, you will generate more—you will do more work and you would not use more?

Prof. Garnett—No. The issue is—and Mr Horlock has mentioned different fuels being qualified—that there are percentage enrichments, and I think you know that, and we are going for low enriched uranium. But different fuel types have different amounts of meat, as we put it, a different amount in there. You can have fewer fuel rods but more meat in the fuel rods, or you can have slightly more fuel rods and less meat in the fuel rods. That is why, depending on the exact number of fuel rods that are put into the reactor—

Mrs CROSIO—But you can see the importance of the question, because the fuel rods become part of the waste—

Prof. Garnett—Absolutely.

Mrs CROSIO—your contracts are for X number to go—

Prof. Garnett—Yes.

Mrs CROSIO—and there are certain that go each year. You have money allocated but, if you are to start generating more, where do we take the finances from for that?

Prof. Garnett—Correct.

Mrs CROSIO—How do we go for storage?

Prof. Garnett—Just remember that the $80-odd million is for HIFAR fuel. All of the costs for the replacement are in that $12 million per annum. The figures that are in there are, again, conservative from the point of view of maintenance of the facility and fuel management.

Mrs CROSIO—Conservative on the high side or the low side?

Prof. Garnett—Conservative in that we have allowed more than we would currently spend.

Mr Horlock—Just to give you a global feel, there are reactors in the world which have a single fuel element. So, just taking an extreme, the issue that is important is how much uranium 235 is there and how much of that is burned. If we run at 15 megawatts on average over the year, we will burn 50 per cent more 235 than we do in our current reactor.

Mrs CROSIO—But you are going to pay for 20 megawatts.

Mr Horlock—The cost of the fuel is related to its design, to its uranium content, to how it is put together. When we get the tenders in, we will be selecting the most cost effective reactor. That is in our interests.

Prof. Garnett—That is stated.

Mr Horlock—What we are interested in is the bottom line of the total package.

Prof. Garnett—But it is also the volume of the wastes, and I understand that issue. I think what we are really committed to is that we can work out that the volumes of the waste will be as they are in the EIS. This comes back to the fact that there are rods but there is the amount of meat that is in those rods. You can have one big fat rod, if you want to put it that way.

Mrs CROSIO—Professor Garnett, you read out, 'The Chief Director of Corporate Services has given me the grabs out of a finance advice.' Mr Hollis then said, 'We wouldn't mind seeing the full financial advice,' and Mr Ripple added, 'Yes, I would like to see that advice.' Mr Hollis then asked whether that would be a difficulty? The response he was given was, 'We will provide you with what we can—provide you separately.' Have we been provided with that?

Prof. Garnett—Was that to do with the comment on GST?

Mrs CROSIO—No. It is a department of finance advice—'We wrote to them and sought advice.' Yes, the written word that they got back—

Mr HOLLIS—Yes, they said that they had written back to you.

Prof. Garnett—We sought advice from the department of finance, and it was in one of these reactor facilitation meetings. They advised us to speak to Treasury, and we have. I will give the chair the document I have here, which is the words from—

Mrs CROSIO—This is one where you were giving advice about what is happening, that it is not subject to taxation under any law of the Commonwealth or state or territory.

Prof. Garnett—Yes, and Treasury's comments are that they believe there might even be a saving for ANSTO.

Mrs CROSIO—Thank you. Perhaps we can take that on board. Professor Garnett, I asked you in evidence about Y2K, and Mr Jackson raised a point. He said:

> . . . with Y2K, you basically get a whole range of interrelated systems. Research that has been done on it shows that it is not exactly what happens in the computer in the particular place which may be the problem. It is how those computers are linked to everything else. It is a question of minimising risk.

I think he was saying that the reactor just does not shut down with a light switch; there could be a long-term problem.

Mr Horlock—Are you talking about Y2K?

Mrs CROSIO—Yes.

Prof. Garnett—We do not have computers shutting the reactor down.

Mrs CROSIO—I know. That is the answer you gave me, that you did not have such computers. It was for that reason this gentleman came up. He must have been listening to the evidence too. I am not a technical person able to say yea or nay. I just have to be certain, in my mind, as well as for the public's mind, that we do not have any problems.

Mr Horlock—There is nothing in the reactor which will inhibit its safe shut down at any time because there is no component in the reactor which is Y2K sensitive.

Mrs CROSIO—So there is nothing else around it. That is fine. That is on the public record. You are convinced and you have reassured us. So, even after having had other questions asked on it, we are reassured again.

Prof. Garnett—We will even have diesel generators to make sure that the water continues to flow through it while it is there. I think we have redundancy in three diesel generators and we have enough diesel to last us for—did you say months, Ken?

Mr Horlock—Well, days.

Prof. Garnett—Weeks, he said to me.

Mr Horlock—We will shut the reactor down prior to midnight on New Year's Eve. We will test the operation of our stand-by diesels. We will revalidate all our safety protection circuits and then we will restart again.

Mrs CROSIO—When will you restart it again?

Mr Horlock—About an hour later.

Mrs CROSIO—An hour into 1 January?

Mr Horlock—Yes.

Prof. Garnett—But that is being ultra conservative.

Mr Horlock—It is ultra, ultra conservative. We do not think it is necessary.

Mrs CROSIO—It is now on the public record, and no-one can dispute it.

Mr Horlock—We do not think it is necessary but we think it is good PR.

Mrs CROSIO—Ms McSorley in her presentation, in terms of disposal of waste and repositories, stated:

> I do not think the committee should just accept that the store is a foregone conclusion. I think there is every possibility that particularly the South Australian parliament or any other government, when they really come to grips with what is being proposed, will kick up their heels and refuse to have the store. There is an extra facility that ANSTO have not mentioned in the hearings—they have not mentioned it in this little booklet—

meaning their response, which she held up—

that is, the long-lived intermediate level waste that will come from the processing of isotopes will only be packaged initially in a form that will last for 50 years.

This is what you were explaining to me before. She continued:

In talks that I have had recently with ANSTO staff, they said that it will have to be processed again, possibly into Synroc, before it can be disposed of in a deep geological repository. That is an extra cost. I have not seen any costings from that.

That is a point; she has a point.

Prof. Garnett—I do not quite understand, with all due respect, what is being said.

Mrs CROSIO—You do have this, do you not?

Prof. Garnett—We have, and I must admit that I did look at it.

Mrs CROSIO—I think, in a nutshell, she is really saying that you were saying—and you have given us this evidence here this morning—that those spent fuel rods will come back and be stored away for 50 years, et cetera.

Prof. Garnett—That is right. I think she is querying the other waste which is still in the 10 per cent that will come from the whole operation of the reactor.

Mrs CROSIO—She was giving us evidence and, if you read it, you will see that I asked her:

Are you telling us that, for the cost of $3 million or $4 million per ship to send it over to be reprocessed, we are basically getting the same amount back into Australia?

She answered:

In terms of radioactivity inventory, yes . . .

Mr Horlock—That is completely wrong.

Prof. Garnett—I think we have addressed that issue earlier on.

Mrs CROSIO—She also commented on this repository in South Australia. From inquiries that were made, the thought was—and I agree with Mr Hollis—that it was for watch tailing and other evidence like that.

Prof. Garnett—There are two parts to the proposal: there is the in-ground low level and short-lived intermediate level waste repository; and then there is the plan for the associated store that she refers to. That store will need to have all of that waste—

Mrs CROSIO—And that will go in South Australia as well.

Prof. Garnett—That is in South Australia at the moment, that is at Woomera—that has come from ADI. That is long-lived intermediate level waste.

Mrs CROSIO—And yours goes there as well.

Prof. Garnett—It would not go to Woomera, but it would go to the appropriate store. Again, I come back to the fact that there was in principle agreement between the various states and the Commonwealth that the collocation of that to handle all of Australia's long-lived intermediate level waste, whether from our activities or anyone else's activities—

Mrs CROSIO—Would ANSTO's activities have to then possibly go into Synroc?

Prof. Garnett—No. This material would already be in a conditioned form—

Mrs CROSIO—Concrete?

Prof. Garnett—No, it will not be in concrete; from HIFAR, it will be in a glass matrix, which is an internationally qualified form. From the replacement—

Mrs CROSIO—But what about the processing?

Prof. Garnett—Yes, the reprocessed material that comes back from France is in a solidified glass matrix of the kind that Mr Hollis has seen through in situ vitrification. It is a better product than you have seen from ISV at Maralinga. It is already immobilised in glass. Then that glass is in a storage container that is internationally qualified for storage.

Mrs CROSIO—So why would ANSTO staff tell Ms McSorley that it would have to be processed again, possibly into Synroc, before it can be disposed of?

Mr Horlock—That is not true.

Prof. Garnett—That is simply not true.

Mrs CROSIO—Good, we have that on the record.

Prof. Garnett—I think she is confusing, with all due respect, the fact that we are currently solidifying into a solid some liquid effluent that we had stored on site from radiopharmaceutical production over a long time. With that solid, we have undertaken research work to show that we would be able to put that—and we have developed the formulation—material into a Synroc waste form. It will produce a very small amount—about a whole cubic metre or so—of Synroc. We intend to do that. It is within our current budget, and it is within what we call our waste management action plan to handle the legacy wastes. That infrastructure will be there so that, on an ongoing basis into the future, that liquid immediately will be solidified and go into a Synroc form.

Mrs CROSIO—In that same statement, Ms McSorley also said:

. . . let us go to the deep geological repository. We know there is absolutely no plan for this. There is no money for it. There is absolutely nothing on the drawing board. I have spoken to officials from the Department of Industry, Science and Resources. They have not got the money to be pursuing that option at present. As you know, it is one of the conditions that Senator Hill placed on giving absolute final go ahead for the reactor.

Prof. Garnett—That is not correct. He did not place that condition that there needed to be a deep geological repository. That is not one of the conditions. In fact, the total volume of intermediate level waste that Australia has is very, very small. That is why the decision has been made that it would be appropriate to put it in an appropriate storage facility.

Mrs CROSIO—When you speak of ANSTO being only one-third of radioactive waste, is there any other organisation or industry, state or territory in Australia, that has the same type of waste that comes from the reprocessing of spent fuel rods? Is ANSTO the only one?

Prof. Garnett—No. The long-lived intermediate level waste—

Mrs CROSIO—No, my question relates to the radioisotopes or spent fuel rods going overseas, getting reprocessed, coming back—

Prof. Garnett—In glass, as glass.

Mrs CROSIO—is there any other company, any other organisation in Australia that generates that waste?

Prof. Garnett—No-one will be generating exactly that kind of composition in glass. But other organisations do have long-lived intermediate level waste which is—

Mrs CROSIO—So they have spent fuel rods coming back?

Prof. Garnett—No, they do not, it is not spent fuel rods because intermediate—

Mrs CROSIO—So the answer is no?

Prof. Garnett—No.

Mrs CROSIO—ANSTO is the only one that has spent fuel rods that are reprocessed stored.

Prof. Garnett—ANSTO is the only one having rods that are reprocessed stored, yes; I accept that. But that is categorised on the basis of its radioactive composition and its heat loading as long-lived intermediate level waste because of the likely length of the decay time for the isotopes. We are not the only organisation with long-lived intermediate level waste which has both the heat loading and radioisotopes of the composition that makes it classified. Department of Defence materials exist.

Mrs CROSIO—But there is no other creator of that level of reprocessed rods?

Prof. Garnett—No-one else has a reactor that is making rods, no.

Mrs CROSIO—I thank the committee for its indulgence, which I appreciate very much. I do apologise for all my questions. I do have a few more, but I gave a certain guarantee.

Proceedings suspended from 10.45 a.m. to 10.57 a.m.

Prof. Garnett—Just before we commence, I would like to clarify one thing. There was a question asked about decommissioning costs, et cetera. I said that there was a table in the EIS. It is table 19.1 of the draft environmental impact statement.

CHAIR—That is for the existing HIFAR?

Prof. Garnett—Yes. Again, it states in a number of places that the cost and volumes of material that would come from a replacement are less. That is because new facilities are designed with decommissioning in mind, and they have lower costs associated with them.

CHAIR—Thank you for that clarification.

Mr HOLLIS—One of our difficulties here today is that some of our questions are being asked on behalf of other colleagues who cannot be here. Mr Lindsay has asked me to ask you several questions. One relates to a claim made by the Sutherland Shire Environment Centre about insurance cover for residents. His question is: what is ANSTO's response to residents' claim that they cannot get insurance cover?

Prof. Garnett—Again, that is extensively covered in the supplement to the draft EIS.

CHAIR—There is a full explanation of that in there.

Prof. Garnett—A very full explanation. There is an indemnity under common law and, in fact, it is not limited in sums. I would suggest that it is probably one of the better covers for issues associated with any potential nuclear event anywhere in the world.

CHAIR—I think the intention of that question was that the indemnity covers staff of ANSTO. If the public wanted to do anything, they would have to take a common law action.

Prof. Garnett—That is correct, but I think we all know that it is not exactly difficult to get a class action and common law actions.

CHAIR—There was some concern about that, but there is quite a full explanation.

Mr HOLLIS—I know the chair intends to ask some questions on accidents, real or alleged, and I also have such questions. Perhaps we might do a bit of a song and dance here in asking those questions. You have seen the evidence that the other witnesses have put before us?

Prof. Garnett—I have seen the statements, yes.

Mr HOLLIS—There was quite a lot about a so-called accident last October. Even Mr Lindsay has something here going to the statements from People Against a Nuclear Reactor.

He asks: there is UF6 on site; was there an accident involving—and he has got—'white powder'? He states that 'a witness said that there was a claim that this was a bad accident' and he asks: was it? He asks how much iodine 131 went 'up stack' in the February accident.

Prof. Garnett—First of all, if we talk about the UF6 incident, I think Dr Hardy, a staff member at the time, was involved in the investigation.

Mr Horlock—He was responsible for it, I think.

Prof. Garnett—He was responsible for the investigation that followed up on that. I gave you evidence about that. Can I say that, firstly, UF6 is not a radioactive material; and, secondly, it has nothing to do with the operation of a reactor. It was associated with a project that was being undertaken during the 1980s, and there was a very small quantity of UF6 which went out into a research laboratory. But there was a very thorough investigation and monitoring, which confirmed again that there was no radiological health risk to any member of the public or any other toxicological health impact because, as I say, this was not a radioactive material. This is covered in the EIS. Again we have listed in the EIS those, what you might call, abnormal emissions or incidents that have occurred. That is in volume 1, main report, page 1043. It is covered there.

The iodine issue I would put in this perspective: as you have heard, there are small amounts of iodine emissions normally. The amounts that we produce and the amounts of the emissions are so small that—and, again, this is contrary to what some people might say—if we were in the USA, we would be exempt from regulation in connection with our iodine production.

As for the case in February this year, there was what we would refer to as an operational event: an amount of iodine that was above normal—but, I repeat, was not a breach of our authorised limits—was released. The amount that was released in that particular incident was about a total of two per cent of the annual activity constraint for that particular building. If you realise that we normally produce iodine on a weekly basis and sometimes twice a week, you can see that that is well within the bounds, virtually, of our normal production. But it was slightly above normal.

To put it in a more publicly understandable perspective, in volume it was about less than 0.01 millilitres of material that was vaporised—an extremely small volume. If you want to put it into the perspective of a dose that a person might get for a therapeutic procedure, it was about a quarter of a person's normal therapeutic dose.

CHAIR—I will follow on with that. Looking at the evidence that Ms Rankin gave about iodine, she says:

> But ANSTO's monitoring since then is all done on a computer; it is desktop monitoring. They are not out there measuring; they are doing desktop computer models. We called for actual testing of what is coming out of the stack. With the accident that occurred in February, the workers tell me that 15 to 20 giga becquerels of iodine 131 escaped up the stack. That is as much as came out in the whole 12 months before.
>
> ANSTO's response to that has been, 'It would only be trivial overall if you average it for 10 months.' We get this sort of answer because they are doing it on a computer model; they are not measuring how much comes out. The

workers only know from what went in. What is important is what is coming out because, if that comes out in a plume and, say, the wind is blowing towards a school, people will be exposed. There is absolutely no doubt about that.

She made several references to this.

On page 21 of the evidence, she mentioned that there had been some dissatisfaction from the workers; that she had had a lot of recent statements from workers. She said that she got them to put the details in writing but that they were anonymous. She stated:

We try to keep to what is published and acknowledged by ANSTO, except when it was such a groundswell like in February where the workers were so dissatisfied because they felt there should have been a site emergency and there wasn't. They felt that the push for the new reactor was putting them at risk on site because ANSTO was going to such lengths to avoid bad publicity.

This was also in relation to the iodine, so I just thought we might deal with some of those aspects of the evidence. She also said in evidence on page 20:

That was why I gave the iodine example. The committee only needs to look at the minutes of the safety review committee to see that often there are recommendations. For instance, when the alarm was broken, at the end of the day after you had worked you would ensure that you were not contaminated. That was raised at the safety review committee.

Mrs CROSIO—How long was that broken for?

Ms Rankin—I am not clear on the exact timing, but my understanding is that it was 12 months. It was raised at about six different safety review committee meetings. Each time costs and lack of money in the budget were put forward. This cost is not a theoretical exercise; it is a straight safety issue. Either we have the money to have filters in the stacks to stop some of that iodine 131 coming out and we have the money to fix alarms when they don't work, or we don't.

So I will leave it at that. There were, as I said, a number of different references to this and you might like to respond.

Prof. Garnett—I will try to respond. There is a lot of stringing together of words there that really do not relate to particular incidents, and there are a number of allegations. Let me come back to the amount. The figure that you have just read out as being the amount that was supposed to have gone out of the stack I said was wrong. The order of magnitude by which it was out was about greater than 10. I have given you the amount that came out of the stack, and that is the honest amount.

It was not 'desktop models'. It is monitored and it is measured, and we have gone through the fact that there are monitors in the stacks. There are also, of course, the monitors of which we spoke earlier on the perimeter of the fence, and nothing was picked up on the perimeters on any of those dosimeters or monitors. So I think the allegations about substantial amounts of iodine cannot be substantiated. Clearly, as we have said, the incident was reported to ARPANSA, which existed at that time. They have had access to the records and they have access to their own monitors.

CHAIR—Would you like to comment on the broken alarm not being fixed for 12 months and also filters in the stack?

Prof. Garnett—That is quite a different issue. That has nothing to do with filters in the stack, and that is again wrong. The fact is that we use a number of monitors of different types where staff, when they leave a radioactive area, can be checked. When you came out of HIFAR, as you will remember, you were hand checked with a hand monitor. There were two of those on the wall. In addition, there was another instrument which is a walk-through monitor. We did not put you through that because the other one is okay, particularly for short visits.

For our own staff normally, our preference is to use those walk-through monitors. They are not different. All they do is allow you to stand in there, put your hands in a thing and you stand on another thing, and it counts your hands and feet in the same way the other monitors do.

A particular facility, that exit scanner, came from overseas. One part broke which had to come from overseas. It was not an issue of cost. It was the fact that the part was not available in Australia. It is not a part that normally goes, so we did not have a spare. In fact, it took some time for that part to come. But the other monitors are there. When a monitor like that goes down, one uses the other kinds of monitors.

CHAIR—So it is considered to be a backup system.

Prof. Garnett—In fact, in many organisations you will find that is the norm, that you do not even have the other more sophisticated monitors.

CHAIR—So it was not a question of not having enough budget to maintain the safety facilities?

Prof. Garnett—Not at all. Issues to do with safety and safety culture on site, as I said earlier, are given a very, very high priority. So what you have put to me is certainly not the case.

You made a comment about the staff. I think the best I can do is refer you to the fact that our own staff unions collectively have written letters to the press refuting the allegations that have been made by Ms Rankin and various other opponents in the press about these incidents that have occurred; about the exposure, et cetera, that has been indicated in those letters and in public statements; that they have investigated the incidents and that they are assured that the appropriate actions were taken and that there were no inappropriate activities on anyone's behalf.

In fact, I think they made the comment to a Senate inquiry that, in their view, the joke among ANSTO staff is that, if you stub your toe in the car park, it is a nuclear accident. They have found themselves in the position of having to go out and indicate that many of these allegations are not true.

CHAIR—Further on that, on page 22 of the evidence, Mr Lindsay questioned Ms Rankin about comments that were made in an earlier part of her statement. He said:

Ms Rankin, a major part of your evidence today revolved around iodine 131, both in gas use emissions and through the sewerage system at Potter Point. Do you agree that ANSTO has an established record in monitoring these emissions?

Ms Rankin—No.

Mr LINDSAY—Why do you say that?

Ms Rankin—I say that because, in the McKinnon review, council's consultants brought forward this issue of the gaseous emissions of iodine 131 and the liquid tritium and others going out to the ashen because they found them coming out. If you compare ANSTO's published figures with places like Sellafield and Dounreay, they were enormous—they were 10 times higher coming out of our little research establishment. The reason for that was discovered to be the production of radioisotopes, which those other plants do not do.

Prof. Garnett—That is correct. Neither Sellafield nor Dounreay, the two that the particular consultants at the time compared our emissions with, produce radioisotopes. As we have said, iodine is a product that we make. It goes into people. But, in doing that, there are certain processes and there is a small amount of vapour. Most of that is trapped and contained, but a very small amount is emitted in our emissions. Those emissions are on the record. They are monitored, they have been estimated. As I said to you earlier, the amount we produce is such that in the US we would not even be required to be licensed.

CHAIR—But they are 10 times higher, are they?

Prof. Garnett—They are, but you are talking about 10 times virtually nothing, with all due respect. The issue with radioactivity is that, because you can measure every individual disintegration of one atom, you have the most exquisitely sensitive tool to measure something. That provides the benefits by which we use small amounts of radioisotopes as traces, and we can use it in medicine, et cetera. But it also allows you to measure. When we talk in units of micro-sieverts, which is 10 to the minus sixth of a whole sievert, we are talking in very low terms. Ten times is still an extremely small amount.

Dr Cameron—It is not appropriate to compare a plant which has some iodine with a plant which does not have iodine. If you looked at those plants in terms of the other isotopes they produce, they emit isotopes that we do not have. So it would not be fair to turn around and say, 'They emit an isotope with 10 times more than ANSTO,' because ANSTO does not handle isotopes. You have to compare apples with apples.

CHAIR—Ms Rankin, in her evidence on page 19, said—and she is right—that one of the conditions Senator Hill put on the replacement reactor going ahead was that there should be no increase in the amount of iodine 131 coming out of the stack. That is as I understand it as well. Ms Rankin goes on to say:

It is a very important condition because iodine 131 causes thyroid cancer and in southern Sydney at the moment there are high rates of thyroid cancers, particularly amongst women. This is just an example.

She went on to say:

If there is going to be four times the amount of production and no increase in iodine 131, there will have to be very sophisticated filters put into the stack, much more so than any that exist at the moment. Since 1992, when Sutherland Council raised this issue about the extraordinary high levels of iodine 131 coming from that plant, there

have been very genuine attempts by ANSTO to lower the levels and there has been some lowering of the level of iodine 131 gases. However, unless we know the cost of those filters and how they are going to achieve that, we believe it should be down to nil release of iodine 131. There is no way that the community or you people can assess whether or not that condition is going to be met.

This is in relation to what she considered the sort of loose arrangement in terms of the building of the plant and the costing where you were saying, 'This is the cost and we have laid down broad parameters, but we have not given the tenders precise detail.'

Prof. Garnett—The iodine issue is not an issue to do with the replacement reactor; the iodine production comes during the processing of materials in the radiopharmaceutical production area that you visited. However, in the EIS, we gave undertakings. There is technology emerging. In fact we have a project, and we will be working with people overseas, to evaluate this issue of cost. I think that is not true. The filters we have put in place at the moment cost. They are a component part of our radiopharmaceutical production. They are costed into that production. Our prices are based on our production costs, et cetera. We have every intention of introducing these new technologies that are emerging. It is not part of the reactor project; it is part of our normal radiopharmaceuticals and it is part of our normal upgrade of facilities.

CHAIR—Can members of this committee be absolutely assured that whatever happens there will not be any significant increase, as Senator Hill outlined, of iodine 131 emissions?

Mr Horlock—Yes.

Prof. Garnett—We have been given a request from our minister to the chairman of the ANSTO board that we put into effect the recommendations. I have written to Environment Australia talking about the ways and means that we would intend to put plans in place to do that. I think you can have every assurance that we will do what we ourselves said we would do in our documentation.

Dr Cameron—The way that will be achieved is that we will be adding that in writing to the licence conditions and agreement between ourselves and ARPANSA about how these measures will be introduced over relevant periods of time.

Mr Horlock—To give a further explanation, not to confuse the committee to thinking that the only way to reduce emissions is to adopt new technology, the advantage of the new technology is that it is a more effective absorber of the radioactive iodine than the existing technology. The existing technology does absorb it. We are just looking at a better way of doing it.

Prof. Garnett—That is right. That is why we have very small emissions.

Mr Horlock—It makes it easier for us to comply with that promise we have given. That is why we are doing it.

CHAIR—Thank you very much. That pretty well covers queries on Ms Rankin's evidence. The other one was Mrs Wilson. At the end of her evidence, Mr Forrest asked some questions regarding the outlet for sewerage. Mr Forrest said:

So it is the sewerage discharge from the site at Lucas Heights but you say it is radioactive.

Mrs Wilson said:

Did I say that?

Mr Forrest then quoted from her written submission, which says:

'Ocean discharge of radioactive liquid waste now occurs through the water board sewer outlet at Potter Point.'

Mrs Wilson then responded:

At the time that was written, which was when the research reactor McKinnon report review was on, that had been discovered.

Mr Forrest said:

This goes back to 1993.

Mrs Wilson said:

Yes. Those two addenda that I have added were my submissions in 1993, to save having to redo them.

Can you comment about radioactive water being discharged at Potter Point?

Prof. Garnett—As I said earlier, all our liquid material is collected on site. We have a treatment plant currently on site. The material is only released after it has in fact been checked. We take those samples, and composite samples are there for ARL. In addition, the material goes to Potter Point. That is the water board. They do their own checks. We have a treatment plant, so when the material reaches Potter Point it is drinking water quality standard in regard to the composition of the radioactivity.

Mr HOLLIS—But you would not want to drink it.

Mr Horlock—No way.

Dr Cameron—Not because of the radioactivity.

Prof. Garnett—Not because of the radioactivity, with all due respect, Mr Hollis. I might state for the record that we are aware—and I believe this has possibly come up in other submission and said to you—that Sydney Water is looking towards what you might call a closed cycle treatment plant for Cronulla. As part of our existing waste management action plan at ANSTO—and this plan has been in existence for some period of time—over the next couple of years we plan for the replacement of our current treatment plant with a more modern treatment plant such that any effluent will be totally compatible with the recycled sewerage works that is going in at Cronulla.

Dr Cameron—It is drinking standard by the time it reaches the sewerage treatment plant, even before it gets diluted through the plant.

CHAIR—Mr Forrest was unable to remain and asked that the committee ask you some further questions on his behalf. They concern waste. His first question was: how is waste defined? I think we have probably covered that adequately this morning.

Prof. Garnett—There are a number of international definitions.

CHAIR—What happens to heavy water?

Mr Horlock—What happens to it when?

CHAIR—He has not outlined that. He has just asked what happens, so I guess we will have to do that as best we can.

Mr Horlock—To give you a little background, heavy water exists in all water. It is present everywhere and in sea water. It is concentrated in plants where electricity is cheap, and that is typically in Canada, by an electrolytic process so that we can have very high purity heavy water for use in nuclear reactors. If you wanted to dispose of it, you could dispose of it.

Prof. Garnett—When we replaced the heavy water—the heavy water is only used at the moment in HIFAR—we shipped it back to Canada. They can treat it to take out the impurities and it is recycled.

CHAIR—So it is recycled. He also wanted to know what material was buried at Little Forest Road Cemetery in the 1950s? Is this dump documented?

Prof. Garnett—Yes, it is. There is information in our EIS about Little Forest burial ground. What is there is on the public record.

CHAIR—What is buried there?

Prof. Garnett—There is some beryllium, as I believe Dr Hardy mentioned in his evidence. There is what you would classify as low level radioactive waste material. That site is within ANSTO's property. It does have security monitoring and it is checked. As you probably realised when you arrived, we have the Australian Federal Police, and it is part of the normal security monitoring system. As far as any potential health impacts are concerned, that has been thoroughly investigated. In fact the state government commissioned a report some years ago to ensure that there was not any material leaching out of that going into streams, and it was shown that it was not.

CHAIR—There were some questions, as I recall, in the evidence on the possibility of leaching from that site.

Prof. Garnett—As I say, our own monitoring—those monitoring reports that you were given when you were at ANSTO, which we produce annually—does cover Little Forest. As I said, the state government commissioned a study a few years ago to look at any current or potential leachate that might come out of that and, in essence, gave it a clean bill of health.

CHAIR—How often is the leaching possibility checked?

Prof. Garnett—As I say, the details of that are in our environmental report. All of that is in that environmental report that is produced annually and the data from that.

Dr Cameron—The important thing to note is that in doing those assessments what they determined was the rate of leaching. So if you know how much it leaches per year, you have an estimate of where it would go over a period of time and then they verify that.

CHAIR—Mr Forrest also had a question on the importance of molybdenum. How often has this been imported, particularly from South Africa?

Prof. Garnett—We import small amounts of material to back up at various times. When we have had shutdowns, as I have already given you evidence, we needed to try to import a major amount. We tried to make sure we had shipments from a variety of other suppliers but even then, as I indicated to you, we had problems in that there were times when the material was not put on the plane. There was a time when because of an issue with packaging at the site the material arrived in forms that were not able to be used.

CHAIR—His other question was: what were the delays which make this the reason for not favouring importation?

Prof. Garnett—Those are all the delays. The other issue is, in the longer term, we are at the end of the longest distance chain of distribution from any of the centres. In all cases it relies on local transport—local planes and then national carriers and transfers at international airports between internal flights and international flights. My guess is that that is sometimes problematic. There really is an issue of reliability of supply. I remember a situation before we had the cyclotron—in fact in the early time before we had all the production of the cyclotron going on. A patient and family had been brought from country to a hospital in Sydney for a procedure and the isotope, which again we were importing in small quantities to provide for people, simply was not on the plane.

CHAIR—The last question from Mr Forrest relates to the incident in October last year where it is alleged that two staff were moved out of the waste water holding tank area.

Prof. Garnett—I believe that the incident they are referring to is an incident that occurred substantially earlier. There was absolutely no incident in October last year that resulted in the moving of anybody. There was an event earlier in the year where one staff member was moved, and they were moved because they did not abide by the safety culture principles that I referred to earlier on where when you have any event at all that person who is responsible should report it up. That person did not report it up but other staff members did.

CHAIR—Somewhere in the evidence there was an account of someone who actually went home.

Prof. Garnett—No, that is a different issue. That was some time before that. The person who went home was somebody who had been working and had a very, very minute amount

of material on them. It relates to the time when the walk-through monitor was not functional and the person was required to frisk themselves. That is something they are all obliged to do. That person did not appropriately do all the checks. On realising that they could have had a small amount, the question was asked: did they check themselves thoroughly, et cetera. Because we found that there was a very minute amount of material—it was insignificant in radiological terms—that person went home.

CHAIR—Have there been some procedures adopted so that does not occur in the future?

Prof. Garnett—Mr Horlock is the director of the division.

Mr Horlock—All staff are required to monitor as they leave a facility. You do depend upon their good practice to do that.

Dr Cameron—If it is found that they do not do that, they will be moved from the area, as happened in the previous case. We do need to be sure that they are following proper procedures. If they are not, it is a management issue and they have to be appropriately removed.

Prof. Garnett—The example you cited where someone was moved is an example that we do do it. We take safety and safety culture very seriously.

CHAIR—I think we have finished.

Prof. Garnett—Clearly we are happy to provide any additional information that you want. From some of the questioning this morning, it is a matter of trying to put this issue into context of the various waste classifications and what comes back. I will provide this document to the committee which indicates the contribution of the replacement reactor to low and short-lived intermediate level national wastes and the fraction of that overall category of longer-lived intermediate level waste material that would come from the replacement reactor.

CHAIR—I think Mr Horlock was concerned about some earlier comments when I was asking about the potential for staff to perhaps provide samples. There was no intention to reflect on staff at the present time. It was a hypothetical situation. I think we have to ask those kinds of questions. Although that may not be a scenario that would occur now, there is the potential for those things to occur at any time in the future.

Prof. Garnett—I think there are two issues. Mr Horlock might like to give you, in answer to that and as an addendum, the practices right throughout the chemical and pharmaceutical industry, particularly the pharmaceutical industry. I remind you that we are not only regulated by our radioactive licence, et cetera, and ARPANSA but also strictly regulated by the TGA. We are licensed under the TGA for good manufacturing practice. That also puts certain restrictions on what we do, particularly in relation to effluent and samples. Mr Horlock might like to comment on that.

Mr Horlock—You noticed my reaction. I was quite disturbed by the inference. The reason is that for many years I was responsible for our radiopharmaceutical production, so I can give you an example of practice there. Radiopharmaceuticals have perhaps more risk to the population in terms of things going wrong than any emission that we might make from the site, simply because it would be possible, if there were any mistake in their content, to directly harm an individual seriously. That applies to any pharmaceutical manufacture.

During our manufacture, we make our product in batches. For every batch we prepare two samples—one at the beginning of the batch production and one at the end, typically. Those samples are used for analysis and they are kept for retention in case there is later on some patient reaction or some event that needs analysis. The staff concerned are responsible not just to ANSTO but to the Therapeutic Goods Administration, the regulator, for ensuring that the samples are taken properly, documented properly and are never interfered with. Those staff take those responsibilities extremely seriously.

CHAIR—I am sure they do.

Mr Horlock—They are not just responsible to ANSTO or the executive; they are responsible to the greater community through the TGA. The same applies to our sampling for our environmental monitoring and our discharges. The staff concerned are individually responsible to see that that is done properly and no sample is interfered with. I would like to record that that is a high integrity operation.

CHAIR—That is why the question was asked on a hypothetical basis, because I think the public have to be absolutely assured that these processes are pretty much foolproof.

Mr Horlock—They are.

CHAIR—It is reasonable that the public should have those kinds of assurances.

Prof. Garnett—Absolutely. It is not only the samples, as we talked about, but also the monitors that we mentioned that are out there on the perimeters not only ours but ARPANSA's. I think that is what we would say is the second line of defence. The samples that we take and the results we publish and the results as checked are appropriate because if there was anything wrong with those it would be picked up by those monitors that are out there. We have ours and the regulator have theirs.

Mr Horlock—When we get audited by the TGA or ARPANSA or anybody else, the staff concerned are questioned about how they do it and what they do. So it is a face to face audit and demonstration of integrity. Believe me, people do not play around with it.

Dr Cameron—One other point is that there have been a number of allegations made over a fairly long period of time, and I think these are difficult technical issues because radiation is unseen, et cetera. That is why these independent studies are very important in their verification process.

CHAIR—We have to wind up at that point. Thank you very much. Is it the wish of the committee that the correspondence received, which has been circulated to members of the

committee, be incorporated in the transcript of evidence? There being no objection, it is so ordered.

The correspondence read as follows—

CHAIR—Thank you very much for returning today and answering our questions. I thank the committee members, Hansard and the secretariat.

Resolved (on motion by **Mr Hollis**):

That, pursuant to the power conferred by section 2(2) of the Parliamentary Papers Act 1908, this committee authorises publication of the evidence given before it and submissions presented at public hearing this day.

Committee adjourned at 11.36 a.m.