



COMMONWEALTH OF AUSTRALIA

Official Committee Hansard

**HOUSE OF
REPRESENTATIVES**

STANDING COMMITTEE ON INDUSTRY AND RESOURCES

Reference: Developing Australia's non-fossil fuel energy industry

FRIDAY, 23 SEPTEMBER 2005

PERTH

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HOUSE OF REPRESENTATIVES
STANDING COMMITTEE ON INDUSTRY AND RESOURCES

Friday, 23 September 2005

Members: Mr Prosser (*Chair*), Mr Hatton (*Deputy Chair*), Mr Adams, Mrs Bronwyn Bishop, Mr Cadman, Mr Martin Ferguson, Mr Haase, Mr Katter, Miss Jackie Kelly and Mr Tollner

Members in attendance: Mr Haase and Mr Prosser

Terms of reference for the inquiry:

To inquire into and report on the development of the non-fossil fuel energy industry in Australia.

The Committee shall commence its inquiry with a case study into the strategic importance of Australia's uranium resources. The case study shall have particular regard to the:

- a) global demand for Australia's uranium resources and associated supply issues;
- b) strategic importance of Australia's uranium resources and any relevant industry developments;
- c) potential implications for global greenhouse gas emission reductions from the further development and export of Australia's uranium resources; and
- d) current structure and regulatory environment of the uranium mining sector (noting the work that has been undertaken by other inquiries and reviews on these issues).

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Committee met at 9.03 am**EWINGTON, Mr Damien John, Regional Manager Uranium, Areva-Cogema Australia Pty Ltd****MANN, Mr Stephen Thomas, Managing Director, Areva-Cogema Australia Pty Ltd****NICOUD, Mr Jean-Pierre, Vice-President Operations, Cogema Resources Inc. (Canada), Areva-Cogema Australia Pty Ltd**

CHAIR (Mr Prosser)—I am pleased to declare open the fifth public hearing of the House of Representatives Standing Committee on Industry and Resources for its inquiry into the development of the non-fossil fuel energy industry in Australia. The committee has commenced its inquiry with a case study into the strategic importance of Australia's uranium resources. The inquiry was referred to the committee by the Minister for Industry, Tourism and Resources, the Hon. Ian Macfarlane MP, on 15 March 2005. The committee is pleased to be conducting the public hearing in Western Australia—Barry and I are anyway!—where it hopes to hear mainly from junior excavation companies based in Perth and from Areva, the global uranium mining and nuclear power group.

I welcome the witnesses from Areva-Cogema. Thank you for agreeing to appear and give evidence at public hearing today. Although the committee does not require you to give evidence under oath, I should advise you that the hearing is a formal proceeding of the parliament. I remind you further that the giving of false or misleading evidence is a serious matter and may be regarded as a contempt of the parliament. I also remind you that the committee prefers that all evidence be given in public. However, at any stage you may request that your evidence be given in private and the committee will consider your request. I now invite you to make a short opening statement before we proceed to questions.

Mr Mann—Thank you very much for inviting us here today and for giving us the opportunity to be part of this current debate. With the current concerns related to greenhouse gases and the anticipated growing energy requirements of the world, I believe this inquiry has come at a very opportune time. It has come at a time when the population is starting to look more seriously at the earth's energy requirements with a more balanced view, and nuclear can be seen as one of those forms of energy that we will ultimately need for future generations. No-one will ever suggest, and we certainly would not, that nuclear should be the only fuel source, but there is no doubt that it is the most efficient and one of the cleanest sources of energy.

I thought it appropriate to give a brief outline of Areva itself, globally, and then to summarise our Australian activities, which are more exploration oriented. The Areva group is an energy company. It offers customers technological solutions for nuclear power generation backed by worldwide expertise in the energy business, primarily nuclear. It is No. 1 worldwide in nearly every aspect of the nuclear power game. It is the world leader in electricity transmission and distribution and it is No. 3 worldwide in the manufacture of connectors and the connector business. Areva's major shareholders are the French Atomic Energy Commission, with 70 per cent; the French state, with five per cent; Electricity de France, which is one of its major customers, with two per cent; and Total, the oil company, with one per cent. There are a number of other parties with up to four per cent interest in the company.

Areva is the only company in the world that addresses the entire nuclear fuel cycle. Sustainable development is central to Areva's strategy. To this end, Areva subscribes to the UN global pact, and its values charter is based on the 10 principles of that pact. Seventy-three per cent of our nuclear sites are ISO 14001 certified—ISO 14001 is the international environmental standard. Uranium activities and exploration in Australia are both ISO 14001 certified and also AS 4801 certified, which is the Australian-New Zealand safety standard.

Areva employs just over 70,000 people, over most parts of the world. It has production and manufacturing operations in 43 countries and it has sales and marketing offices in 100 countries around the world. At the end of 2004 it had a market capitalisation of nearly €12 billion. The Areva group is divided up into five sections, four of which relate to the energy cycle. The fifth is the connectors division. In relation to the energy cycle, though, we have what we call the front-end division. This division primarily includes all activities leading up to the generation of nuclear power—namely, uranium exploration and mining, uranium conversion and enrichment and nuclear fuel fabrication.

Prior to the formation of Areva in 2001, Cogema, which was probably more well known, was responsible for most of those parts of the energy cycle. Secondly, we have the reactor and services division, which includes the design and construction of the various types of reactors and also the supply of products and services to nuclear power companies. Thirdly, we have what we call the back-end division. That includes used fuel treatment and recycling after use in nuclear power plants. It also includes the interim storage of the material and, similarly, the design and supply of casks for the transportation and storage of nuclear materials. Finally, we have the T and D division. This division provides a complete range of products, systems and services for electricity transmission and distribution. We have a large group in eastern Australia related to this part of the business.

Importantly, the company invests a significant amount in research every year. In 2004 it spent €402 million on research, primarily to optimise the front end of the fuel cycle, to enhance reactor performance, to develop solutions for the back end of the fuel cycle and to prepare for the next generation of reactors. It has continuously spent a large amount of money on research and development.

Areva, through Cogema as a 100 per cent owned subsidiary, has consistently been the world's second highest producer of yellowcake in the world, behind Cameco, with mining operations in Niger—it has two operations in Niger: an underground and an open-cut operation—in Canada, where we have a number of joint ventures with Cameco and with other partners, and in Kazakhstan. In the past it has also mined in France, Gabon and the USA. Cogema currently explores in many countries around the world, including Australia, Kazakhstan, Canada, Russia, Finland and Mongolia, and has explored in many other countries from time to time. That is Areva briefly.

Very briefly now I will give you a summary of what we do in Australia. Primarily we are responsible at the front-end division. In Australia that is represented by Cogema Australia and its 100 per cent owned subsidiaries. Cogema realised the importance of Australia as an exploration province many years ago. With around 30 per cent of the known recoverable resources of uranium in Australia, which is host to seven of the top 20 uranium mines in the world, there is no doubt that Australia could remain a major player in the nuclear market for a long time into the

future. As these discoveries come with the knowledge that negligible exploration has been undertaken, particularly when you compare it with other commodities for the last 20-odd years—the only real exploration that has been done in Australia has been the seventies and early eighties—there appears to be a much greater potential for discovery of further uranium resources in Australia.

Cogema, or its precursors, has been active in Australia since the 1960s. Exploration has been conducted in most states and also in the Northern Territory, with the most intense exploration being undertaken in the seventies and early eighties. Nevertheless, it has continued to spend a significant amount of money ever since that time. Cogema currently owns the Koongarra deposit in the Northern Territory, the Ben Lomond deposit in Queensland and a number of exploration properties both in the Northern Territory and in South Australia. Over the last decade it has also divested a number of smaller uranium resources to Paladin—one in Oobagooma, just inland from Derby, and one in Manyingee, which is in the Carnarvon basin.

In total, the Cogema group has spent around \$150 million on exploration in Australia since it has been present in the country. Currently Cogema explores for uranium in South Australia, as I mentioned, and there is a small amount of work being undertaken in the Northern Territory. Cogema exploration budgets worldwide have significantly increased over the last 12 months, and its uranium exploration programs in Australia have benefited substantially from that increase. Cogema believes there is significant potential for uranium discoveries in other states of Australia, but at the moment it prefers to explore in those states that are not opposed to the concept of uranium exploration or mining.

Areva is such a diverse group that I will not pretend to be knowledgeable on the whole scope of Areva and all the aspects of the company. Nevertheless, hopefully between me and my colleagues we can enlighten you on aspects of exploration in this country and perhaps the synergies with our Canadian operations and exploration in Canada.

CHAIR—Thanks for that. I note that in your submission you say that according to the International Atomic Energy Agency the sharp increase in the forecast for energy will trigger a 70 per cent increase in CO₂ emissions, with dramatic consequences in climate change. You go on to say that this situation could translate into temperature increases of almost 1.5 degrees centigrade by the end of the century. You also go on to quote figures like 6.2 billion metric tonnes of carbon dioxide emitted in the year 2000 jumping to 15 to 16 billion tonnes in 2050. Do you think the public are aware of these?

Mr Mann—I think part of the problem that the uranium industry has both in Australia and elsewhere in the world is that there has not been a very good effort to educate the public. I do not think the public understand. Even if they understood the figures, I do not think they really understand the consequence. Look at a 1½ degree increase. Most of the public would say the variation from year to year is more than 1½ degrees. When they realise that it means melting of the icecaps and all these sorts of things they might have a different perspective. I think there has been a very poor job of the industry in general in educating the public on many of these facts.

CHAIR—To add to that, the report goes on to state that the developing countries represent two-thirds of the increase in energy demand, and fossil fuels including oil, natural gas and coal are expected to satisfy only 85 per cent of the demand. The fossil fuels are the problem, as we

both know. I will modify my question. What do you think the government could or should do, if anything, to educate the wider public? If we are going to be serious about greenhouse emissions and global warming, we cannot keep burning fossil fuels to the extent that the world is—not necessarily us, but certainly the developing countries. One way of stemming it, in part, is nuclear energy because it has basically zero CO₂ emissions. Do you think there is a role for government? If so, what is that role?

Mr Mann—I think there is definitely a role for government. First of all, inquiries like this certainly help to bring the attention of the industry and the issues to the people. Ultimately there will be reports that the public will have access to, I assume, and they have access to the inquiry's web site in terms of people's comments. Even from that point of view, I think the government has an involvement. Ultimately if the government, with the industry, helps educate the population both here and elsewhere, it could certainly be beneficial.

The other thing is that there is no doubt that coal, oil and gas will continue to be major fuels worldwide. Various sorts of subsidies to help develop cleaner emissions from the production of coal-fired power stations would certainly be useful. If the government supported people with the research and development phases of these sorts of things, that would no doubt help.

CHAIR—We have had evidence at our other hearings that there are almost no nuclear scientists left in Australia now and, further, that the message of the problem and ways to solve the problem of emissions are not taught in schools. From some of the submissions that we received there was evidence, particularly in Sydney last week, that the wrong message is given—the problems are taught in schools, but the solutions are not being explored. What is your reaction to that?

Mr Mann—I have no doubt that the nuclear scenario is not taught in schools. I have children of my own. They come back from school in Perth and mention that comments have been made by science teachers that are very negative towards nuclear power: that we should not be considering nuclear power; we should be considering solar and wind power. I think there needs to be education of the teachers as well as of the general population because they are making comments to the students. If the students get a biased message, it is going to go up through the whole system. I have a lot of parents also making comments to me of a fairly negative manner. They are messages that have been relayed through their children at schools to them. So I do agree with you. The message is not being relayed to kids at school. Once again, I think it is a lack of education on the part of the teachers themselves in relation to that particular aspect of nuclear power.

CHAIR—Do you think the attitude is changing, particularly in the last year or two?

Mr Mann—I think the attitude generally is changing in the population, but I am not sure whether it is changing in the schools. I have not seen any dramatic change in the schools and, from the feedback I have from children, it certainly has not changed at all. They seem to be getting the same message now as they were getting a number of years ago. It takes a long time for adults to change their minds, particularly when they have been of a particular mindset for a long time. I think it is going to take a long phase of education to change that mindset of the population and the teaching staff and those sorts of people who are educating our children.

Mr Ewington—To add to that, we are a member of the South Australian Chamber of Mines and Energy. One of their roles is to educate the public in South Australia and they have an excellent primary and secondary school system. They employ education officers who prepare study kits for teachers and students. One of the activities they engage in on a yearly basis is that the education officer from the Chamber of Mines accompanies a number of secondary and primary school teachers on visits to mines around the state. One of the visits they conduct is a trip to Beverley, the in situ leaching uranium mining operation in the Northern Flinders.

CHAIR—It is very impressive. We visited there the other week.

Mr Ewington—It is my understanding, from talking with the chamber, that over the past couple of years this has resulted in some quite substantial shifts in the attitudes of certain teachers who have gone up there with a very closed mind. While they perhaps have not been converted entirely, they have at least come back armed with more facts that they can pass onto their students. Even though they might still not agree with the nuclear energy philosophy, they can teach their students that Beverley and other mines operating around the state are operating in an environmentally and socially responsible manner.

CHAIR—The Beverley operation is very impressive.

Mr HAASE—We enjoyed looking at the Beverley in situ extraction experience and its very low environmental impact. But that is just part of the issue. The environmental impact and the public's reaction to the perception of the degree of impact is just one of the issues we are up against. To kick off, I wonder whether you can give us any practical evidence of the impact of the latest Western Australian decision to virtually duplicate the environmental impact study necessary for mine clearance. Are you across that as yet? It has taken the process from three weeks to three months, and there is all manner of complaints about it.

Mr Mann—The only comment I would make is that, unfortunately, the approval process that we seem to be getting in many parts of Australia seem to duplicate previous processes. I think there have always been adequate processes in place—in Western Australia in particular there have been adequate processes for whatever commodity you are looking for—and all that is happening is that it is being dragged out for longer periods of time. We are doing the same sort of work. The processes that have existed have always been adequate and fairly detailed. A lot of people do not see any reason why there should be any additional processes or additional length of time. The whole environmental process is fairly extensive, and I think all questions are answered when that is undertaken.

Mr HAASE—Do you have a point of view on whether there is any practical improvement in the outcomes with this extended process? Do you think it is designed to convince the public that there is less cause for concern because we have insisted it be so duplicated and so protracted?

Mr Mann—I guess I believe that, ultimately, the bona fide companies—the ones that are really serious about the environment and safety—will do the same work. It does not matter whether it takes three weeks or three months, they will do the same studies, they will consider all the issues and the outcomes will be the same. Yes, it might make the public a bit happier, but I think the final outcome will not be significantly different.

Mr HAASE—So you think it is more about getting the public on side than making a difference in practical outcomes?

Mr Mann—Exactly. I think it is just the perception.

Mr HAASE—My perception is that one of the other major impediments to universal acceptance of uranium, nuclear energy and the process is the issue of international security—energy source versus weapons of mass destruction. We have heard a great deal in a technical sense about the controls that have been put in place by Australia in league with the rest of the free world. I wonder whether you, as somebody from the industry, could comment on the practical nature and give assurances that the public can believe as a result of those impediments in relation to security being put in place. I hope you understand my question. I am looking for reasons from within the industry as to why all of these regulations can be believed by the public as being effective in limiting the risk of nuclear energy being used for immoral means?

Mr Mann—I understand your question. With uranium, global pacts and all the stringent safeguards are often talked about. The Atomic Energy Commission has inspectors who can inspect every mine site. Any ore that is left at a particular mine site is accounted for. We are not talking about billions of tonnes like we might do with coal or about billions of barrels of oil; we are talking about much smaller quantities. The output of the reactors is known and the amount of fuel going into the reactors is known, so a particular volume of fuel can be traced quite clearly and it is well documented. It has to be well documented for power plants to operate et cetera. So it is documented very well throughout the process. That certainly helps a bit. You know where the fuel is going. Maybe a number of years ago the industry was not as transparent as it is now, but it has to be very transparent now because it is such an emotive issue and the internationally recognised inspectors—mainly from Europe—visit all the reactors. There is a very well documented process of the ore going from one step to the other. I think that partly answers your question. I am probably not appropriately qualified to comment on the details.

Mr HAASE—I have this perception that many out there in the public think that because we are talking about a concentrated energy source it is akin to a diamond mine or a gold mine, where you could surreptitiously put it in your pocket and create a nuclear warhead the next day. I am sure that in the broader sense that is the degree of ignorance in many sectors of the public. Even though we have agreements in place internationally, it seems to always come back with a second charge from the public, ‘Yes, but we know that that is just window dressing.’ I wonder whether you could comment on this secondary processing that is going on in Russia presently with the product out of their nuclear warheads.

CHAIR—Megatonnes to megawatts.

Mr HAASE—Yes, that is the program. How can the public be assured that the security measures in place for that process do not see a hiving off of product, especially given the international publicity given to the fact that the Russian mafia is controlling the distribution of some of this stuff?

Mr Mann—On the first point, uranium is a lot different from gold. Perhaps you can slip gold into your pocket and walk out, but uranium is a lot more difficult. It costs a billion dollars or thereabouts to build a processing plant, so it is not a matter of putting a bit of uranium ore in

your pocket and walking out. You could not do anything with it; it is just a rock, like anything else. If you have visited Ranger or Olympic Dam or other places, you will realise that the safeguards when you leave those places ensure that no uranium of any sort leaves the site. It is all drummed on site, it is packaged on site in very well defined containers and it is shipped under fairly strict security.

To be honest, I cannot really comment on the safeguards that they may have in the USSR, Russia now, for the conversion of the warheads to energy and then ultimately the processing by companies such as Cogema and Cameco. Their safeguards are monitored by the Atomic Energy Commission. I would assume that the appropriate safeguards are in place, but I am not appropriately qualified to say.

CHAIR—Do you think that the general public has the view that uranium for civil purposes is the same as uranium for nuclear purposes? Clearly it is not, but do you think they do?

Mr Mann—I think a lot of the public do have that same opinion.

CHAIR—You have three to five per cent for one and nearly 90 per cent for the weapons grade, but of course it is a quantum leap to be able to get there.

Mr Mann—Exactly. I think people perceive that uranium is uranium, like any other commodity. But there is an awful lot of processing, and there is an awful lot of reprocessing if you are going back the other way. Once again, these cannot be done by somebody in their backyard. It is very specific technology—it cannot just happen overnight—and I do not think people really understand there is a significant difference.

CHAIR—Not to cut in on one of my colleagues' questions—

Mr HAASE—Never; surely not!

CHAIR—It is the advantage of being the chair. Do you think the public are aware that what is happening with the agreements due to expire in 2013—that they are down-blending the weapons grade uranium to get it down to three to five per cent so it can be used commercially? Secondly, that is coming to an end, so to what extent do you think that will have an impact on the price?

Mr Mann—The public should be aware that it is a dramatic downgrade. When the issue first arose back in 1993, it was well documented in the papers. There was a lot of comment on the fact that it had to be downgraded. Perhaps the public do not realise the process that it has to go through to get down to that two or three per cent.

CHAIR—You are in Perth today. You should know that the only thing on everyone's mind is the footy, so how can they cut through any of that.

Mr Mann—True. What was the other part of the question?

CHAIR—What impact will it have on the price in the coming years?

Mr Mann—There is no doubt that the weapons grade material coming on stream to be used as fuel was equivalent to several new world-class uranium deposits suddenly coming on stream. When that stops—and the world's energy needs will continue to increase—that part of the supply will basically diminish and it will gradually disappear over a few years. Therefore, we will have to find significantly more resources and reserves to mine in order to fill that gap. Every year, the uranium usage in power plants is increasing reasonably significantly. The number of power plants being produced or on order at this point in time is certainly quite high compared with what it has been over the previous 10 years. The requirement for uranium will become very significant over time and suddenly this supply will not be there any more.

CHAIR—In your report you state that Western Australia had something like \$5.5 billion worth of reserves. Do you think the state government should allow companies to mine and export that?

Mr Mann—I think it should be more open with its thinking. Ultimately it is a resource. It is a value to the population, it is a value to the Australian economy and it is a value to the world as far as reducing greenhouse gases, so it should be considered with an open mind rather than a closed mind.

Mr HAASE—Thank you, Chair, for giving me back the baton. In relation to the issue of global warming and the use of alternative sources for energy, a lot has been publicised in the recent weeks. I believe the headline was something like 'Nuclear is not the solution to global warming', and I think you would know the paper I refer to. How do you counter that sort of statement when it is recognised by the media as being very acceptable fodder and it is so widely publicised? I was quite shocked to not see the counterargument coming from the industry that in fact it does have the high moral ground in this regard and it is fighting the good fight to reduce global warming.

Mr Mann—A lot has been said to imply that uranium and nuclear power will be the be-all and end-all—that it will be the thing that totally helps global warming. I think it is just one aspect. Technology to clean the product from coal-fired power stations will obviously help to reduce the amount of carbon dioxide going into the atmosphere. Just a little more reasonable use of fuels in general will improve it. Nuclear power is just one of the many aspects. In a relative sense it is a clean fuel. It does not produce CO₂ which, as scientists have shown, is creating global warming. It does not matter what people say, the more CO₂ we put into the atmosphere the greater the global warming will be. That is just a scientific fact. Nuclear power will help to reduce that, but there have to be other ways as well. It is not going to stop it, but it will help to reduce it. I guess the second part of your comment goes to the comment I made before. I think the industry has been very tardy in its education and its support of the nuclear industry in Australia. Up until the last nine months, we have very rarely seen any responses to any negative press regarding nuclear power.

Mr HAASE—Do you think you are a little gun-shy in that regard? I wonder why the industry is not out there pushing its own barrow. Do you think the public do not have an appetite for those who make commercial gains from the industry to promote the industry? There must be a psychology behind it somewhere.

Mr Mann—I think until recently—perhaps in the last six or 12 months—there have been very few players within Australia in the nuclear power game or in the mining of uranium. There have been three, four or five players and those players work amongst themselves through the Uranium Information Centre and other sources to try to educate people, but it has only been recently that between 30 and 40 new companies have come on board or have taken uranium under their wings. With that momentum there will be a lot more reply and a lot more comment. Over the last six months we have seen a lot more comment on some of these things than we ever saw in the previous 10 years. It has been quite an amazing about-face, and a lot of that is coming from the small end of the market rather than from companies such as Cameco, Cogema, Areva, Western Mining, BHP or Rio Tinto.

Mr HAASE—Is there perhaps a perception that the small end of town in relation to uranium has less to lose by pushing the argument than have the larger international companies?

Mr Mann—Perhaps it has more to gain is more to the point rather than less to lose.

Mr HAASE—It is a shame. Just today—breaking news, I am assured—the Premier of Western Australia has blasted Vince Catania for suggesting that some of the Western Australian budget surplus ought to be put into the investigation of uranium mining, nuclear power et cetera. Do you have any comment about that?

Mr Mann—I certainly think that an unbiased or balanced review of nuclear power and uranium exploration and mining in Western Australia is certainly appropriate.

Mr HAASE—It seems very difficult to achieve, though, when you have a senior government member in Western Australia decrying any suggestion that there out to be a debate on the matter.

Mr Mann—I agree.

CHAIR—In the enrichment part of your note in your submission, what is a Georges Besse II plant?

Mr Mann—It is a more modern type of reactor that has been developed. There is a whole range of reactors.

CHAIR—Is that like a pebbled bed technology plant?

Mr Nicoud—No, it is not. The Georges Besse plant is an enrichment plant to increase the percentage of fissile uranium. The current plant enriches through gas diffusion and the next one should use centrifugation. So it is just a different technology to achieve the enrichment.

CHAIR—Australia has very good safeguards and is well regarded around the world. Given Australia's reserves, the world demand, the potential markets in China and your company being what I would describe as a vertically integrated company, have you any plans or have you considered setting up further enrichment plants in Australia to supply those markets?

Mr Mann—No, we have not. The company would not set up enrichment plants per se, but it would like to mine uranium in Australia. Although it would like to export the yellowcake to the

appropriate markets, enrichment is another stage for further down the track. To the best of my knowledge, there are no plans to develop enrichment plants in Australia.

CHAIR—I guess the cry always is that we export raw materials but there is no real processing done in Australia. I go back to the point that, because we have such firm safeguards, I would have thought that companies would have looked at—and may well have looked at—the next stage of value-adding in Australia.

Mr Mann—I cannot comment on what Cogema might do in the future but I would think so if there were more acceptance of uranium mining in Australia and there were more operations. With the current numbers of operations it is probably not viable to put in enrichment plants in this country. You probably need the enrichment plants in situations where you would have the reactors within the country, and you would probably have the enrichment plants developed somewhere else.

CHAIR—You are saying the step forward we have achieved in the last 12 months or so is welcome but do not tempt fate just yet.

Mr Mann—Yes.

Mr HAASE—Just an interim question: how long do you think it will be before we see the pebble-bed style reactor commercially available for power generation?

Mr Mann—I would not know the answer to that, I am afraid.

CHAIR—Is it a fair comment to say that the public have not appreciated the quantum, or constant steps forward—which is probably a more conservative way to put it—on reactor design that have happened over the last four years. They look back and think of Three Mile Island or Chernobyl and say, ‘It’s all bad,’ but they do not realise that the design is like mobile phones—it has moved on in quantum leaps. Is that a fair comment?

Mr Mann—I think you are right. Most of the public see reactor designs as being similar to the Chernobyl design and having the same problems. As we mentioned in our paper, the designs are dramatically different now. Even the Chernobyl design, as has been commonly stated, would never have been built in the Western world. The technology was far greater in the Western world than what it was in Chernobyl at the time that it was built. We have moved on. Last year we spent €402 million on research and development. The company spends a lot of money continuously, year after year. Many other companies are also doing that and trying to improve the technology and to improve the safeguards. I do not think the general population understand or realise the safeguards that exist now following the September 11 incidents. People were talking about aeroplanes flying into nuclear reactors. Aeroplanes can fly into any of the modern nuclear reactors and it would automatically shut down. There would not be any contamination. I do not think people really understand that.

CHAIR—I am sure you are right. Are there any further questions?

Mr HAASE—I think you want to wrap it up, don’t you, Chair?

CHAIR—No.

Mr HAASE—I would never presume what the chair wanted to do. The fact that it is 9.45 is beside the point. I do have a question and it again goes to the public perception of the issue. If we mine and export yellowcake out of Australia, don't we have a moral obligation to take the eventual waste of that product back into Australia?

Mr Mann—I think we probably do have a moral obligation. Once again, I think this is a matter of a lack of education. The *Four Corners* program that was on television several weeks ago was a very good program. It provided a very balanced view to show how perceptions have changed with a bit of education and also how the waste material could be stored very safely in repositories deep beneath the earth.

Mr HAASE—Yet the debate goes on in America about Yucca Mountain and safe storage, of getting approval of governments to do that and of the federal government fighting state governments. The Yucca Mountain development has been going on for decades and is still not resolved with the American people. Is there any end in sight, do you think?

Mr Mann—Once again, it is a process of education and it will always be the problem. It is a very emotive issue, and I guess there are a lot of people out there who think that, if another country is using it for their power generation, they should keep the waste product. I guess it is an issue of education. It is a long process. I think that, ultimately, there will be appropriate storage facilities in the United States. But of course there is the old story that nobody wants it on their doorstep. It is the same issues that they are having in the United States at the moment.

Mr HAASE—It is a marketing problem.

Mr Ewington—At least for a generation now the education of young people in this country has, at best, been lacking. At worst, it has been quite negative towards the nuclear industry. I am a geologist by training. The only university education that I had with regard to uranium or the nuclear industry was, quite literally, exposure to what pitchblende or uraninite looks like in year 1 mineralogy class. That was it. Everything I have learned about the nuclear energy industry and uranium exploration in general has been learned on the job since I became a geologist. I have been a geologist with this company since I was a junior geologist.

You also need to look at nuclear engineers and nuclear physicists and the level of training that goes on in tertiary institutions in Australia. You need to train people how to do that and to educate them in the philosophies of the nuclear energy industry. We could take a step back through to primary and secondary education as well. This is the place where the government could be intimately involved with educating people, not necessarily brainwashing them—I am not suggesting that by any stretch of the imagination—but at least providing some objective and balanced information about the pros and cons of the nuclear energy industry.

CHAIR—We had evidence in Sydney that in the late 1960s Australia was right up there in regard to nuclear physicists and the whole cycle, and we lost the lot. We were a world leader and we let the lot slip from our hands. What is your comment on that?

Mr Ewington—You are correct. There is really no other comment. As I said, I am a geologist by training and I learned nothing about the nuclear energy industry. I did not know anything about uranium until I applied for and got the job as a junior geologist with this company. That was it. And that is just in my profession. We really do need to be doing something about this. You are right—we were a world leader—and I would like to think that, at least in uranium exploration, Australians are becoming a lot more knowledgeable and a lot more technically proficient at exploring for uranium in Australia and around the world. We are starting to export some of our technologies that can be specifically used for uranium exploration. We just need more support. Public education is one of the ways of doing that.

Mr Mann—Mr Chairman, I mentioned to Jerome very briefly that people from Areva would be quite happy sometime in the future to meet with you or the panel privately if there are issues from a marketing and global perspective. For many reasons, it was difficult for them to be here at this time.

CHAIR—Particularly given plane flights to get to Perth today. Thanks for that, and we will probably take you up on it. Thank you for appearing before the committee today. If the secretary has any further questions, we will contact you.

Is it the wish of the committee that the document entitled ‘Uranium Market Forecast: Coverage for Uranium Requirements’ be accepted as an exhibit? There being no objection, it is so ordered.

[9.51 am]

BLIGHT, Dr David Frank, Committee Member, Association of Mining and Exploration Companies Inc.

LAYTON, Mr Alan John, Research and Policy Officer, Association of Mining and Exploration Companies Inc.

CHAIR—Welcome. Thank you for agreeing to give evidence to the public hearing today. Although the committee does not require you to give evidence under oath, I should advise you that the hearings are formal proceedings of the parliament. I further remind you that the giving of false or misleading evidence is a serious matter and may be regarded as a contempt of the parliament. I also remind you that the committee prefers that all evidence be given in public; however, at any stage you may request to give evidence in private and the committee will consider your request. I now invite you to make a short opening statement before we proceed to questions.

Mr Layton—AMEC appreciates the opportunity to present a submission and to make recommendations on issues concerning the strategic importance of Australia's uranium resources. Our submission argues in favour of removing the current political constraints on the mining and export of uranium. We are not seeking any favours or special consideration. We are advocating that the uranium industry be allowed to fairly compete with the other alternatives for its place in the supply mix to provide energy to the world at large. In AMEC's view, the current constraints on the mining of uranium imposed at the state level serve no useful purpose. All these constraints do is to favour our global competitors, notably Canada, and deprive Australia of billions of dollars of export revenue and employment opportunities. These constraints also inhibit the commercial interests and opportunities of our members. The development of Australia's uranium resources for peaceful purposes would assist in bringing electricity supplies to many more millions of people around the world and, by replacing some other energy sources, play a part in reducing greenhouse emissions.

In our submission we have made five recommendations. One, that Australia adopt an active exploration program to identify further uranium mineralisation, as very little exploration for uranium has been conducted since 1983. Two, that there should be no undue restraint or discrimination against the development of uranium deposits. Uranium should be treated in a similar way to other minerals, with proper and consistent attention to occupational health and environmental issues. Three, that while export controls are important to Australia's participation in international nonproliferation arrangements, and to ensure that Australian uranium is used for exclusively peaceful purposes, there should be no other constraints or restraints on the export of uranium. Four, that consideration and encouragement be given to developing and introducing various value-adding activities in Australia, particularly uranium enrichment, thus capitalising on new technologies. Fifth and finally, that the question of nuclear energy being used as an electricity supply option in Australia be constantly reviewed. The future adoption of nuclear energy will allow Australia to effectively contribute to the consistent global reduction of greenhouse gas emissions.

CHAIR—Thanks for that. I note one interesting point. In your background, you state:

The amount of electricity generated from use of Jabiluka ore will be sixteen times the electricity used annually by Australia.

Do you think the public knows that?

Mr Layton—No.

CHAIR—Do you think it would be to the advantage of the public to know that?

Mr Layton—I was interested to hear the company that gave evidence just before us. Linking that to the other question in relation to the suggestion by Mr Catania that there be some resources put into research, if some of the states' resources were put into some form of education program to update the public's knowledge, that would be useful, as was said by the company Cogema that just gave evidence.

CHAIR—Do you think the public are aware that nuclear power or nuclear generation accounts for only 16 per cent of world generation but it saves, in CO₂ emissions, 2.5 billion tonnes of emissions per year?

Mr Layton—I do not think anybody, unless they take a particular interest in this subject, would have any idea of that statistic.

Mr HAASE—I would like to start by fleshing out some of these perceptions of public opinion and your reaction to them. I find most interesting the current attitude of the Western Australian government in relation to the mining and export of uranium—the whole cycle. It simply, for me, is inexplicable. Given that you are representing the industry, I wonder if you can make some comment about one particular aspect of it. It would seem that the Western Australian government believe that they can save the world by withholding the export of Western Australian uranium and that somehow by holding these seemingly head-in-the-sand attitudes a great deal of difference can be made internationally, and Western Australia can hold its head up and say, 'We saved the world.' With your in-depth knowledge of the industry, is there any comment you can make that perhaps makes sense of such a perception?

Mr Layton—I am aware of the Premier's statements in parliament. I read the *Hansard*. I do not normally read the *Hansard* unless I am suffering from insomnia but I did read carefully what Dr Gallop had to say. I was quite disappointed by his remarks. My reading of the Premier is that he has a deep personal conviction about this matter, and we can only respect that. It would have been useful had he stated that and then got on with laying out what, in his view, are the pros and cons of this industry and then saying what his opinion was. Rather, he chose to talk about what he sees as the risks. He mentions, typically, Chernobyl, he talks about dirty bombs and then he comes out and says that this is the worst product in the world. Leading on from there, I do not find it very helpful either to take the view that if there is some awful incident somewhere in the world, because the product did not come from here, that is okay. I do not think it is okay at all.

I think you can apply that logic to all sorts of other aspects. Someone asked me the other day that, taking that logic to its conclusion, if it could be shown that the steel that was used in the

encasement for the bomb came from Western Australia's iron ore industry, do we close down the iron ore industry? If we generally apply a proposition that if something is dangerous we should ban it, I wonder where we stop. We can say that all the things that kill people—that could be anything from alcohol to religious belief, misused and abused—should be banned.

To sum up my comments, I did not think what the Premier said in parliament that day was all that helpful, and I think that I agree with the suggestion that perhaps there could be some finances, some allocation by government, put towards laying out in a more constructive and unbiased manner the pros and cons of using uranium as a source of energy, especially if you consider that in the next few decades the demand for energy in this world is going to double, some say. I think that we ought to know in some objective way whether or not uranium can play a part in that.

Mr HAASE—We would all agree, I am sure, that the Premier of this state is no flat-earther, and you would expect him to be well-informed about the various forms of energy, their use and their appropriateness for certain situations.

Mr Layton—I would like to come in there, because we are an association of mining and exploration companies. We adopt some balance in our political views and I should also balance what I have said about the Premier with a comment in relation to Mr Birney. I think the Leader of the Opposition ought to show some leadership there and express a view. He has trouble in doing that, so, whilst we might be critical in the sense that we do not like the views that the Premier is espousing, he has expressed a view and I think that it would be incumbent on Mr Birney to express a view, as indeed we would think that it ought to be incumbent on the leader of the federal opposition, Mr Beazley, given the obvious differences of opinion within his party. If you read the front page story in the *Australian* this morning, where Bill Ludwig has come out and said that we need to revisit the issue of uranium, perhaps it is time that Mr Beazley also came out and made some statement. So I will cross this political spectrum. As you suggested, there could be some value in an educative program.

Mr HAASE—It seems that of all the evidence we have taken—and I pursue this line of questioning with all witnesses—the thing everyone agrees on is that there is such a large degree of ignorance in the Australian public in relation to matters uranium, nuclear and the whole cycle. It just disappoints me, as I say. I am sure it disappoints you that public figures talk down the debate, talk up the nuclear fear and do not do anything to change that degree of ignorance amongst the Australian public. That is why I am very pleased to be part of this committee, quite frankly. I believe we are doing something positive about it.

Mr Layton—I think it is fair to say that there are people who, for whatever reason, have very deep feelings about the issue. It is a very emotive issue. It goes back to the Second World War, 60 years ago, and the dropping of the nuclear bombs. There have been one or two awful incidents involving problems with nuclear reactors and so on. So there are some deeply held views. We have to recognise that, but I do agree with you that we need to lay out the facts and get some understanding that the industry has moved on.

If I can give you an analogy, in 1912 the *Titanic* sank. What did we do? We did not say we were never going to build another ocean liner; we said we were going to have to build them better and safer. We have been saying since 1986 that we have decided we are not going to close

down all nuclear reactors; we are going to build better and safer ones. In the same way, we have the situation with the hurricanes in the United States. We have not said we are going to close down New Orleans because of hurricanes; we are going to try and build a better New Orleans.

Mr HAASE—My thoughts are that one of the greater problems in discussing anything nuclear is the fallacy about the danger of the stored waste product. I wonder whether, for the record, you could talk about your understanding of the actual danger and period of time and what it means in real terms. We talk about the half-life of uranium or nuclear waste. I wonder whether you could put some light on how long that dangerous cycle is in reality. What are some of the processes for the storage internationally? Should that storage perhaps take place in Australia? What is the real danger associated with the material?

Mr Layton—I am not an expert in this matter; I just make a few observations. I watched the *Four Corners* program, as other people did, and saw how the storage is being handled in Sweden and I think that technologies exist to bury those sorts of radioactive wastes. That is point one. Where in the world they are buried is not so much the issue to me; it is to make sure that, wherever they are buried, they are buried safely. The only observation I would make is that there is probably an argument that there is some safety in burying the wastes close to where the product is used, rather than transporting them.

I am not certain about this notion that when we sell uranium we necessarily have to take back its wastes. If we send a live sheep overseas and it is gutted and they do not use the gut, we do not take the gut back and bury it in the Gibson Desert, for example. Do we have a moral obligation to do that? I do not always follow that argument. Perhaps it is just a matter of a commercial transaction. If a company wishes to export uranium, they might enter into a commercial arrangement to bury it here. Then there is the political issue of where to bury it, and I understand all those politics.

My understanding is that the wastes of the industry can be buried safely. I am aware that there are a whole raft of environmental and safety regulations governing the disposal of the waste product. Having said that, the issue for the people I represent is mainly about the ability of all companies in Australia, whether they are on one side of the border the other, to explore and mine for uranium and get an export licence. That is basically our thrust. We find it quite ludicrous, frankly, when you say that you can do it over there but you cannot do it on the other side of an imaginary line called a state border. I find that argument difficult to follow.

Mr HAASE—Is AMEC involved in any part of the education process? Can you give any examples of what AMEC is doing to lift the profile of uranium or to educate the population about the benefits of the use of uranium in the energy cycle?

Mr Layton—No, we are not, but we would be happy to join in any initiative. We simply do not have those sorts of resources.

CHAIR—Do you think that bringing back the waste to Australia could have real benefits in regard to safeguards and non-proliferation?

Dr Blight—By way of background I will introduce myself a little differently than I did earlier. In my previous life I was the Executive Director of Minerals and Energy in South Australia. I

was responsible for regulating the mining and petroleum industry and as a technical regulator of elements of the energy industry, so I have a little knowledge of the issues that we wish to talk about here, which are about the mining of uranium. I feel a little reluctant to progress beyond the elements of mining. Nevertheless, I suggest to the committee that I do have some expertise in understanding many of the issues that the industry faces in the regulatory part of the mining industry. As a personal observation, I believe that there is a wonderful opportunity for Australia to capture the ability to dispose of radioactive waste in this country and to do it safely.

CHAIR—With regard to public perception, the public and the media point to the Chernobyl disaster and quote figures which state that thousands were killed. The UN investigation found that only 50 people died as a result of that, and yet there is evidence that some 15,000 a year die in the coal mining industry. China has announced the closing down of their mining operations in southern China because of the safety record. I notice that in 2004, in China alone, there were deaths of 6,027 and, in 2003, 6,200. It is a bit rough to indicate that the whole nuclear-uranium cycle is dangerous when, if you compare the figures, it is actually a lot safer to work in that industry than in the coal-mining and coal power generation industry with the downside benefits. Would you agree?

Dr Blight—Yes, I would agree with that totally. I draw the committee's attention to a very good book that is out. If the committee wishes, I will try to get more details on it. It is entitled *The case for nuclear energy*. It discusses all of those matters and is a wonderful source of statistics, if you wish to examine the statistics associated with those sorts of things—the people who have died from respiratory illnesses because they live close to a coal-fired power station and the subsequent atmospheric contamination from that. The numbers are probably well in excess of those people that have died from, for instance, any form of radiation poisoning emerging from Chernobyl. They are the sorts of statistics I believe the committee needs to get their hands on. I will get that book reference for you, should you wish.

On the matter of mining, I draw the committee's attention to the matter of safety from my experience in South Australia. There was an in situ leach mining operation which had a number of, for want of a better word, spills in their treatment plant. You may be aware of these spills. It received a lot of press at the time. My major concern, as the regulator, when the first spill happened, was for the environment, for the trees, because the salinity of that water was not insignificant. I was not concerned about the level of radioactivity, and I remain unconcerned about it; it is not an issue. Yet the general population were convinced that there was radioactive waste being spilled that was toxic to one and all.

Mr HAASE—That public perception that they should fear the radioactivity was no accident, though, was it? It was rammed down their throats very widely by the media of the day.

Dr Blight—I would not disagree with you, Mr Haase, on that matter.

CHAIR—At the inspection of the Beverly mine a couple of weeks ago—a very impressive operation—a point was made about the acid tank that many of these operations have. The manager showing us around pointed to the acid tank and said: 'That's the most dangerous thing at this site—the drums of acid we have around our pool and a whole range of other things. The yellowcake is not. You can put your finger in the yellowcake and it won't fall off. If you stick it

in the acid, you better wash it real quick.' Do you think it is a case of fear of the unknown rather than understanding? I take your very good point that you just made.

Dr Blight—I am absolutely certain that it is fear of the unknown. I think it is incumbent upon Australia to start to redress that issue, to get a balanced debate going so that the people actually understand the facts of the matter. Some of the wonderful facts that emerged during my time in South Australia were that this supposed deadly, toxic, highly radioactive water that was unbelievably dangerous was nowhere near as bad as the naturally occurring spring some 60 kilometres away in the foothills of the Flinders Ranges, which was emitting a much higher dose of radiation. The amount of radiation coming from that fluid was less than the granite that made up the base of Parliament House at the time. It was less, by a long shot, than the majority of the fertilisers that were spread on the wheat fields of Australia. Yet people did not understand this and, consequently, became concerned. It was, as you put it, a media campaign that was very effective in painting absolutely the wrong picture.

CHAIR—To add to that, the public do not realise that, in certain components, mineral sands mining is radioactive.

Dr Blight—That is correct.

CHAIR—As it is within limits, although certain parts are not. There is just not the same fear that as is built up with uranium and yellowcake, basically. What do we need to do to address those educational concerns?

Dr Blight—It is a difficult task addressing educational concerns like that. I do not think I am the one to actually ask how you do it. I have thought of ways, but I am not sure that any of the things that I could do would do it. You mentioned the minerals sands industry. One of the things that the Australian mining industry has done very well in my view, which is from the perspective of a former regulator, is safety. This industry has taken safety matters on board and manages them as a matter of routine, such as with the uranium mining at Olympic Dam, the in situ leach mining at Beverley and the uranium mining at Jabiluka. And the mineral sands industry has the ability to deal with this material that does, under certain circumstances, pose some danger. It has an exemplary safety record in this matter. I am not aware of one person in this country who has suffered dramatically as a result of exposure to radiation gained during the mining and subsequent on-site processing of uranium materials and the production of yellowcake.

Mr HAASE—The sad reality of course is that that sort of information is so unpalatable to the public at large. We have asked you what we can do and you confessed to being bereft of absolute answers. I believe the public have been mesmerised a little by the scientific qualifications of those most erudite figures emanating from universities whose cause is to save the world. They pontificate about this nasty called 'nuclear', and they capture the hearts and minds of an adoring public who are overwhelmed by their professional ability to pontificate. We do not seem to have that counterbalance in the industry which is viewed as being a commercial operation, hungry for profits for its shareholders et cetera. Therefore, it has nothing like the same credibility. Can you comment on that?

Dr Blight—I certainly can comment. I will make a couple of observations. Despite what you say, it is encouraging that in a recent Westpoll the figures came out pretty even Stephen. Despite

a lot of what we might see as people endeavouring to exaggerate the dangers of the industry, I think that often the public is smarter than we think—I note comments made recently in relation to Mr Latham. The public is beginning to see that the arguments about uranium do not reside back in the days of ban the bomb. I also think that there are a number of people in the environment movement—and I think we make reference to that in our submission—who may not be all that great a fan of uranium mining but, in the context of global warming, they are beginning to realise that we need to do something about global warming, which is probably a much greater problem. They have had the courage to come out and say these things and they have copped a lot of personal criticism from their colleagues and friends. They have come out and said, ‘We need to have another look at uranium.’ I think there are some encouraging signs about.

Mr HAASE—How do we increase that number of persons who are prepared to go out on a limb? Those involved in the industry and those knowledgeable about the product know that in fact it is simply another commodity. Even amongst us, we agree that anyone from the scientific or public education sector is a brave person who stands up and says, ‘Uranium is not such a bad thing and we should debate the issue’.

I think we almost are too defensive about the issue. For a long time I used to say, I am sure quoting somebody else, that nuclear was the elephant in the room around which the environmentalists danced in relation to global warming, and it was true. No-one dared mention the word ‘nuclear’ as far as some remedy for global warming. Still we are hesitant in ill-informed but very vocal circles to mention the word ‘nuclear’. It is almost: ‘Don’t mention politics and religion, and don’t mention the word ‘nuclear, either.’ It is something of a blight that we are not dealing with very well at this stage, isn’t it?

Mr Layton—That is true, and we need to do more work on it. I think our organisation, as you suggested earlier, has a part to play in that.

Mr HAASE—Somebody made the point earlier that there were regular school visits to sites. I think Beverley was mentioned. That is an impressive site as far as being low-impact environmentally is concerned. Has AMEC thought of involving themselves in visits to sites?

CHAIR—There are not too many uranium mines in Western Australia, are there?

Mr HAASE—No, but you would have the opportunity, I am sure, to visit mines that are goldmines, where there is a substantial presence of uranium ores.

CHAIR—Where are all the goldmines, Barry?

Mr HAASE—They happen to be in the Kalgoorlie electorate, as a matter of fact, Geoffrey.

Mr Layton—As time progresses, I think that we could obviously consider that, yes.

Dr Blight—There is a program running in Australia called Australian Student Mineral Ventures, ASMV. It is a not-for-profit organisation that is subsidised and funded by those people in the industry, such as companies that belong to AMEC, companies that belong to the chamber and some government agencies including, I know in the past, a South Australian government

agency. The element of that program was to take children from schools and I do believe maybe even a teacher—I think that was the chamber program. The ASMV took students into the industry, took them to sites, showed them what the future held for them and endeavoured to educate them. So AMEC company members were involved in that.

Mr HAASE—That is a very positive move. I suggest there ought to be a proliferation of that.

Mr Layton—You are right. That is where the education is most important.

Mr HAASE—Perhaps the educators of this world do not want to give a leg-up to any commercial operation and are therefore finding themselves unable to make decisions about who they may or may not support. They ban any sense of commercialisation or interest in the process in their students and have them consider more esoteric matters.

CHAIR—I do not know if that is the case.

Mr HAASE—I am sure it is a generalisation. Nevertheless, you represent people who get out, provide jobs and create income for Australia and pay dividends et cetera. You are perhaps a long way from what is perceived to be the educators and it ought not be so in the perfect world. You ought to be as much involved in creating your future work force as you are creating dividends for shareholders, in my humble opinion.

CHAIR—In your submission, you say that Australian scientific innovation has produced important technologies relating to the civil nuclear fuel cycle. You make specific reference to the SILEX enrichment process. Could you explain to the committee what is involved in that?

Mr Layton—That is sourced out of the Uranium Information Centre. I am not a technical person; I cannot go into the technical side of it. Why I was enthusiastic about making that statement in our submission is that I and AMEC have a view that we should be looking towards value adding. I think that is a point, Chair, you made in a discussion with those who gave evidence prior to us. As a general proposition, Australia has a history of producing the resources but we do not take it any further—we send our resources overseas.

I am hopeful that companies such as Cogema will have a look at value adding and that there is greater recognition of the efforts of Australians to be innovative and create new technologies. That has happened in the past and we have not taken full advantage of it. I believe that the uranium industry has a positive part to play not only in the technology but also in the safety standards of the whole industry. That is why the bans that we have here—bans that I think are largely politically motivated—are unhelpful. We are missing out on opportunities on the technical and safety sides.

CHAIR—We are aware that Australian uranium exports last year topped the 10,000 tonne mark at \$420 million. After Olympic Dam cranks up to the next stage, we will become the world's largest producer, given that we have the world's largest reserves of economically extractable uranium. In your submission, you mention that the benefit to the economy would be in the range of \$890 million to \$1.6-odd billion. Given the potential for supply to China—we are negotiating an agreement right now with China—and China's intention to put nuclear power reactors in there, what role do you think Western Australia could or should play in supplying that

market? What do you think is the value that we are likely to get out of that for this state as well as for the nation?

Mr Layton—We could play an important part but we cannot do much while we have the present government. That is the first statement I can make. I think that Australia, by its geographic proximity, has a role to play in supplying China. If you look at where the reactors are being built or are proposed to be built they are mainly in our part of the world, China as well as India. There is a clear opportunity for Western Australia to develop its uranium resources and participate in those markets. I cannot tell you exactly how much there is to mine. I do not think people know. That is one of the great problems.

CHAIR—The Yeelirrie deposits have been identified as very substantial deposits.

Mr Layton—They are substantial and there are probably more substantial deposits. In other forums, AMEC argues about the provision of moneys for pre-competitive geoscientific data to better discover not only uranium in this state but all minerals. Your question implies there is a great opportunity. We would support that. I think there is a great opportunity for Western Australia and indeed the whole of Australia to play its part. Leading on from there, obviously there are also deposits in Queensland. Mr Beattie says we cannot develop them because he is making too much money out of the coal industry. I thought that was an alarming statement. It would be more responsible to say there is uranium as well and Queensland can also participate in supplying the Chinese and Indian markets.

CHAIR—I do not think there is any question that nuclear power generation will take over fully. I think it is a fair statement to say that countries that are looking to put in nuclear power want to slow the rate of emissions. They will not solve it completely but nuclear power has no CO₂ emissions. If they were to go down the path, as we mentioned earlier, of continuing to have fossil fuel burning power generation, I think I quoted to the last witness that we will jump to 16 billion tonnes of CO₂ a year by 2050. Clearly this inquiry must look at what we can do about that.

Mr Layton—It was interesting to me that Dr Wally Cox, who chairs the Environmental Protection Authority, recently said words to the effect that we have a moral responsibility—I do not know if those were his exact words—to do something about the burning of fossil fuels and ameliorating the effects. I am not an expert in this area but I have listened to and read a lot of commentary about what the ravages of global warming could be. Whether uranium is the answer, I do not know. But some people say, ‘What we need to do is develop the renewables’ and they talk about waves and winds and so on. I am not suggesting we should not do those things.

What we are saying is that, on balance, it is the uranium industry, certainly in the short term. It may not be the answer in the longer term; we might eventually develop energy sources so that we do not have to use uranium. I do not know. But I do not think we can just dismiss uranium. With the growing demand for energy and the dangers that global warming presents, I think at least in the short to medium term we have to develop uranium deposits throughout this country. That is our basic proposition. We do not believe that bans on uranium are in any way constructive. Quite frankly, it does not really matter whether Western Australia exports uranium or not, because plenty of other countries are going to do it.

CHAIR—Absolutely.

Mr Layton—The Canadians are going to do it. Kazakhstan will continue to do it. Someone is going to supply the demand. As Colin Barnett said in a paper he delivered recently, the horse has bolted. I think that sums it up.

CHAIR—I believe there are five, six or seven licences issued for uranium prospectors. There is a question of whether, because of that licence issue, they are entitled to mine what they have found. Can you comment on that?

Mr Layton—When the current government came in—the Gallup government—they had a policy that they were not going to issue mining leases that allowed the holder of the lease to mine for uranium. In our submission we say there have been about 250 leases. Well, I was talking to the Department of Industry and Resources the other day and they said, ‘You could probably double that because we issue 300 leases a year and they have all had that provision struck out’—or whatever it is the minister does. The fact is that there are those leases and you are probably aware that Paladin Resources has been quoted in the media as saying, ‘We are holding some of those leases and if the price goes to a certain level we will endeavour to develop them because we had these leases prior to the time this government came in.’

Whether or not that will happen, I do not know. All I can say is that I understand the government here is working on a bill. I do not know whether that bill is going to endeavour to prevent people with the leases that existed prior to 2002 from developing the resources. I am not privy to the legislation. The situation may be that those pre 2002 leases are developed and then the government here endeavours to stop it. They cannot very well say, ‘We won’t let you do it because Dr Gallup doesn’t like it.’ Presumably it will have to go to the Environmental Protection Authority and there will have to be an environmental reason for not developing it. How that is all going to play out, I do not know. Certainly, as you suggest, there is an issue there.

Dr Blight—Once again from the position of a former regulator, could I also add that I find it quite bizarre that a regulator would be placed in a dilemma such as Olympic Dam found itself in when it was first discovered that in order to mine the copper one had to also mine the uranium. In order to separate the copper one was also required to separate the uranium. They were intimately linked; the two were part and parcel of the same thing. The issue then becomes: having mined it and separated it, what do you then do? Recombine it with the waste? Put it back in the waste dam? That seems a bizarre and unconscionable act.

CHAIR—If, after having issued those permits, the state government did put in to the state parliament a bill to ban the mining, would they open themselves up—in the industry’s view—to legal action to recover losses?

Mr Layton—I have read that that could be a course of action. I am not a lawyer and I do not know the answer to that. It could be that those companies who own the leases could endeavour to seek some compensation, yes.

CHAIR—Our time is up. Thank you for giving evidence before the committee today. David, if you could find that document the committee will contact you about it.

Proceedings suspended from 10.34 am to 10.49 am

FEWSTER, Mr Michael Edward, Manager, Eaglefield Holdings Pty Ltd

CHAIR—I welcome our next witness. Thank you for agreeing to appear and give evidence at this public hearing. Although the committee does not require you to give evidence under oath, I should advise you that the hearings are formal proceedings of the parliament and that the giving of false or misleading evidence is a serious matter and may be regarded as a content of parliament. I further remind you that the committee prefers that all evidence be given in public. However, at any stage you may request that your evidence be given in private and the committee will consider your request. I invite you to make a short opening statement before we proceed to questions.

Mr Fewster—Firstly, I extend my gratitude for being offered an invitation to address the committee. My company, Eaglefield Holdings, is a privately funded company. We have been operating for about 18 years in undertaking exploration out in the far-eastern regions of the goldfields of Western Australia. Over that time we have come to understand the geology of the area particularly well. Fortunately, about five years ago, we were able to acquire ownership of a known uranium polymetallic deposit, previously known as the Mulga Rock deposits. We have elected to retain that name. The Mulga Rock deposits are a large uranium resource, possibly the second or third largest known uranium resource in Western Australia. More interesting are the commodities associated with the Mulga Rock uranium itself. It is a polymetallic deposit, of which scandium is the most significant.

The theme of my submission is that uranium deposits in Australia, and certainly in Western Australia, are significant. Obviously, they are of value to the nation and of value around the world for greenhouse gas abatement, but my submission is more about the fact that uranium deposits quite often have associated with them other commodities and those commodities clearly have significant value. Secondly, uranium deposits tend to be located away from typical mining areas. As a consequence of that, the development of uranium deposits, particularly in WA, would see the development of infrastructure in parts of Western Australia which are presently devoid of any infrastructure. I am talking primarily about access, accommodation and other types of infrastructure. A consequence of the installation of that infrastructure would be to allow the development of other resource projects of great benefit to the region.

Our deposit, as I said, is located out in the far-eastern goldfields region. It is about 250 kilometres from Kalgoorlie-Boulder. It is in what is generally referred to as the Gunbarrel Basin, which is known to be a very substantial reservoir of water. It would have the capacity to supply, for example, the eastern goldfields region with water. The main impediment, of course, is that to develop a water-supply system out of the Gunbarrel Basin to the goldfields region is simply vastly too expensive at present. However, if there were infrastructure in the region, then the cost of that would be clearly offset.

Moving back to the Mulga Rock and its polymetallic association, the most important being scandium, scandium is possibly the world's rarest but most keenly sought industrial commodity. Historically, its use is in the manufacture of aluminium alloys. It is universally regarded as the optimum alloying material for aluminium. It is particularly sought by the aerospace industry. The aerospace industry around the world, both military and civilian, has investigated scandium

alloys. In fact, it was first created by the Soviet Union as one of their key products to try and maintain parity with the United States in the manufacture of aircraft—the MiG-29E was made from a scandium aluminium alloy. There has been a huge amount of research conducted—all the major aerospace manufacturers have investigated scandium alloys and papers have been published on the benefits that it would bring.

Effectively, scandium alloys would allow the manufacture of aircraft by welding the panels together in much the same way as ships are built today—the pieces are welded together. Aircraft are still manufactured effectively along the same lines as the way the *Titanic* was made—panels are made, strengthened and then riveted onto a skeleton. The cost of that in terms of weight, materials and labour is very high. Airbus have done some work in this area; they published a paper some years ago to say that aircraft manufactured from scandium alloy would be at least 15 per cent lighter and 15 per cent cheaper to build and, you would have to say, probably 50 per cent stronger than a conventional aircraft. There are other applications for scandium alloys as well, but that is really where the main application lies.

Until about a year ago, our main focus on the Mulga Rock deposit was its scandium component. We have spoken to and had dealings with quite a large number of organisations associated with the aluminium or aerospace industries, so we have a fairly good knowledge of what is actually happening. Effectively, the industries will not or cannot go near the scandium alloys until there is a major supply established somewhere in the world. When I say ‘major supply’, I mean that at present there are only two tonnes of scandium oxide produced from mines around the world—

Mr HAASE—Per annum?

Mr Fewster—Yes—two tonnes of scandium oxide per annum. A further three tonnes are taken from a stockpile in Russia that is a sort of leftover from the Soviet era. So there are about five tonnes of scandium oxide going into the market per year at the moment. Virtually all of that is going into the aluminium alloy industry. It is used primarily, at the moment, to make things like baseball bats, bicycle frames and a few bits and pieces, but really nothing very significant—certainly not in aerospace.

From the discussions that I have had with people in the aluminium and aerospace industries, they are suggesting that aerospace alone would probably consume 50 tonnes of scandium oxide a year. It would probably consume more, but realistically there can be no substantial scandium industry in the world until what is referred to as a critical mass of production is reached. Our best guess is that that is about 150 tonnes per year. So somewhere in the world there has to be a source that can deliver 150 tonnes of scandium oxide for a lengthy period of time at a very low cost such that, once that supply has been established, the potential consumers can start to retool to utilise the scandium.

Scandium oxide alone is, in fact, useless to the aluminium and aerospace industries. It has to be refined into an intermediate product called ‘master alloy’. Effectively, it is just the conversion of the scandium oxide into a metallic form. Scandium master alloy typically contains about two per cent scandium. This metal sample I have here is a sample of scandium master alloy. It contains two per cent scandium. It is a very, very complicated process to convert scandium oxide into this metallic form. There is effectively not a plant in the world at present that can actually do

it at a commercial scale. There is a very antiquated facility in Russia that the Soviets built for their supplies. At present there is only enough capacity in the world to produce about 100 tonnes of master alloy a year and, again, a critical mass of master alloy would be in the order of 5,000 tonnes per year.

The retail price of two per cent scandium master alloy at the moment is about \$A100 per kilo. Scandium oxide is worth about \$1 million per tonne in the marketplace at the moment. Clearly, that is at a very small supply. We are working on a cost of potentially half of that or a value of half of that at a commercial scale but, even so, 5,000 tonnes of master alloy at \$A50,000 per tonne adds up to a fairly substantial amount of money.

Secondly, and more importantly, Mulga Rock is the only exploitable scandium resource in the world today, in that the scandium is actually recovered at the same time as the uranium would be. The scandium and uranium are bound up in exactly the same form, so when the uranium is recovered the scandium comes with it. We have conducted metallurgical work and we know that we can recover the scandium relatively easily, so in fact we get the scandium for free in the actual processing operation.

There are larger scandium resources in Australia. There have been deposits announced in both New South Wales and Queensland. Scandium turns up in nickel laterite deposits as well. The deposits here in Western Australia have small amounts of scandium in them—only a few tens of grams per tonne. We think Mulga Rock carries on average somewhere between 200 and 300 grams of scandium per tonne of ore but, as I said, there are deposits in New South Wales and Queensland which are nickel laterite type deposits that carry similar grades of scandium, anywhere from 150 to maybe 300 grams per tonne. Those deposits are very large in terms of their scandium content. The problem they have, though, is that the development of those resources will need a full nickel laterite facility, which is a \$1 billion to \$1.5 billion capital exercise. Of course, those deposits could not be developed until two things are established: a market for the product in the order of hundreds of tonnes per annum, and a market price for scandium.

Our work suggests that the potential market for scandium in the medium term is in the order of 400 to 500 tonnes of scandium oxide per year. Final demand is very much linked to the size of the aluminium market. Effectively, probably a full third of all of the aluminium produced in the world—and there is about 25 million tonnes of aluminium metal produced annually around the world—would benefit from the addition of some scandium. Demand is huge: eight million tonnes. The alloys that are anticipated for use in the aerospace industry carry about 0.2 per cent scandium, but multiply that by one million tonnes of aluminium a year and it turns out to be a very, very large amount of scandium in the context of what we are looking at.

The Mulga Rock deposit has the capacity to be the foundation of a scandium supply industry in Australia. We anticipate Mulga Rock will supply between 200 and 250 tonnes of scandium oxide per year for a mine life that could extend to 15 years. Once a market is established, we would envisage other potential scandium suppliers in WA. Certainly the Murra Murra nickel laterite project in WA would have the capacity to deliver maybe 10 or 20 tonnes of scandium oxide per year; Ravensthorpe could deliver some. Then we would see development of other deposits in New South Wales and Queensland to pick up the slack from what our deposit could not develop. Very early on in the piece, there would have to be constructed somewhere in the

world—and we see no reason that this would not be in Australia—a facility for the manufacture of master alloy. The CSIRO in Melbourne, who I have had some discussions with, are very keen to participate in that exercise. They are actually developing technology at the moment for application for producing titanium metal which they think could be adapted to refine scandium. The Mulga Rock deposits could be the foundation of a scandium supply and processing industry here in Australia which could exceed the value of the uranium industry. It is potentially a billion-plus dollar industry per year spread right across Australia.

That is what we see as being the most important aspect of Mulga Rock in terms of its co-product. From the infrastructure side, there is also a very large resource of what we call oily lignite—oil rich lignite—in our same lease area. The deposits themselves are hosted by this oil rich lignite. We have had some preliminary work done on that, and it suggests that potentially it could deliver upwards of four barrels per tonne of oil by conversion of coal using fairly sophisticated technology that has not been commercialised yet. But, even using existing technology, the deposit appears to carry about two-thirds of a barrel of oil per tonne of coal in the ground. We have not calculated the size of the resource yet, but estimates are that it is in the order of 250 to 500 million tonnes, so the oil resource potentially within the deposit is in the order of 500 million to a billion barrels of oil.

There are a number of other oily lignite deposits around Western Australia around the eastern Goldfields and the Esperance area and from Esperance around through Balladonia. All of them have one major deleterious element and that is that they are very salty. Processing those lignites requires the removal of the salt and that requires access to large amounts of fresh water. None of the deposits in the south have access to fresh water or brackish water. Again, we have a very large supply of brackish water virtually on site.

We would envisage that, once infrastructure was in place, it will be possible to look at our resource development. Our development model is to mine the coal, put it in a slurry and pump it down to Kalgoorlie or somewhere east of Kalgoorlie to some sort of a process facility down there. By doing that it would allow all the other resources in the area to feed into that same facility, given that there would also be a supply of fresh or brackish water that would also go with the coal. Longer term we see this Mulga Rock area as potentially one delivering enormous benefits. Should there be a mining operation out there, clearly that would be focused on the Goldfields or on Kalgoorlie-Boulder. That would be our centre of operations, effectively.

Moving forward, we see the potential to use it as a staging point effectively for the delivery of potable water to the whole Goldfields region. Moving on from there, there is this energy resource that we have, which is clearly huge in size, which again could be the foundation for a very large liquids fuel industry in the eastern Goldfields region. We have contemplated and had discussions with some organisations about the concept of constructing an aluminium smelter in the Kalgoorlie-Boulder region fed from this obviously huge energy resource that we know is out in that region. That is something that is still open for more discussion.

That is pretty much where we are at. To summarise, Mulga Rock is a large uranium resource but really it is the associated scandium that makes it such a strategically important resource—strategically important at both a national and international level. Scandium alloys obviously have many military applications. Once it is known that we can produce the product, there will be some interest from military manufacturers. The Goldfields region will benefit enormously from

both the mine itself and also the other products, be it water or energy or whatever, that it will deliver to the Goldfields region.

CHAIR—Thank you. In your submission you make the point that you believe that there is probably well over 150,000 tonnes of yellowcake in five substantial known uranium deposits in Western Australia. You further go on to say that in your estimation it could be worth \$10 billion, with royalties to the state of some \$30 million. We have had other evidence that puts it a bit lower than that. On what basis do you put forward those figures?

Mr Fewster—The actual resource on Mulga Rock is about 45,000 tonnes of yellowcake. It was previously owned by the Japanese government, who tended to understate the size of the resource. Also, historically, there was a great deal of confusion in the way in which the size of deposits was quoted. That confusion has now been resolved by the introduction of what is called the JORC code, which I am sure you will have heard about from a number of the parties—JORC standing for the Joint Ore Reserves Committee. It sets in place a framework by which you actually determine the size of a deposit. Using the JORC code, Mulga Rock is about 45,000 tonnes, Yeelirrie is about 55,000, Kintyre is about 35,000, Oobagooma is about 10,000, Manyingee is about 9,000 and Lake Way and Centipede between them are about another 10,000 tonnes. Then there are a number of other smaller deposits which I think in time will become viable. Yeelirrie and Mulga Rock are effectively 100,000 tonnes. If you add on Kintyre, that is 135,000. Oobagooma and Manyingee make 155,000.

I think that the number of 150,000 tonnes is on the low side. My thought now is that Western Australia's yellowcake resource from a minable reserve is probably more likely to be 200,000 tonnes of yellowcake. Bear in mind that these deposits carry a lot of other commodities. Yeelirrie is probably the largest vanadium deposit in Western Australia, even compared with Windamurra. As a resource figure, I think Western Australia has in the order of 150,000 to 200,000 tonnes of yellowcake. Again, how much of that is recovered over, say, the next 20-year period will be dependent on mining costs and other factors. Out of Mulga Rock, my estimate is that, of the 45,000-tonne resource, we could recover 15,000 or 20,000 tonnes at present prices, given that there would be a fairly large contribution from other metals as well. Mulga Rock contains a lot of nickel, cobalt and vanadium.

The resource figure on Yeelirrie is 55,000 tonnes, but I think most people would expect that to grow with further exploration. When you bear in mind that there has not been any significant uranium exploration in Western Australia for 15 years, it is fair to say that, once that exploration begins again in some earnest, there will be some more discoveries. I am quite comfortable in saying that as a resource Western Australia has in the order of 150,000 to 200,000 tonnes. The quoted resource figure on Mulga Rock is about 15,000 tonnes of yellowcake. That was PNC's estimate of a minable reserve, and that is the difference—Mulga Rock is a lot bigger than has been stated historically.

CHAIR—What is your comment on the suggestion that other witnesses have made about mining for another commodity? Olympic Dam is a good example. It is a copper mine but they are, of course, getting gold and uranium as well. With regard to mining in Western Australia for, say, gold, a previous witness said, 'What do you do with the uranium if the state government won't let you mine it and export it? You would throw it back in the ground.' What is your reaction to that?

Mr Fewster—It is true. I have written to the former minister here in Western Australia outlining the predicament we have found ourselves in with Mulga Rock. We have run the numbers and we know that we cannot produce scandium without the sale of uranium. His reply was: ‘Good project but we’re very sorry.’ My comment is that that is just utter nonsense. There are three separate deposits, but parts of the main resource—a thing called ‘Ambassador’—are almost certainly economic just on the amount of nickel and cobalt that would be recovered, but that is only a very small part of the resource. It may eventuate that we decide to go ahead and mine that component to recover nickel, cobalt, vanadium and scandium, for example, but in that process we will recover uranium.

Our deposit is very similar to Olympic Dam in the sense that the uranium has to be extracted from the process stream, because if it is left in it will contaminate all the other products. Clearly Olympic Dam have to remove the uranium so that it does not contaminate the copper. We could not produce nickel from our resource without first removing the uranium. If we leave it in there it will contaminate the nickel concentrate. In order to recycle the process solution, we would then have to precipitate the uranium out of the solution, so we would have uranium in a solid form on the surface, in a drum, and the question is: what would we do with that? To suggest that we then tip it back in the hole is just ludicrous.

My comment is that the government’s policy at present looks good on paper, but the reality is that, if it were ever put to the test and a mine or a deposit was brought right up to feasibility stage and a predevelopment stage and the government had to then justify its position that it was going to prevent the development of a mining project that we clearly thought would have enormous benefits to the state and the goldfields region in particular, I could not quite see how the government could sustain what I think would be fairly significant public criticism for trying to impose that policy. As I said, it looks quite good on paper but in reality, in this instance, I think it is just nonsense.

CHAIR—Is it fair to say that the state government’s uranium mining ban is a restriction or a severe restriction on your company?

Mr Fewster—I would think it is severe. If it were not for this ban, we would effectively be two years into the project development phase and two years ahead of where we are now. Certainly there has been a very significant change in the capital market’s position on uranium mining and resources in Western Australia. Twelve months ago we could not raise any money at all to evaluate a uranium resource in Western Australia.

CHAIR—I think the price has a bit to do with that.

Mr Fewster—It has. That is right, and I have to say that in the last four or five months we have had no shortage of offers from people able to contribute. But, at the same time, there is the evaluation that is placed on uranium resources in Western Australia, as in Queensland. There is an amount. Yellowcake can be valued, and in fact the capital markets value anything and everything. What I would call embargoed yellowcake in Australia, being uranium in either Queensland or Western Australia, appears to be valued at about \$2 a pound in the ground.

CHAIR—US dollars?

Mr Fewster—No, that is Australian. Thereabouts. It has probably gone up a little bit lately, but if you look at the value of companies that are listed on the Australian Stock Exchange that hold significant uranium resources—the obvious example is Summit—their market capitalisation works out at about \$A2 a pound or thereabouts for yellowcake in their state of resource. If you compare that to ERA, for example, Ranger appears to be capitalised, and ERA or the yellowcake at Ranger appears to attract a market capitalisation of maybe \$5 or \$6 a pound in situ. So we are effectively suffering a very severe discount compared to the rest of the market in what the market is prepared to pay for our uranium resource.

But this time 12 months ago embargoed yellowcake was worth nothing to the capital markets. They just were not interested. In fact, two years ago in our project the uranium was actually a liability. We have had some dealings with the major US based aluminium company, and one of the reasons they gave for being reluctant to proceed with a project was the difficulty in dealing with the politics of uranium in Western Australia. So we are at a point now where we are certainly able to raise capital, but there is a huge disparity between how much Australians are prepared to pay and how much, for example, Canadians are prepared to pay.

This is another point I raised in my submission. Mulga Rock is virtually one of the last major uranium resources—probably the last—in Australia which is looking for capital. We obviously are unlisted. We cannot afford to continue funding this privately. We intend to raise capital in quite large quantities in the near future. The best offers that we are receiving are coming from offshore, and I think that is very much driven by the fact that, while there are a number of people in Australia who are very keen to invest in uranium, they are still not prepared to pay as much as those in the rest of the world are prepared to pay. Without wanting to sound xenophobic, I think Australia should try to retain ownership of its uranium resources in some way. WMC was a good case in point. We are quite comfortable with anyone owning just about anything in Australia except resources that we see as having quite significant strategic importance, and uranium would be at the top of the pile.

I can assure you that the Canadians have been moving through Australia like a vacuum cleaner and acquiring virtually everything that has a uranium resource attached to it. There are probably three or four Canadian companies operating in Australia. They have enormous market capitalisations on the Canadian stock exchange and can acquire funds of any magnitude, at almost a moment's notice, to acquire whatever they want. As time progresses, I can see that progressively more and more of Australia's uranium resources will pass into foreign ownership, and ours may well be one of them. Again, that is because of the impediments that come about here in Western Australia because of the government's policy and the way in which both state and federal policies appear to generate a perception, certainly amongst Australian investors, that they have to apply a significant discount to the value of uranium as opposed to what the rest of the world will value it at. State government policy has held us up for two years.

Personally, I think Mulga Rock will be the first potential uranium resource to be developed in Western Australia. It is virtually one of the top three, I think. The top three are Yeelirrie, Kintyre and Mulga Rock, in terms of deposits that are of sufficient size to allow their development as a stand-alone operation. I cannot see any of the other deposits developing until there is some process developed in Western Australia for the transport and export of yellowcake, for example, and that alone is going to be a fairly complicated process. On that matter, our proposal is that yellowcake would come into Parkston at Kalgoorlie, and our intention would be to export it

through Port Adelaide. I do not think any Western Australian yellowcake would be exported through a Western Australian port, simply because of the initial problem of getting access to the port and also because of the problem of getting access to shipping that is prepared to take yellowcake. It would seem to me to be a rather futile exercise to try and arrange for yellowcake to be shipped out of Western Australia when there is a very well-established protocol for shipping it out of both Adelaide and Darwin. In our case, it is just as easy to put a container of yellowcake on a train at Parkston and send it to Adelaide as it is to put it on a train and send it to Fremantle.

Mr HAASE—The public perception of what exactly is the current Western Australian government's policy in relation to restricting the shipping of uranium is a little confused at present. I wonder if you could tell us what your perception of the current state of play is, in what order you see the obstacles and what processes need to be engaged to knock some of them down?

Mr Fewster—I think the most important first step for the uranium industry in Western Australia is to educate the public and acquire public support. There was a Newspoll some weeks ago in the *West Australian*—and I have to say that the results were very surprising to all of us in the uranium industry—which found that 48 per cent of those surveyed supported uranium mining in Western Australia and only 44 per cent opposed it. So it would appear that virtually half the people support uranium mining in Western Australia at present. First and foremost, there has to be a well-funded and well-organised campaign to inform the people of Western Australia about what is actually involved in uranium mining and the fact that it is such a benign industry.

Mr HAASE—But what is your perception of the status of the bans imposed by the state? There has been confusing talk about some deposits predating such and such a decision, and a question as to whether or not they can be legally mined et cetera. There is a restriction on the movement of product and the Western Australian government is able to control that movement in Western Australia. For the record, could you give us your knowledge of the current status in reality and take some of the cloud away from the public perception.

Mr Fewster—I guess in a word you would have to describe it as being a bit schizophrenic in that Mulga Rock is probably the only one of the three major deposits which is still not covered by mining leases. So, yes, the proposed government prohibition on uranium mining would only be by amendment to the mining act, which would then apply a condition on the grant of mining leases. I certainly cannot see any way in which the government can prohibit the mining of uranium from an existing mining lease—or at least they cannot remove ownership of that uranium from the owner of the mining lease. Effectively, if the government wanted to do that, they would have to resume ownership of the uranium, and that would obviously bring about issues of compensation and also sovereign risks. It is the case at the moment that, theoretically, both Yeelirrie and Kintyre could be mined, or at least they could start a mine there, start mining uranium, process it, recover it and put it in a drum.

Mr HAASE—Let us proceed from having put it in the drum.

Mr Fewster—When it is in the drum they then have to get it to a port somewhere. There is, I believe, sufficient existing legislation to allow the government to prohibit the movement of the

yellowcake off the lease. Certainly in terms of its movement on public roads, yellowcake is a class 7 material and there are notifications that are required.

Mr HAASE—What is a class 7 material?

Mr Fewster—It is a hazardous material.

Mr HAASE—How hazardous?

Mr Fewster—Yellowcake is actually about the least hazardous of all commodities that you can put on the back of a truck. By way of analogy, countless truck loads of sodium cyanide are shipped to the goldfields each year. Each one of those truck loads of sodium cyanide would be 1,000 times more dangerous than a truck load of yellowcake.

CHAIR—But the perception is that yellowcake is more dangerous than sodium cyanide.

Mr Fewster—That is right. All it goes to show is that those who would oppose uranium mining in Western Australia have succeeded in the public relations war up until now. Yellowcake is almost entirely benign. It emits alpha radiation in very small quantities. Alpha radiation is effectively helium gas. It is barely radioactive and it is not toxic. It is only dangerous if you inhale it. If you get it in your lungs it is a problem. If you swallow it, it does not really matter—it just finds its way back out again. The industry would in general say that a tanker load of petrol is a far more dangerous thing to be moving around on the roads of Western Australia than a container load of yellowcake.

Going back to what the Western Australian government can do, I would think that they would be able to prohibit the movement of yellowcake on public roads because it is a class 7 material. There is a whole range of other issues that come into the transport of radioactive materials anyway. I am not entirely familiar with the legislation. It has been put to me, though, that there would be a case that, if the purpose of the movement of the yellowcake was to ship it, for example, to South Australia, then that aspect of the federal Constitution—which, as I understand, requires free trade between states—could be tested to see whether it would be allowable to move yellowcake, particularly, for example, if it was transported on a private road.

The obvious example of a private road in Western Australia is the access road on the trans-Australian railway line. As I understand it, the railway line is located on freehold property owned by the federal government, or whoever it is that operates it now. Could we truck yellowcake from Western Australia to South Australia on a private road or even just put it on the train across to South Australia—again, if it was transported on private roads from site? That would be a very interesting scenario to examine. If someone did develop a resource to the point where they were at mine development, I would think that it would be very difficult for the state government to then sustain their position that they should prohibit the development of that resource.

Mr HAASE—Do you believe there is any appetite for any of the owners with mining leases to bring Federal Court action against the state government?

Mr Fewster—No, unfortunately.

Mr HAASE—Given that there is no appetite in your opinion for that, what would you say to the consideration that the action was not being taken with the intention of leaving the resource in the ground for even higher prices post 2013—this is in the minds of industry as a strategy from the shareholders of the industry?

Mr Fewster—I think the present prices are enough to get everyone interested in developing resources. I would certainly think that Rio, for example, would be very keen to do something with Kintyre but, given their vested interest in the iron ore industry, maybe they will not achieve that. The companies who have the capacity are BHP, Rio or Paladin. They are the resources that I see as potentially being developed. But Paladin's resource at Manyingee is an in situ leach operation and I would be very surprised if that would be the first deposit to be developed in Western Australia, just because of the problems inherent with using the in situ leach technique.

Mr HAASE—Going back to the Mulga Rock situation, what would you identify as your major hurdle at this point in time: the policy of the Western Australian government or your inability to enter into a joint venture for the development of the scandium?

Mr Fewster—The policy of the state government. We need to go to mining leases. Mulga Rock is a very complicated deposit, but beneath one of the uranium deposits we have a gold deposit which we think we can recover using some known mining methods. Of course, before we could even develop a gold deposit, we need a mining lease, but we will not accept a mining lease that comes with a condition that we are never allowed to mine uranium, because we know that the most valuable component of the resource in that particular case is uranium. We have a problem in that just acquiring a mining lease is something that we would not entertain at the moment, and that is particularly because of government policy.

Mr HAASE—Everyone knows the Western Australian government policy. What are you finding in your day-to-day dealings with the mines department—I am not sure that it has not been renamed in Western Australia—and the personnel that you need to deal with face-to-face in seeking out these leases and rights to mine?

Mr Fewster—The mines department I have found are very sympathetic. There are some in there who are not but, in general, they are very sympathetic to the predicament we all find ourselves in, certainly in our instance. Their advice is that they are bound by policy and, of course, are not allowed to operate outside the bounds of that policy. The mines department could not, for example, grant us a mining lease that did not carry the 'no uranium mining' condition.

Mr HAASE—Of course, but generally you would say that those that are involved with and are probably, in a practical way, most knowledgeable about the industry in Western Australia, as individuals understanding the product, problems and environment that they exist in, are sympathetic to your cause but political bureaucracy says that this is a hot potato and they are not going to debate it.

Mr Fewster—Very much so, yes. As I said, the people in the mines department are sympathetic. One issue, for example, is the movement of samples from a site. Clearly, Western Australian policy does not prohibit us from conducting exploration of our deposit. In the process of conducting exploration, we gather up samples. Those samples can carry grades of uranium, which again bring them up into the class 7 category, so there are issues related to the transport—

Mr HAASE—They are less dangerous than a can of petrol.

Mr Fewster—They are far less dangerous but fall within the auspices of a class 7 material. We have no problems in dealing with the departments that would allow us to transport those samples. They are fully aware of the fact that moving a truck load of uranium around Western Australia is far safer than moving a truck load of smoke detectors, and there are plenty of truck loads of smoke detectors being shunted around the country.

They are aware of the signs; they are aware of the facts. On that basis, that is how they operate. Being aware of the facts, they realise that there is absolutely no health or safety or other issues related to what we are trying to do. But, at the same time, they are bound by policy in that they could not give us permission for a truck load of yellowcake.

CHAIR—For the *Hansard* record, explain why a truck load of smoke detectors is more dangerous than a truck load of yellowcake.

Mr Fewster—The active product in the smoke detector is an isotope called americium-241. Americium-241 was discovered during the Manhattan Project, which is why it is called americium. Americium-241 is a decay product of plutonium-241. Plutonium-241 is a product that is recovered from the reprocessing of high-level nuclear waste. Plutonium-241 can only be produced in a nuclear reactor.

CHAIR—Do you think the public know that?

Mr Fewster—No, of course they do not. But, as I said, uranium is an alpha emitter but uranium-238, which is the predominant isotope in nature, has a half-life of 4.8 billion years. The amount of radiation that something emits is a function of its half-life.

Mr HAASE—If I can interrupt you: that is a very scary statement in the hands of those who have little information. What does half-life mean, and how dangerous is it to start with?

Mr Fewster—Half-life is the amount of time it takes for half of an isotope to decay down to the next product, effectively. All elements that emit radiation transform themselves from their primary product to an end product. So uranium decays to lead. There are two isotopes primarily in nature: 238 and 235. Uranium-235 is the stuff that goes into nuclear power stations and atom bombs. But 235 represents only 0.71 per cent of all uranium in nature, so effectively 99.3 per cent of uranium in nature is 238. As I said, 238 has a half-life of 4.8 billion years. That means that, every 4.8 billion years, half of the uranium that exists in nature turns into lead.

Mr HAASE—How dangerous is it when it starts out in that process?

Mr Fewster—Because its half-life is so long, it takes a long time for the material to emit the particles. The first particle that uranium emits in its process of shrinking in size, effectively, is what is called an alpha particle. An alpha particle consists of two protons and two neutrons—that is, effectively, helium. So most of the helium that exists on earth today is actually a product of the decay of uranium. Because uranium has such a huge half-life, the amount of alpha radiation that it emits is very low, whereas I think americium-241 has a half-life in the order of 200 years. Effectively we have elements that are starting off with about the same sort of atomic size:

uranium-238 has 238 protons and neutrons; americium-241 has 241. Uranium-238 then takes 4.8 billion years to reduce in volume or mass by half by emitting radioactive particles, whereas americium reduces its mass by half in 200 years. So it clearly emits a far greater amount of radiation. Indeed, that is how they work.

Mr HAASE—And it is therefore more dangerous?

Mr Fewster—It would be if you were to inhale it. The only way alpha emissions are dangerous is if they are inhaled and captured within your lungs. When the alpha particle is emitted, it is ionising radiation. It is ionising because it does not contain any electrons. But, as soon as that alpha particle acquires electrons—and it just strips them off, whatever it bumps into—it then turns into helium gas. Typically, the sort of distance over which alpha particles are ionising is in the order of a few millimetres. So if we could have, sitting on the desk in front of us, a paperweight of a piece of plutonium—plutonium is an alpha emitter as well—or americium, lead or uranium, as long as it was more than 10 centimetres away, we would all be safe. The only problem comes if it is vaporised into some form that allows it to be inhaled. If it then attaches to the lining of the lungs, it becomes dangerous.

Mr HAASE—What about the likelihood of it? You have already given the doubting Thomases the ammunition. You say, ‘If it vaporises.’ What sort of special circumstances would be required to vaporise that piece of plutonium?

Mr Fewster—If you attach some very high explosives to it, as the English did at Maralinga, that does a very good job.

Mr HAASE—But it is not going to do it of its own accord?

Mr Fewster—No, it cannot do it of its own accord. Indeed, if it is encapsulated within a small piece of plastic, as a smoke detector is, it is entirely safe and it remains safe forever.

CHAIR—Thank you for your evidence. If we require any further information, the committee secretariat will contact you.

Mr Fewster—Thank you.

[11.41 am]

MASTERS, Dr Peter Leslie, Member, Executive Committee, Medical Association for Prevention of War (Western Australia Branch)

CHAIR—Welcome. Thank you for agreeing to give evidence today. Although the committee does not require you to give evidence under oath, I advise you that the hearing is a formal proceeding of the parliament and that the giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. I further remind you that the committee prefers that all evidence be given in public. However, at any stage you may request that evidence be given in private and the committee will consider your request. I invite you to give a short opening statement.

Dr Masters—Firstly, I thank Jerome Brown for enabling me to appear as a witness to this inquiry. Secondly, I wish to acknowledge that the main author of our submission is our recently retired executive officer, Judy Blyth, who has produced a very comprehensive submission—the longest of all submissions to this inquiry, I believe. Following the summary and recommendations, the first part of the submission reviews plans by China, India, Russia and the USA to expand their nuclear power industries and then discusses the factors influencing future demands for uranium. With reference to the recommendations, we are challenging the committee's decision to make the development of our uranium resources its first choice. Our view is that priority should be given to industry, not resources, by a rapid development of Australia's renewable energy program.

Australia does not have nuclear power plants, but it does have an innovative renewable energy industry together with a climate favourable to both solar and wind power. Moreover, the large spread of its rural population also favours energy sources placed at the point of use as opposed to the centralised nature of nuclear and fossil fuel power generation with its associated costly distribution network. Recent evidence of an acceleration in global warming has led promoters of nuclear power to claim its expansion as the answer. Although the operation of nuclear power plants does not produce greenhouse gases, their construction and the mining and enrichment of uranium do. More importantly, the recently appreciated phenomenon of solar dimming highlights the urgency of reducing the use of fossil fuels by an intense campaign to use energy more efficiently as we replace fossil fuels with renewable energy—solar, wind, geothermal et cetera.

The 10 years needed to plan and build a nuclear power plant, together with the high capital cost, makes the nuclear response to accelerating global warming particularly inappropriate. In fact, I think it would be a recipe for disaster because of the greenhouse gases produced in building those power stations.

Indonesia, our nearest neighbour, is currently considering its energy options. Australia's choice of renewable sources would encourage it to follow suit. This would dispel the nightmare of siting nuclear power plants in that earthquake prone country, with the prospect of the fallout from any meltdown being carried by the prevailing winds in the upper atmosphere towards Australia.

The technical link between nuclear power and nuclear weapons remains the strongest argument against the proliferation of nuclear power plants so long as the current climate of mistrust and terrorist activity is compounded by the failure of the nuclear capable states to agree on a program to dismantle their weapons. I should add that they are unusable weapons. We need to get away from our age-old acceptance of a culture of war and put our hearts and minds into developing our skills for reconciliation and non-violent solutions to our political disputes.

CHAIR—Thank you. You made the statement in your opening address that Australia should move to renewable energy—wind power and the like.

Dr Masters—Yes.

CHAIR—The bulk of our base load power in Western Australia at present is located in Collie—probably about 400 megawatts of power. How do you propose that solar or wind power replace that capacity base load, given that the sun does not shine all night and the wind—even the Fremantle doctor—does not blow all day?

Dr Masters—Obviously, this could not happen in a short period of time. That is admitted. But do not forget that we are already using wind power in Australia. It could be expanded anywhere much more rapidly than could nuclear power.

CHAIR—But it cannot replace base load power because the wind does not blow 24 hours a day.

Dr Masters—That is true.

CHAIR—It might in Geraldton but not down in the south west.

Dr Masters—There has to be more work done on storing energy. This is one of the problems that have to be faced. I agree that there is a problem with the storage of energy. Nevertheless, the point is that we are dealing with an urgent need to reduce greenhouse gases. So the sooner we start with what we have, the better. Energy efficiency is the other big aspect of this. A lot could be done in that area. Of course, there have been moves towards it but not with a proper sense of urgency.

CHAIR—Given that nuclear energy used around the world today saves the emission of some 2.5 billion tonnes of CO₂ annually, if that was to be taken over by fossil fuels don't you consider that saving of 2.5 billion tonnes of CO₂ emissions—

Dr Masters—Absolutely. I would not suggest phasing out nuclear power now. I think it is responsible for something like 13 per cent of electricity around the world. Obviously, we would not want to reduce that at this stage, although ultimately I think we should. This would be a long-term thing.

CHAIR—So you accept that nuclear energy of nuclear power generation does not emit CO₂ and does not contribute to global warming?

Dr Masters—That is right—except in terms of the building of the power station and the enrichment of the uranium—

CHAIR—Would you accept that even the building of wind turbines contributes in the same way?

Dr Masters—Yes, that is true.

CHAIR—Solar panels are a bigger offender.

Dr Masters—In what way?

CHAIR—In the generation of energy and emissions when developing the solar panels.

Dr Masters—Yes, in the making of photoelectric panels, of course. There would be some, but I would not have thought it was on the same sort of scale as building power stations of any kind. We need to get away from the centralisation of power. This is the great advantage of solar: it can be put up anywhere. You do not need to distribute it, to the same extent, as you do with the centralised approach.

CHAIR—Several prominent environmentalists—James Lovelock; Patrick Moore, Greenpeace founder; and Hugh Montefiore, the former chair of Friends of the Earth—have stated that the rapid expansion of nuclear energy is necessary to avert an environmental calamity. Montefiore said, ‘The dangers of global warming are greater than any other facing the planet,’ and that the advantages of nuclear power ‘far outweigh any objections’. He goes on to say: ‘I can see no practical way of meeting the world’s needs without nuclear energy. The predictions of the world’s scientists are dire and the consequences for the planet are catastrophic. This is why I believe we must now consider nuclear energy. The subject is so important that it should be a matter of informed public debate.’ What is your response to that?

Dr Masters—I agree: it should be subject to public debate. I am very surprised that James Lovelock has taken this view, in view of his other writings on Gaia and so on—if that is the view he has taken. I repeat that it is going to take a long time for nuclear power to make any difference to global warming. It is going to be worse with the 10 years required to build more power stations. We should now be getting on with spending much more money on renewable energy. The trouble is that, because of nuclear weapons, so many countries have adopted nuclear power as they see it as a way of making weapons as well. The two are inextricably linked. They pour money into nuclear power through subsidies. The result is that renewable energy has been veritably starved of funds. I think it is time that we spent much more money on developing renewable energy. That is my view.

Mr HAASE—I want to take up your last point that renewables have been starved of funds. One of the major decisions of the current federal government concerns just how much money it will throw into renewables and the development of renewable energy. It is a very costly exercise when the pointers already indicate that energy sourced from renewable sources is uneconomic. That is why we have taken the decision at this stage to put so much money into research for the cleaning up of fossil fuels, such as our abundant supply of coal. That is still seen, for the long term, as the major source of our energy supply in Australia. What we are talking about in this

whole debate presently in this inquiry is the mining and export of the eventual product of yellowcake. We have heard so much evidence in the inquiry thus far indicating that the basic product of yellowcake that we want to export is relatively innocuous and far less potent than many other substances that we use daily that are moved freely on our public roads across the state of Western Australia.

The whole debate thus far seems to point out many idiocies and perceptions that simply cannot be sustained. On page 121 of your submission you have dot-pointed a number of issues. You point out that there have been incidents at mines which could damage the environment or the health of workers. You cite five radioactive waste spills at Olympic Dam in 2003, including one in which 145,000 litres of waste liquid escaped from a plastic pipe. What you do not say on that point, for instance, is how dangerous, or innocuous, in fact, that waste is. I think it somewhat skews and brings into question your whole argument that there is something foreboding or obnoxious about this yellowcake product.

You go on to say—and this is a dot point of significance because you put it in your submission—that in 2005 the South Australia government ordered an inquiry into an increased number of bird deaths at Olympic Dam. I point you to the fact that where birds alight on waste sump oil there are numerous fatalities. In my own area, the Pilbara, we had a problem for many years in that regard. It has nothing to do with the nature of the yellowcake product that you are referring to, and you are in no way clarifying the issue.

You say that there was a spill of radioactive material at Honeymoon mine in South Australia in 2002. You cite that. I would suggest that your submission is skewed in such a way that we are to take it from the fact that you dot point these facts that this is something that is incredibly sinister and ought to be taken as a negative in the argument. I put it to you that these dot points are no more than a statement of fact that is recorded under a very strict regime of regulation as to what occurs on these mine sites. In fact, this simply adds to the positive debate. If uranium is going to be used as a feed stock for reactors generating power that will greatly reduce the gradual and eventual effect of greenhouse gases, isn't it better that that feed stock, innocuous as it is, be sourced from somewhere like Australia where the regulation is, to say the least, extreme?

Dr Masters—I see your point. I sympathise with your point in the sense that anything radioactive has become, by public perception, an extremely dangerous thing. What I will point out first is that the main trouble about radioactivity is that its effects are not apparent immediately. It has long-term effects, such as producing cancer 20 years later. If you start contaminating the environment with these radioactive products, particularly uranium which has a very long half-life, you are left with potential problems in, say, ground water for thousands of years. Admittedly it may be a lesser evil than some of the other aspects you were mentioning, but I do not think it should be taken too lightly. It has been taken lightly simply because the effects are not obvious. Chernobyl is a good example. The IAEA in their first statement a few years ago said that there were only 30-odd deaths from the Chernobyl disaster. They were referring to the deaths from acute radiation exposure. They did not say anything about the later deaths from thyroid cancer and others cancers and those deaths that are still to come. There is a tendency to underestimate the effects of radioactivity, simply because they are so long term.

The other point I wish to make is that the federal government are planning to spend more money on improving the fossil fuel industry and its pollution than on developing renewable

energy. The discovery that we have global solar dimming means that, if they concentrate on making fossil fuels more free from pollution, they will actually accelerate global warming because it is the pollution that is produced by these fuels that is causing the solar dimming—which of course is working against global warming. So their recipe is not a good one. It will lead to an acceleration of global warming. It does not seem to have been discussed very much yet, but solar dimming appeared on an ABC *Four Corners* program a few weeks ago. It was actually a BBC program that they used, and I advise you to look at it very carefully. It was based on the work of scientists in various countries, including Australia, and it is a very important issue.

Mr HAASE—I know not about solar dimming. I will pursue the topic we have at hand. Your submission lists seven recommendations and item 5 states:

The health consequences of uranium mining and nuclear power are on their own enough reason to spurn any increase in uranium mining/nuclear power.

Would you care to substantiate that assertion on the basis of the known tens of thousands of deaths per annum in the coal industry?

Dr Masters—Yes. I must admit that I feel that was an overemphasis of the health risks. There are health risks but, as you say, there are a lot of health risks in coal mining.

Mr HAASE—Dying is a poor outcome.

Dr Masters—I do not think the health risks are the main argument against nuclear power. As I emphasised in my statement, I think the main argument is this inextricable connection with nuclear weapons. People say they want a nuclear power plant, but all the time they are secretly producing weapons. As long as this atmosphere of distrust goes on and given that the argument that says we have to have nuclear weapons to gain security—which is an absurd idea—seems to have caught on, we will have this problem. ‘Join the nuclear club and we will become more secure.’ It is an absurd idea. Until we get over this problem, nuclear power is going to be a pain for us.

Mr HAASE—If the two could be delinked, would your objections then cease?

Dr Masters—It would certainly reduce my objections, yes.

Mr HAASE—How much would they be reduced by?

Dr Masters—I think that is a pretty difficult question to answer. When you start getting hypothetical, it is pretty difficult, isn’t it, because there are so many factors involved.

Mr HAASE—I take it that your objection is not to uranium mining and not to nuclear power generation.

Dr Masters—No, not as such, perhaps. The other problem, of course, is the safety, isn’t it? This is a very difficult issue because there are so many different kinds of nuclear power stations. Obviously, if you work hard you would probably find a nuclear power station that is safe. But

we cannot be altogether happy about that issue at the moment, and that is why I do not want to get involved in that. I do not know very much about it, and it is a very difficult issue to discuss.

Mr HAASE—Okay, let's not discuss the power generation. Let's go to item 6 of your submission, which states:

Enlarging Australian uranium exports would add more burdens to the indigenous people under whose land this ore occurs. They should be left in peace—and the uranium left undisturbed in the ground.

Can you substantiate that assertion?

Dr Masters—It is true that most of the uranium mines are in fairly remote rural areas where Aborigines predominate. I think that is true and Kakadu is a good example, isn't it? I am not sure about the Olympic mine in South Australia, but I think it applies there as well. I think there is a lot of truth in that.

Mr HAASE—What truth do you point to?

Dr Masters—That it disturbs their lifestyle to have a big mining project and there is the risk that there will be some residual permanent contamination of the environment which they may be exposed to in terms of their lifestyle.

Mr HAASE—But there is absolutely no evidence to suggest that there is permanent contamination of the environment. We have heard ample evidence to suggest that rock outcrops and numerous water sources are naturally contaminated with radioactive material and that is far more potent than the by-product of uranium mining today in the environment.

Dr Masters—That has often been stated, but it neglects one thing—

Mr HAASE—But it is also substantiated.

Dr Masters—Yes, but there is one thing. The last witness pointed out that the main danger from uranium is when it is inhaled. You do not inhale it when it comes from background radiation. You inhale it when they mine the uranium and they create dust which can be inhaled.

Mr HAASE—No. He did make the point in fact that it was not the particle; it was the helium gas emitted as part of the natural process of breaking down. It was the inhalation that was the problem. He made the point that the human form is in no danger when millimetres from a radioactive source.

Dr Masters—He was talking about radon gas and that sort of thing. I am talking about uranium waste that has been pulverised and not completely buried.

Mr HAASE—But that is now in the process. It is in a drum and on its way to Europe in exchange for huge volumes of export dollars.

Dr Masters—Yes, I know.

Mr HAASE—We do not leave that yellowcake lying around unattended.

CHAIR—But that uranium is in the ground anyway, isn't it?

Dr Masters—Uranium is in the ground. What I am talking about is what happens when it is taken out of the ground by the mining industry. That is when the danger arises because you may get inhalation of uranium. The best example of that is depleted uranium. Are we all aware of depleted uranium and its use for tank warfare? When a bullet containing a lot of so-called depleted uranium hits a tank, the heat generated causes it to vaporise and then this uranium can be inhaled. There is a lot of evidence that this is causing a lot of trouble to health in Iraq and other places where it has been done.

Mr HAASE—I think the major amount of damage that has been done to the world is by increasing its chance of suffering global warming because of the fear of using nuclear power, fear which has been created by experts—

Dr Masters—So-called experts.

Mr HAASE—and the media in wanting to put an extensive negative spin on the use of an energy source that has the potential to save us from a great calamity which has been referred to today as global warming, which is resulting in a rising sea level. I am a little frustrated because I have the opportunity to view the arguments from both sides and I think the amount of damage done by the negative spin is far greater than the amount of harm that might be created long term by the use of nuclear energy.

Dr Masters—I see your point, but I think you neglect the fact that the reason why no nuclear power stations have been built in the West for some time—

Mr HAASE—Do you mean in Australia?

Dr Masters—No, I am talking about the USA and the UK. The reason why they have not been built is not because of public outcry so much as because it has become very expensive. The safeguards they have had to put into these power stations have made it very expensive and so private industry has not been willing to invest. A good example is in the UK when Margaret Thatcher was prime minister—she wanted to privatise the nuclear industry and the private companies did not want to take it on, and so it did not happen.

Mr HAASE—The negative debate was winning the day in those times. It was making it very, very unpalatable.

Dr Masters—Yes but it was about money as well as about radioactive danger. Admittedly there was a public outcry but it was not very strong—not compared with the influence of the multinational companies of this world who, after all, are now the greatest influence, aren't they?

CHAIR—There are countries now moving towards nuclear power, acknowledging that the capital cost of building a nuclear station is dearer than a coal-fired generation plant but acknowledging that the only way they are going to stop or reduce CO₂ emissions is to go to nuclear power.

Dr Masters—Yes. China and India are fine examples, aren't they?

CHAIR—Yes, and isn't it true also that the Americans are now once again looking at nuclear power within their own country for the same reasons?

Dr Masters—Yes, I agree they are. The Bush administration in particular is, but the Bush administration is also talking about making use of nuclear weapons. In their Pentagon statement they talked about exploring ways of using nuclear weapons in warfare, so for me that damns their support of nuclear power right from the start.

CHAIR—But the nuclear powers also already have the capacity. Part of a positive program was the agreement between the Russians and the US, which is going to expire in 2013, to decommission some of the warheads.

Dr Masters—Yes, they have been getting on with it fairly slowly, and they are using the decommissioned nuclear weapon plutonium and so on in their power industries, are they not?

CHAIR—That is right, they are down-blending.

Dr Masters—It is a sensible approach, really, to get rid of some of it although it does not get rid of it ultimately because there is still the nuclear waste to deal with at the end.

CHAIR—It is part of the reason why the price of uranium is increasing, because that stockpile is now running down, and the purpose of this inquiry is to look into the potential for uranium exports from Australia's point of view. My colleague raised a question in regard to the Indigenous communities. The submission goes on to say they should be left in peace and their land left undisturbed. Would that not also applied to iron ore and nickel and gold mining on their lands?

Dr Masters—Yes, to an extent it does. It all really depends—

CHAIR—So to take that all the way to its logical conclusion, to be fair, if you say, 'Don't mine uranium on their lands and don't give them the benefits and the payments for it,' then you would also say, 'Don't mine iron ore, gold, nickel or whatever.'

Dr Masters—That all hangs on what the importance of the radioactive element is, doesn't it? It all hangs on what emphasis you put on the radioactivity.

CHAIR—So are you saying that if you solve that problem—if there is a problem—then you have no problems with mining taking place, whether it be of uranium or whatever, on lands controlled by Indigenous communities?

Dr Masters—The disposal of the waste is still an issue that has not really been properly solved, has it?

CHAIR—But there are other industries such as gold mining, which has a tailings problem.

Dr Masters—I know. The radioactivity is what makes the difference.

CHAIR—Is it a bit alarmist just to pick uranium mining in exclusion rather than all the others? Should we not be environmentally responsible and make sure that all tailings are dealt with safely?

Dr Masters—I agree with that, certainly. But I do not quite get your point here.

CHAIR—My point is: why single out uranium mining as disturbing Indigenous lands when that could be argued of all mining? That is excluding looking at the value to all the community, including the Indigenous communities, of mining benefits that are drawn to the state and the individual peoples.

Dr Masters—You are more or less saying that the radioactivity is a furphy and that it is not important. I think that is going too far, myself. Admittedly, it could be exaggerated. When you compare it with other risks, one has to admit that. But it is not something that can be neglected.

CHAIR—I am not suggesting that we neglect it. I am suggesting there is no evidence—and the committee has not received any evidence—to suggest that it is a problem.

Dr Masters—One of the problems is that the evidence has not been collected properly. For instance, I do not think Australia has a proper system of monitoring the long-term health of miners. The result is that we do not really know how much damage is being done. That is another thing that particularly bothers the medical profession.

CHAIR—Given that figures are recording that we are all living much longer now—life expectancy is longer—and I think it was the medical profession that stated that one in every three babies born today can expect to live to be 100 years old, wouldn't that go against what you are saying?

Dr Masters—You are talking about statistics now. I am talking about a specific risk that somebody who is exposed to uranium during the mining process may, 30 years later, develop cancer of some sort. That is what I am referring to—a specific risk for a particular group of people.

CHAIR—Unfortunately, all of us are, in part, developing cancer for all sorts of reasons.

Dr Masters—I know, but that does not mean we should extract something that causes an injury.

CHAIR—If you could solve it, you would be a very rich man.

Dr Masters—Yes, that is right.

Mr HAASE—I mention my frustrations in knowing both sides of the argument yet seeing such a public ignorance, if you like, of both sides of the argument. So many of the public are so well informed of all of the negative aspects of mining of uranium and the nuclear power industry et cetera. It is therefore difficult for me when we have extremely erudite people like yourself making public all of the negative views in relation to the nuclear industry.

I wonder about the motivation at the end of the day. You have just asserted, for instance, that the by-product of mining uranium might be radioactive, that the results of mining uranium for the individual involved might be injurious and be inducing cancers et cetera. By your own admission, you have no evidence of that, so what leads you to publicly expand the negative view and at the same time ignoring the very long-term benefits of the nuclear industry? What has made you choose to take the negative path rather than the positive path?

Dr Masters—One of the reasons is there has been a terrible tendency to cover up on nuclear issues—

Mr HAASE—But that is an assertion. The conspiracy theorists have been running this line for years. It is the most transparent industry around, with regulation in this country especially that is more concerned about the tailings from a uranium mine than it is with the groundwater coming to the surface from a deep paleochannel which is seven times saltier than seawater and which does far more damage to the immediate environment.

Dr Masters—I see your point. But do not forget that I am not being negative. What I am saying is, ‘Let’s be positive and develop renewable energy.’ What is wrong with that?

Mr HAASE—Because it is far too expensive from an energy perspective.

Dr Masters—At the moment it is, but that is because not enough money has been poured into developing it.

Mr HAASE—Yes, but whose money?

Dr Masters—It is our money, of course.

Mr HAASE—Of course. Don’t you think that, as a government serving the country and its people in the best possible way, we will spend that money in the most economic fashion for the best eventual outcomes?

Dr Masters—Quite honestly, I do not.

Mr HAASE—So do you cite that philosophy for the basis of your decision to be negative rather than positive about nuclear and therefore being concerned about the eventual environment of the earth?

Dr Masters—I thought I made it clear in what I said at the beginning. It is this link between nuclear power and nuclear weapons that makes nuclear power such a dangerous thing to develop. If that link was the problem, I could certainly envisage a time when, if we gave up our culture of war, we could get nuclear power going and avoid most of the problems. But at the present time, with this posturing between countries which seem to think they need nuclear weapons to survive, it is going to be dangerous to produce more nuclear power plants. That is my main contention.

Mr HAASE—You refer to Iran and North Korea.

Dr Masters—Yes, and of course Israel is another example.

Mr HAASE—But you do not, for instance, speak of—I have it here—the Megatons to Megawatts program that was negotiated between the USSR and the USA in 1993. That is converting all of that potentially mass-destructive material into a peaceful usage.

Dr Masters—I think that is a very good move. I approve of that. We cannot phase out nuclear power in the short term. That is obviously not sensible, but I think in the long term it would be feasible.

Mr HAASE—But it provides 16 per cent of the world's electricity supply today. Don't you think it would be virtually impossible?

Dr Masters—Yes, at the moment.

Mr HAASE—We have a diminishing hydrocarbon supply through fossil fuels. I am not aware of an energy source other than hydrogen perhaps, and that would be very expensive to harness also.

Dr Masters—Yes, I admit that. But do not forget that when it comes to, say, solar panels their cost has gone down a lot over the years. In fact, it is now economic to use solar panels in remote areas because you avoid the need to have a distribution of electricity. It will take time, but the point is the money has not been available as freely as it might have been. That is my contention.

Mr HAASE—The statistics will of course disprove that.

Dr Masters—It is difficult to prove that sort of thing, I agree. A public debate on this issue is a very important one that should happen. We should do it more widely and have a more informative debate than has so far appeared.

Mr HAASE—We are encouraging that. Thank you.

CHAIR—You obviously support and see the benefits of nuclear medicine?

Dr Masters—Yes, but do not forget that this is now becoming less important in investigation because there are other techniques such as MRI and positron emission tomography which do not use radioisotopes. Certainly, I would prefer not to because even these can have side effects, although admittedly they are not that common.

CHAIR—Thank you for appearing before the committee.

Proceedings suspended from 12.20 pm to 1.03 pm

STEPHENS, Mr Alistair James, Managing Director, Arafura Resources NL

CHAIR—Welcome, and thank you for agreeing to appear and give evidence at the public hearing. Although the committee does not require you to give evidence under oath, I should advise you that the hearings are a formal proceeding of parliament. I remind you further that the giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. I also remind you that the committee prefers that all evidence be given in public. However, at any stage, you may request to give evidence in private and the committee will consider your request. I now invite you to make an opening statement.

Mr Stephens—The needs of the world are changing rapidly, with increasing demands for sustainable environmental solutions that will improve our quality of life. Technology makes advances every day to tackle global warming, increase energy efficiency and reduce our reliance solely on fossil fuels for power generation. The world has recognised that urgent action is needed to protect our environment as well as sustain our quality of life. Arafura is positioned to take advantage of some of these global issues. We have products that are rare earths that will be instrumental in supporting changes in the transport industry as it creates more fuel efficient and environment friendly vehicles associated with uranium, which is purported to be the clean solution to power generation. Uranium is recognised as the only viable substitute for depleting fossil fuel resources and the long-term solution to the reduction of greenhouse gas emissions.

As an overview of Arafura, our premier asset at Nolans Bore is located 135 kilometres north of Alice Springs. Nolans Bore is a mineral deposit containing not only rare earths but also uranium and thorium hosted in a phosphate rock. It has a significant resource of high-grade mineralisation that could sustain a mine life in excess of 20 years. A recent drill program indicates that that resource, currently at 5.8 million tonnes, could increase by two to three times. The current resource contains 227,000 tonnes of rare earths, 1,800 tonnes of uranium and 24,000 tonnes of thorium. The primary objective of the project is to recover rare earths and then by-products of uranium, phosphate and potentially thorium. As I stated, rare earths are the key raw material in the manufacture of rechargeable of batteries and magnets in the electric motors of hybrid cars. The technology results in the reduction of fuel consumption and reduced greenhouse gas emissions. It is a key step towards full electric motor transport.

Associated with the rare earths is uranium, which we hope to market for power generation. In addition, thorium, which we currently view as a waste product, could in the future potentially be used for nuclear power generation. There are reactors in Russia and India. For instance, the Russian thorium reactor—the Radowski reactor—is fully operational, and India has committed to the construction of a 500-megawatt thorium reactor at Kalpakkam by 2010. Thorium power is considered to be more environmentally friendly than uranium for power generation, as it depletes plutonium stocks as a catalyst to thorium reaction as well as having a significantly shorter half-life of waste products. In 2006, Arafura will enter into a feasibility study to assess the economics of the recovery of rare earths, uranium, phosphate and, in the future, thorium. Preliminary test work is currently under way at the Australian Nuclear Science and Technology Organisation at Lucas Heights. As I stated before, rare earths, uranium and thorium are closely interrelated in their mineralisation style.

So the world needs energy and Arafura can provide products through our resource that can meet some of those needs. Energy drives economic development, changes to lifestyle and the improvement of the standard of living. Arafura has defined resources of rare earths and nuclear energy products that will play a key role in the world's energy needs. They provide part of the solution to new energy alternatives, energy efficiency, sustained world economic development and solutions to the environment.

CHAIR—Thank you. I notice that in your submission you propose a hypothetical situation: if all coal-fired power generation were to be replaced by nuclear power generation, CO₂ emissions would drop by some six billion tonnes per annum. How did you arrive at that figure?

Mr Stephens—I made an assumption that 3.8 tonnes of CO₂ were generated for every tonne of coal.

CHAIR—Further, you explained that the challenge ahead for Australia is to consider the issue of product stewardship and governing principles of product regulation. Would you explain what you mean by that statement?

Mr Stephens—I merely wished to raise the issue that some of the community's concerns over the use of uranium for power generation are the waste product disposal and usage of that material. I believe there are adequate checks and balances in place such that countries that are currently recipients of Australian uranium are obliged to record the responsible disposal of the uranium wastes. Product stewardship is an issue that the community needs to know more about so that they can become more comfortable with it—that uranium is not going to be used for any illegitimate purpose.

CHAIR—You make the statement that Arafura acknowledges that nuclear power does not produce radioactive waste. You say:

... power plants have a safe form of waste disposal. Nuclear power plants produce low volumes of radioactive waste products. For instance, if one tonne of enriched uranium was fed into a nuclear power reactor, 97% of this product can be re-cycled ... and "spent" into a relatively low level radioactive product.

You go on to say:

The remaining 3%, or 30 kilograms, is highly radioactive material that requires responsible and safe disposal.

Would you care to expand on that.

Mr Stephens—The research I have undertaken has indicated that for every 1,000 megawatts of power produced there are about 20 cubic metres of high-level radioactive waste produced. So there were some mathematical assumptions there, based on the calculations for what percentage of high-level radioactive waste was produced out of that.

CHAIR—I also note some very interesting figures in the work that you have done. You go on to make the point that 600 million cars generate 1.8 billion tonnes of carbon dioxide annually. There is no question that we will have nuclear cars one day, so I presume that the only thing we could look at would be the emissions from fossil fuel power generation. It is further said that the

nuclear power plants around the world save the emissions of some 2.5 billion tonnes of CO₂ a year. Would you agree that that figure is fairly accurate?

Mr Stephens—Sorry, could you repeat the question so that I understand which figure you are asking me to quote on.

CHAIR—Firstly, we have heard in evidence previously that nuclear power plants operating at present, as opposed to coal-fired power stations, save the emission of about 2½ billion tonnes of CO₂ into the atmosphere per year. Would you agree that that figure is fairly accurate?

Mr Stephens—I would have to check the figure. I understand there are about 365 gigawatts of power generation from nuclear power. I would have to actually validate those figures with the alternative figures for fossil fuel consumption. It really depends on where that fossil fuel comes from—whether it is coal or gas. It could be correct.

CHAIR—Can I take you back to that figure you quoted of the 600 million cars generating 1.8 billion tonnes of carbon dioxide annually. You go on to say that Arafura believes:

Greenhouse gas emissions could drop by 7 billion tonnes per annum with the use of hybrid cars ...

You link that to nuclear power generation. Can you carry on further in regard to what you see as the use of hybrid cars in the future.

Mr Stephens—May I make one correction to that statement. I noted that the seven billion tonnes was as an alternative to 2.4 billion tonnes of coal in power generation. The figure for cars is 1.8 billion tonnes of carbon dioxide that could reduce by 900 million tonnes. Hybrid car technology is in the early phase of adoption in the market. It uses a combination of electrical power as well as conventional fuel power to generate propulsion in vehicles.

CHAIR—Toyota have one now, don't they?

Mr Stephens—They do, yes—in fact, many organisations have one. Toyota certainly have got the jump in terms of the mass production and marketing of the product. The electric motor takes over essential responsibility of acceleration, where most of the fuel consumption is used. During cruising speed the conventional fuel or petrol engine will then maintain cruising speed and recharge the batteries through the natural motion of the vehicle.

Mr HAASE—I want to go back to something you said in your opening statement. I am speaking to a lot of our witnesses about this particular topic. I am concerned about the public interpretation of the term 'half-life'. I think the perception is that something that has a 2,500 years half-life must be very dangerous. There is obviously very little understanding of the significance of the term. We have had it explained to us by a witness today that the longer the half-life the less injurious that product is in close proximity, because it refers to the speed with which the ionisation is taking place. It is the injurious substances that are being created, even though they are not terribly injurious given that you are any reasonable distance from them. I would put that the term is both frightening and confusing to the public at large and perhaps you would be advised to take the opportunity to explain in practical terms what 'half-life' means so it is understandable by the layperson. I know that you are talking about quite a specific term, but

the perception is that this is really scary and really dangerous for this very long period of time. I would like you to explain the difference between the years of half-life and its danger factor to human life.

Mr Stephens—What you say is correct. You need a little bit of chemistry and physics to really understand the concepts and that is what makes it so difficult sometimes for the general public to understand. By general assumption, a material that has a short half-life is deemed to have a degree of instability in its atomic structure—it changes to another elemental form by the emission of energy particles within it, which are either electrons, protons or the like. Its subatomic structure leaves the atomic structure such that it changes into a different form. By natural progression, the half-life products—or the daughter products, as they are sometimes called—of, for instance, uranium end up decaying at a different rate and have different levels of emissions, which end up basically forming lead. Lead is the stable end-form product of the uranium decay cycle. That is a difficult concept to get across but I will give you an example. If I were to park a cargo ship on the beach of Scarborough, its half-life would be about 500 years as it decays away. In some respects, the term associated with the decay in half-life, which is attributed to atomic materials, also has relevance to many other products.

Mr HAASE—But how dangerous is it? We often miss the opportunity to explain the real significance of danger to human life or human presence. I would like you to highlight in your terms the practical significance of half-life indicating the degree of danger.

Mr Stephens—It is not necessarily the half-life that is the degree of danger; it is the nature of the radiation. There are three types of radiation: alpha, beta and gamma. Alpha radiation, which is more common, is very easily insulated. It stops at the barrier of a piece of paper or human skin. Beta radiation has a high degree of energy and intensity. A sheet of alfoil will stop beta radiation. Gamma radiation is the one which is probably the most threatening from that perspective—

Mr HAASE—How threatening?

Mr Stephens—It depends upon the dosage rate. There are guidelines within Australia about how much alpha, beta and gamma radiation you can be exposed to before it is deemed to be a health risk.

Mr HAASE—Am I going to glow in the dark if I spend half an hour beside a source of this material that has a half-life of 2,500?

CHAIR—Only you would, Barry!

Mr Stephens—Only in *The Simpsons*! No.

Mr HAASE—My point is that, if we are concerned with this becoming an emerging industry in Western Australia, we have to educate the public as to the real problems associated with the industry and the resultant waste long term, after energy production. I assert that this talk of thousands of years of half-life convinces the individual in the public that this must be a very dangerous product. I know it is not so, but we seem to fail when it comes to explaining that to the public in real, believable, practical terms. I would like you to have a go at that.

You have explained the chemistry and the time factor, and that is very relevant, but what does the public believe about the danger for either five minutes or a year? What is it comparable with? We have already heard evidence today that yellowcake is innocuous, but people believe it is a class 7 and therefore must be dangerous. They do not know of the relative danger of a tanker full of petrol, for instance. I would give you the opportunity to explain that this material, even though it has a half-life measured in thousands of years, does not start out being particularly dangerous.

Mr Stephens—The public have to have a basic understanding of the nature of radiation and a point of reference, which might be that the radiation emitted by the sun or an X-ray you get at the surgery—which is beneficial to your health in diagnosing conditions that you may have in your body—can be managed by the dosage level. You might equate it to the same degree that you would allocate a conventional medicine, a Panadol tablet or something like that. You should only have so many Panadol per hour. The same relative scale would be attributed to radiation. There are standards at the moment—there are ways of measuring and limiting exposure to it. The other issue is that the public think that radiation is being introduced into their lives. They need to know the background radiation level that exists around their lives—around their houses, beaches, rocks and whatnot. That would be a better point of reference for them. It is about the magnitude. People see radiation as dangerous. They do not appreciate that there are different degrees and scales of radiation.

Mr HAASE—Help them; explain.

Mr Stephens—For instance, the deposit I am attempting to develop in Central Australia has a level of radiation that is about three times the background level. Exposure to that level of radiation is not detrimental per se.

CHAIR—And it is occurring naturally.

Mr Stephens—That is correct. I do not have an easy answer, unfortunately.

Mr HAASE—It is one of the major battles we have to win if we are going to have public awareness and, hopefully, in an even situation, understanding and acceptance of it. Yet it seems that so many people involved with the industry do not have the ability to discount those fears. I would suggest that the half-life term equated in thousands of years is one of the least understood and scariest factors in the whole nuclear debate. I was going to lead into your statement about disposal in Australia of nuclear waste.

CHAIR—The witness had not finished answering your last question.

Mr HAASE—That is right.

CHAIR—Why don't you let him?

Mr HAASE—I do not know where we can go as far as finding a way of explaining how innocuous this material is, even though it might have a 2,500-year half-life.

Mr Stephens—I will give you an example of my appreciation of the levels of radiation from a recent program we had at Nolans. We had a radiation safety officer on site. He showed me the level of radiation of some of my rock samples and then took the meter and tested the amount of radiation that came out of a monitor on a TV as well as the filaments you get for camping gas lanterns. Both the TV and the gas lantern had levels of radiation which were in excess of the standards that would attribute radioactivity to something. He showed me that some TV screens emit radiation. They are common in lounge rooms across Australia. We need to get away from the half-life, I think, and talk about radiation in terms of its true fundamental bases of alpha, beta and gamma. The TV emits alpha radiation. People need to appreciate that radiation exists in the common things in life. Show them the TV and how much radiation is emitted by it, and then show them relatively the nature of radiation from radioactive products.

Mr HAASE—A good exercise.

Mr Stephens—I am just putting a practical aspect to it.

Mr HAASE—It is not me you have to convince, but I am sure somebody somewhere will refer to this evidence one day. Your submission argues that Australia could be the best place for waste storage, given our ideal geological location. I take it you are referring to our portions of remaining Pangaea in Central Australia when you talk about geological locations.

Mr Stephens—Yes, okay.

Mr HAASE—Are you advocating that Australia establish a repository industry for disposable high-level waste? Are you suggesting that that importation and storage should be tied to approval to export yellowcake from Australia?

Mr Stephens—Not necessarily. I was purely trying to indicate that the nature of the rocks should lead to the responsible disposal of all waste products. Whether it is high-level, moderate-level or low-level radioactive waste, there are responsible methods of disposing of it.

Mr HAASE—Is it not true that we have a concentration of high-level radioactive waste and that this would contaminate the surrounding hundreds of square kilometres of countryside?

Mr Stephens—No, that is not correct. I believe that taking it out of the basements of hospitals and putting it into responsible waste depositories would be far more responsible.

Mr HAASE—I go back to public perception again. In this debate every final stand by those against uranium mining is that, if we produce the yellowcake and export it and it is then concentrated into what we refer to as high-level waste, it is such a dangerous product that it ought not be stored anywhere because it cannot be done safely. Therefore we should not mine the uranium because that is the start of the chain. I believe that, if you can refute the argument that that end product is extremely dangerous, then you can encourage the argument that says we should be developing our natural resource.

Mr Stephens—Correct.

Mr HAASE—Chair, see if you can get blood out of a stone!

CHAIR—It is argued that, at the current rate of consumption, known low-cost uranium resources will be exhausted in another 50 years and that all conventional resources are basically sufficient for only 200 years at current consumption rates. How do you respond to that claim about the uranium supply, particularly given the projection for growth in uranium consumption and, of course, export from Australia?

Mr Stephens—The calculation that there are only 50 years of uranium resources left is made on the basis of the supply and demand relationship, so the grade of concentration of uranium in currently known resources that could be economically extracted would last 50 years. If the price of uranium were to increase, the amount of resources that are known would increase, so our supply of product would increase. That calculation also does not account for the fact that exploration will, in all probability, find new sources of uranium that could be used for injection into the supply relationship. I also point out that one of the reasons I brought up thorium is that, while I know this committee is specifically looking at uranium, thorium is far more abundant than uranium. I think it is three to four times more abundant, and it is a viable source of power generation as well.

CHAIR—Why are there only two reactors at present?

Mr Stephens—Thorium is a product that needs a catalyst to get it to start reacting. So a thorium fuel rod needs something like a plutonium catalyst to start the reaction that will then create the energy from the reaction. It has been slightly more challenged, technically, historically in the front-end processing of thorium, but most of the technology has now overcome that. I think we will find thorium reactors will start to become more commonplace. In addition, it is a bit like VHS and Beta: VHS was out there, so everyone buys VHS video players—or used to. Thorium will come into the fray further down the track.

CHAIR—Do you think Australians should get into the enrichment part of the cycle?

Mr Stephens—I am not sure. If we went to nuclear power, should we get involved in enrichment—is that what you are saying?

CHAIR—Should we get into more value adding? I guess the criticism sometimes has been that Australia always sends raw materials away rather than value adding before we export a product?

Mr Stephens—I do not know enough of that to make a valuable contribution. My perception would be that the enrichment processes are located very close to power plants and that we should stick with that process for the time being. I would have to understand what the purpose of enriching would be, other than just value adding. I think there is more to it.

CHAIR—Given the known reserves of uranium in Western Australia, particularly, and given the evidence we have had that there is the potential for literally billions of dollars of exports out of Western Australia alone, do you think Western Australia should get involved in exporting uranium, given of course that the Territory and South Australia already export it? It seems illogical, some would argue, that some parts of Australia are happy to mine and export and other parts are not happy to do that. What is your reaction to that?

Mr Stephens—I do believe Australians should take a holistic philosophy to export uranium, yes.

CHAIR—So there should be uranium mining in Western Australia.

Mr Stephens—Correct. I believe so.

Mr HAASE—What is your view of the current state of play in that regard? How do you as a company or as an individual view this attitude of the Western Australian government, which is saying, ‘We will save the world by not mining Western Australian uranium,’ and the three-mine policy of the current federal opposition? How do you see those points of view that are restrictive, in the full dynamic? Do you see there is an opportunity for your company? Are you optimistic? Are you pessimistic?

Mr Stephens—The whole Western Australian debate is completely messy and confusing. In terms of my company, I have taken a direction that we will focus on the Northern Territory, where there is a clear path for us to develop uranium or radioactive mines that we find. From a commercial perspective, there is too much risk for me, with a junior company with a small bank balance, to undertake exploration in WA without knowing that I may be able to take commercial advantage of that discovery. So we have taken the perspective that we will stick to the Northern Territory.

Mr HAASE—Are you confident that the current attitude of the Australian government will facilitate that full mining cycle process in the Northern Territory?

Mr Stephens—Yes.

Mr HAASE—So you would be fairly favourably disposed to the actions of the current minister?

Mr Stephens—Yes, for mining.

Mr HAASE—Nice of you to say so!

CHAIR—Do you agree that public perception in the last 12 months in regard to uranium mining and nuclear power has shifted?

Mr Stephens—It has moved immensely. There has been a dramatic shift. As an example, some two years ago when we had uranium mineralisation in some of our projects we were careful of how we actually went about releasing that information, uranium prices were low and public perception was deemed to be unfavourable—and within 12 months it had changed dramatically.

CHAIR—What do you put the change in public perception of such a major issue in such a short time down to?

Mr Stephens—A combination of factors. I think there is now a realisation that global warming is, to some degree, underpinned by greenhouse gas emissions and that the more we

emit the more detrimental impacts we are going to have on the environment. People are far more conscious of maintaining the environment as a method of sustaining our lifestyles. In addition, I think there is now a real realisation that our fossil fuel resources also have a limited life and that there should be a balanced approach globally to energy generation.

CHAIR—Given that no-one went out there and promoted the argument that nuclear power basically emits zero CO₂ emissions, how do you think the public picked up that quantum leap between fossil fuels and global warming and nuclear power and no global warming? What link got them to change their mind?

Mr Stephens—Price?

CHAIR—But every Joe Public out there is not involved in the price and does not have to pay the price.

Mr Stephens—No, but uranium became topical because the price increased from between \$8 to \$10 a pound to suddenly \$20 a pound on the basis that there was a reduction in stocks and an undersupply based on demand and the growth was not going to be underpinned by more production. Price increased, so uranium came to the public's attention, and then the story came out that uranium does not produce CO₂ emissions yet fossil fuels do. So people naturally linked that. They are concerned about global warming. I think most people, even the most stringent disbelievers of the global argument, are changing and are recognising that greenhouse gas emissions are detrimental. As I say in the submission, all economic development comes at a cost. It is a matter of the cost-benefit analysis. I think people now deem that nuclear power generation is far safer now and that we have a much better and more responsible attitude to our nuclear products in the world.

CHAIR—I would agree with you on that. So in this particular case, it could be argued that the financial reports with regard to the commodities market in effect changed—in a positive way, I might add—public perception.

Mr Stephens—I think you are right.

CHAIR—What role do you think government could play in educating the public that there are alternatives—not to make up their mind but to promote the argument out there that we recognise we have a problem with the burning of fossil fuels and global warming and that there are a number of alternatives? Sure, they jump to renewables but you say that when the sun does not shine, that renewable will not work and when the wind does not blow, you cannot have base load power out all of those. To get greater public discussion on what the alternatives are and to let them make up their mind, what role do you think government could play?

Mr Stephens—I think the government plays a fundamental role in that. It will provide the resources so that people can get a balanced argument and make an informed decision. When things are emotional, the discussion is chaotic, and people do not necessarily see a clear picture of the benefits on either side of the equation. I think the government needs to drive the process and provide the information that allows the public to make an informed judgment.

CHAIR—Given that all governments take a lot of notice of public opinion—because, dare I say it, it converts to votes at the ballot box—do you think the state government of Western Australia should encourage open debate on the benefits of uranium mining and, of course, what nuclear power can do with regard to global warming?

Mr Stephens—They should but they should also look at the data and the facts and actually feed that back rather than just feeding off a discussion that is based on emotion. Let us look at the facts and provide the facts and then rationally discuss each aspect.

Mr HAASE—What do you think has conditioned that emotional debate? Why is it that everyone overlooks the death toll of coal mining, for instance, but maximises the global impact of Chernobyl and the fact that we had 60 deaths? Can you put your finger on it? You are involved in the industry. We are mere outsiders, by comparison.

Mr Stephens—It is a good question. I do not understand why. I would be appalled at 60 deaths. I am absolutely stunned at 250,000 or however many people are killed from coalmines just in China alone. It is extraordinary. Human nature and human behaviour has an ability to distance and dislocate itself from issues that it does not want to hear about. So, if it does not want to hear that coalmines create deaths and it does want to hear that uranium does, it tends to work off human psychology rather than rational thought. That is why I am saying: ‘Bring it back to the facts. Bring the data into the fray.’ From there you have the ability to actually change people’s fundamental opinions and behaviours towards uranium.

Mr HAASE—We seem to be dealing with the negative constantly. We have this exception. Let me put this to you. We have spoken about the benefits of the nuclear power cycle in relation to global warming. Yet most recently you must have seen a paper that was presented in Parliament House in Canberra that decried the whole idea that nuclear power was a solution to global warming. I was mightily surprised by that. I heard no outcry from the industry or the potential players in the industry that that paper was so drastically flawed and that there is ample evidence to suggest that the use of nuclear energy will be a mitigating factor in global warming.

Mr Stephens—You are right. It is probably because it lacks credibility that people do not wish to comment on it.

Mr HAASE—So you seriously suggest that the paper so much lacked credibility that you are better off to ignore it and let it go away? It is not a trick question.

Mr Stephens—In some respects, yes. But I am an advocate for uranium exploration and mining. I see the end benefits of the products that I potentially could explore for and develop. I am not an advocate for the power industry, for example. I am purely a member of the chain that provides products for it. People have a right to an alternative opinion. It is healthy for the debate, but it needs to be based on fact. In some respects, if you enter into a debate that does not have credibility then you may end up walking away with mud on your own face.

Mr HAASE—Is there any credibility in a proposition that says: leave the uranium resource in the ground, let us wait for treble the price and let us conserve this resource for greater benefit at some point in the future? Is there any credibility in that argument?

Mr Stephens—No, I do not think so. Not in my opinion. There is a demand for uranium at the moment. There is an insatiable need to increase power generation to sustain economic development in countries like China and India, which are fundamental for world economic growth and development to occur. Nuclear power can generate electricity responsibly. Why shouldn't we feed those markets? As long as they are appropriate members of an export licence agreement then it should be supplied.

Mr HAASE—There is an argument that we, as Western Australians, ought not be contributing to a global problem—that is, the use of nuclear energy—and that by preventing the mining of uranium in Western Australia we would significantly affect the world outcome. How credible is that theory?

Mr Stephens—I do not believe nuclear power generation is a problem. What we do not supply, others will.

Mr HAASE—Do you have any comment on our level of regulation, which is set at a particular level amongst other world standards?

Mr Stephens—Indeed. I think there is a highly credible process. Australia must regulate where the supply of uranium or radioactive products are destined.

Mr HAASE—How do our standards compare with standards elsewhere in the world?

Mr Stephens—It is in collaboration, so it is equivalent to international standards.

Mr HAASE—All right, so we are party to those agreements.

Mr Stephens—Absolutely.

Mr HAASE—Do you believe that those regulations, in a practical sense, regulate the movement of the product, both in its yellowcake form and its enriched form, sufficiently to prevent that product at any time in the cycle being used for illicit purposes?

Mr Stephens—My understanding is that that is correct. I take the regulator's judgment on that, that they have the appropriate checks and balances.

Mr HAASE—There are so many involved on the negative side of this debate amongst the public that would argue that, for all those regulations that we have and believe are effective and are thorough, that so many of the public do not believe that they are not credible regulations and do not prevent anything.

Mr Stephens—I used to work in the explosives industry. It is a lot easier to manufacture explosives. If you actually want to manufacturing something out of a nuclear product, you need to have a government behind you to support you—the technology is just way out there. You cannot use it for anything nasty. The appropriate checks and balances are in place, I believe.

CHAIR—Thank you very much for agreeing to appear before the committee today. If there are any further questions that the committee has, the secretariat will contact you.

[1.47 pm]

KENNEDY, Mr Donald Ross, Chairman, Jindalee Resources Ltd

CHAIR—Thank you for agreeing to appear to give evidence for the public hearing today. Although the committee does not require you to give evidence under oath, I should advise you that the hearing is a formal proceeding of the parliament. I remind you that giving a false or misleading evidence is a serious matter and maybe regarded as a contempt of parliament. I also remind you that the committee prefers that all evidence be given in public. However, at any stage, should you wish, you may request that evidence be given in private and the committee will consider your request. I now invite you to make a short opening statement before we proceed to questions.

Mr Kennedy—Thank you very much. I hope I am partially as eloquent as the previous gentleman.

CHAIR—I am sure you will be.

Mr Kennedy—I would like to provide you with a little bit of my background. I was in charge of uranium exploration for CRA in the 1970s and so went through the Fox inquiry in Darwin into the Ranger mine. In later life I ran the Resolute group's uranium exploration in Queensland and just recently I have been involved in a spin-off from Jindalee Resources, which is Energy Metals, which floated about a week and a half ago. We will possibly be the next new uranium mine in the Northern Territory. I am not certain where that previous gentleman's ground is, but we are 400 kilometres north-west of Alice Springs.

The other point which we did not quite make in the submission and which I think is very relevant is in regard to the fear of radioactivity, which, as you mentioned, the public has. I find it fascinating that if you go to a coal-fired power station and you look at the fly-ash that is around the power station, it is as radioactive as hell. The point that the public does not realise is that all coal is radioactive. At one stage I was in a plane and we had a big sodium iodide crystal to do some uranium exploration in South Australia. We flew over the Sir Thomas Playford power station at Port Augusta and we got the biggest uranium anomaly you have ever seen—from the fly-ash around the base of the coal-fired power station. One thing that people do not realise is that all fossil fuels are radioactive to some degree. In its concentrated form, with all the residue, coal is fiercely radioactive, yet we use it as a filler in cement. It is just crazy.

That is one side issue I wanted to mention. The other thing I want to mention is that I think it is important to involve the community. The local Aboriginal community is a shareholder in the Bigrlyi uranium mine in the Northern Territory, which we will hopefully bring on in a couple of years time. They have quite a significant chunk of it and they are already doing a bit of contracting for us. This is part of getting the community involved, and those people are enormously on-side. Those are the peripheral things I wanted to add to the submission. Our submission addressed the fact that nuclear power is basically not a carbon dioxide or sulphur dioxide emitter. I have seen a lot of the power stations in the Loire Valley in France. They are in beautiful, lush country like the dairy country to the south of here. They generate a lot of power

and reticulate it across the English Channel, via the Channel Islands, to Britain—and there is no pollution.

Our company is very much in favour of pressing ahead with whatever uranium we can safely mine and export. We are looking at Queensland, the Northern Territory, South Australia and Western Australia. There are no uranium mines worth a damn in Tasmania, Victoria or New South Wales, so they are out of the question. Here in WA we have a couple of magnificent deposits. Yeelirrie and Kintyre are world-class deposits and they are just sitting there. It is crazy. In the papers, we read about Paladin Resources, a local company that has gone from almost nothing to being worth many dollars because of the deposit it has in Namibia. I am very familiar with that because I was the chairman of Paladin at one stage. The deposits we have in Western Australia are far better and they do not have the HDIP problem—the historically disadvantaged African people problem—where you have to give out equity of 25 or so per cent. In Australia we pay a royalty of a few per cent and do the right thing by state governments. That is the total impost. I do not think people appreciate the strength of some of the deposits in WA.

There is another point I would like to make, although it is possibly none of my business. The previous speaker asked, ‘How do you get through to the public?’ When Roxby Downs came on in the 1980s, I was the CRA representative on the chamber of mines in South Australia. We had the problem of getting the Roxby Downs bill through the state government. It was Dunstan’s government and it was a bit trendy and lefty. In the end, a guy by the name of ‘Stormy Normie’ Foster crossed the floor and let Roxby go ahead. We went into the problem of how we could get the public away from the fear of cows being born with three heads and everybody dying of radioactivity. We singled out the main problem, and that was primary school teachers in South Australia, who tended mainly to be of the left and not to want to believe in uranium. We arranged a situation where the chamber of mines would every now and then fly a planeload of teachers to Olympic Dam and to some of the small uranium deposits in the Flinders Ranges to show them that this was not horrendous stuff that was going to fry you the minute you walked around. We got quite a good response to that. It is an education thing and it has to start at primary school level. I am very sure of that.

CHAIR—Thank you for your introduction. So you are saying that the way to overcome the public perception of danger is better education—and, most importantly, at the primary school level?

Mr Kennedy—Yes.

CHAIR—Do you think that should be the role of the Chamber of Minerals and Energy or the Minerals Council of Australia? There is no way that the present state government is going to do it, because they are opposed to uranium mining.

Mr Kennedy—Absolutely. This is probably a diagonal answer to that. I give occasional talks to high schools for the Chamber of Mines here in Western Australia about mineral exploration, mining and what is involved in it. I always lean towards the uranium side to give them a little bit of information like that. The Chamber of Mines here is very good. They could be galvanised into giving a little bit more uranium information.

CHAIR—The irony is that the two states that are the greatest mining states—Western Australia and Queensland—on the question of uranium, both ban uranium mining. What could we or should we do to overcome that?

Mr Kennedy—It has been done beautifully in the Northern Territory where Claire Martin got back in again on a no uranium ticket. All of a sudden, about two months ago, the federal government said: ‘By the way, uranium is really a mineral that is a proclaimed federal thing. We’re not overly happy with the way you’re running it; we’re taking over the uranium in the Territory again.’ Claire Martin then had this wonderful out. It meant that she could say: ‘Bunch of sods! I really don’t want that, but they’ve rolled us over—thanks for the royalties.’ I think that that is the way it could happen.

CHAIR—Except that the territories are a little bit different constitutionally than the states.

Mr Kennedy—Yes, they are.

CHAIR—You have to remember that the state governments created the federal government and not the other way around. I would like to go back to those statements on fly-ash. Precipitators now take the bulk of the fly-ash out of the air, but in the past the fly-ash that floated over communities and towns and settled on houses, cars and properties would have been radioactive.

Mr Kennedy—Absolutely, yes.

CHAIR—Why do you think that the community are not aware that fly-ash, which is mixed into cement, is radioactive? Why do you think that they do not worry about that, because it comes out of coal-fired power stations, but perceive uranium as quite dangerous? As we have heard in previous evidence, it is classed as a class 7 product for transport purposes, but if it was sitting here it would be no problem.

Mr Kennedy—I think that the public do not want to realise that lots of things in their everyday life are a danger like that. Look at Albany or Esperance, for example, built on those beautiful granites right on the coast. Those things are radioactive. You see people with beautiful houses with hewn granite and so forth—it is radioactive. I do not think that they consider that. A watch is radioactive and so is a colour television set, but nobody is going to toss their TV set out.

CHAIR—But it is the degree of radioactivity.

Mr Kennedy—It is very minor, admittedly. The amount that is emitted from those things that I mentioned is small.

CHAIR—The granite rock in the houses built overlooking Princess Royal Harbour in Albany would probably emit more radioactivity than a drum of yellowcake. Is that what you are saying?

Mr Kennedy—That is an interesting point. There is a fair chance. The degree of radioactivity in these granites varies. You read of hot granites and cold granites. The hot granites are those that have a higher radioactive count than the others. It is possible.

CHAIR—It is all in the public perception.

Mr Kennedy—Indeed.

CHAIR—It is a magnificent harbour anyway and a really pretty town.

Mr HAASE—You are one of a long list of witnesses today—

Mr Kennedy—Saying the same things, obviously.

Mr HAASE—Saying similar things, but I like to think that I am giving you the opportunity to address this public perception, this very fearful state. You have talked about the relatively innocuous nature of other common objects in our daily lives—the fact that they are radioactive and are ignored by the public. The mere mention of the word ‘nuclear’, however, sends the collective head deeper into the sand. Could you have a go at explaining why that is so? We know that the television set, the wristwatch et cetera are innocuous, but how dangerous, comparatively speaking, is nuclear waste—low, medium or high? Could you reference to its half-life? What is the real significance of that? Try and put into layman’s terms the real danger, as opposed to the perceived danger, of these various levels of radioactive waste.

Mr Kennedy—I think part of the perception is that Hiroshima was 60 years ago and it gets lots of airspace on the television and in books and so forth. People think nuclear and they think of atomic bombs. I reckon that is really the background to the fear of the word ‘nuclear’. I believe all the radioactive waste that has ever been generated in the history of the world would fit into a deep mine somewhere in a tectonically stable area. I do not think the waste is a problem.

Mr HAASE—Yes, but how dangerous is that waste? Could we go and camp beside it, or would we have to stay 500 kilometres back? Will it jump up and bite you?

Mr Kennedy—There are heaps of ways of stabilising this stuff in high-temperature glass.

Mr HAASE—In rock?

Mr Kennedy—Yes, it is in rocky sort of stuff. I think you could almost camp on top of it, yes. If you lived to be 10,000 years old, it might reduce your life by a day or two.

Mr HAASE—But what if somebody came in the middle of the night with a ute, filled up the back of it and then held the world to ransom? That is the perception. Can you dispel any of that irrational fear?

Mr Kennedy—Not really. I am sorry I am repeating myself, but it is because people think of Hiroshima: ‘Maybe they’re going to make an atomic bomb out of it!’

Mr HAASE—Which we know they cannot. Somebody purported that it would take a government behind you to have enough money to produce a facility to do that.

Mr Kennedy—That is right, but the average guy out there does not realise that. He sees it on television once again and says, ‘Nuclear, atomic bombs—I think this is a problem.’ In actual fact, it is the most sensational way of making cheap base load electricity. That is all uranium is.

Mr HAASE—And you would purport that it certainly was, to a degree, a saviour in this global warming debate?

Mr Kennedy—Yes, very definitely. These are statistics you have probably seen, but look at the number of power stations that are being built in China, for instance, right now. I have a friend who runs Golder Associates, the big consulting outfit there, and they have just set up in Beijing. He said he could not see from his hotel room to the other side of the street in Beijing because of the pollution from the coal-fired power stations there.

Mr HAASE—What do you believe is the motivation of the Chinese government in proposing these nuclear power stations, as opposed to fossil alternatives?

Mr Kennedy—I think it is because of the environmental side of it. They are rapidly improving their mining technology and obviously their environmental technology. They are trying to cut down pollution. I firmly believe that, and I believe the Indians are starting to do that as well.

Mr HAASE—But we hear an argument that says that nuclear power stations are out of vogue because they are simply far too expensive to build. What would you think the Chinese government would say to that?

Mr Kennedy—That is probably not a consideration.

Mr HAASE—Do you agree that they are more expensive, capital wise, than conventional coal fire?

Mr Kennedy—Yes, indeed, but once you get them going they are very cheap to run. So it is a big capital cost initially, but after that it is dead easy.

Mr HAASE—We also heard an argument today that said that nuclear energy is not the saviour of global warming because to turn the situation about would take too long. You could not build nuclear power stations fast enough to aid the global warming situation.

Mr Kennedy—That is an interesting comment. I do not know the exact length of time it takes to build one of these, but it is considerably longer than for a coal-fired power station. It is probably in the 10-year range or something like that. But I believe you have to start somewhere and start somewhere pretty soon.

Mr HAASE—You are geologist and miner-explorer, but do you know of another energy source, even mooted at this stage, that may be a saviour of the globe?

Mr Kennedy—No. I have just been fishing at Bremer Bay for a week, and there is the biggest bloody windmill arrangement you have ever seen in you life down there. It is an enormous damn thing. Bremer Bay has a population of about 500 in the winter and this thing provides 22 per

cent of the base load power for Bremer Bay for some of the year, which means the winter. I do not know what it costs. It is a \$1 million plus type thing. It is as noisy as hell and it is an eyesore. I do not think wind power is the answer. There are a couple of wind farms down at Esperance—same thing. They are terrific, but you cannot store the electricity very well, and wind does not blow in every town, so you are back to—

CHAIR—I cut in on my colleague just on that very point. Thank you for raising it. We have had witnesses that keep arguing the case that we should go to renewable energy. It is always solar energy and wind farms. The public, when it is written up in the newspapers, do not seem to understand that that power can only be generated when the wind is blowing or when the sun is shining. How do you think we actually shake them? I think my colleague was saying that the public reacts better to fear than to fact.

Mr Kennedy—Absolutely.

CHAIR—Someone said that big windmills are noisy and when the wind does not blow there is no power. What they have not looked at is how to store the power when the wind is not blowing.

Mr Kennedy—I guess you gentlemen would have seen the two wind farms at Esperance—quite major efforts. That is a very good case in point. Sometimes in the early autumn there is no wind in Esperance. The other thing is, I would suggest, you would not want to live too near them, they are so darn noisy.

Mr HAASE—I am told they chew up all the purple lorikeets that fly along the coastline as well.

Mr Kennedy—I can believe that. I will tell you about another interesting thing that I saw years ago. I was wandering through Newfoundland and I went to a place where there is a tidal power station; it brings back thoughts of this job that people were talking about up at Derby. It is the same thing at Charlottetown, either in Newfoundland or Nova Scotia.

Mr HAASE—Nova Scotia.

Mr Kennedy—Again, it is a small town and this thing generates a bit of power, but it is no big deal. This is one of these 10-metre tidal ranges, akin to what we have got up in the Kimberleys. The tidal power is very nice and it makes you feel good too. But as a base load power supply—no way.

Mr HAASE—The reason for the mirth from my chairman, Mr Kennedy, is the fact that I am the great perpetrator of the ideal of tidal power in Derby at Doctors Creek. Obviously it is the most safe, innocuous and sustainable source of power in the universe, probably. The technology involved in the design of that facility would of course have been base load power, because it was 24-hour duration power. But we will not use any of the committee's time to explain that today.

CHAIR—Thank you for your comment. On the question of emissions, what part do you think government or industry organisations can play in further putting out to the wider community that

there are options? Ultimately industry organisations along with government are going to have to form a view as to how to solve the problem.

Mr Kennedy—It is just an education thing.

CHAIR—Governments spend money advertising. Those opposed would say you should not spend taxpayers' money informing the community.

Mr Kennedy—I am bowled out middle stump on that one. I do not know the answer to that one.

CHAIR—Do you think industry organisations should play a greater role?

Mr Kennedy—Most likely. I would suggest, without knowing, that companies like Western Mining Corporation and ERA in the Northern Territory do that now. I am not sure what their educational situation with the community is. I think certainly the chambers of mines in each state are a very good group to do it.

CHAIR—In your submission you say that uranium mining is one of the safest industries in the world and that, in regard to coal mining, there is something like 12,000 to 15,000 deaths a year. Do you think the community is aware of that?

Mr Kennedy—I think it is becoming more so. In the *West Australian* newspaper each week there is usually a little thing that says, '30 coal miners trapped and dead in a mine in China'. The public would have to be pretty thick not to occasionally look at those articles and realise that we do not lose many people here. I guess the corollary of that is that almost nobody dies in the uranium industry each year.

CHAIR—But do they take that quantum leap? The public perception, in submissions we receive—

Mr Kennedy—Perhaps it is just a progressive thing. I do not know. I certainly try to talk to as many people as I can. I like talking to the school kids, and I take a piece of uranium along with me. I have some uranium torbanite and I just stick in my pocket and say, 'It's not doing me much harm, fellas.'

Mr HAASE—Isn't the perception, though, that that is uranium and that is okay? We accept it is innocuous because it is natural. But immediately you step into the process and concentrate that into that dreadful product called yellowcake it is going to jump across the road and devour you! It is the perception that as soon as mankind applies technology to the natural substance it makes it something very scary indeed.

Mr Kennedy—That is probably right, yes.

Mr HAASE—How do we negate that? The chair has been asking you about what you think industry should do. I know that a number of mining companies that are interested in uranium carry out educational tours. We have heard from AMEC today, amongst others. I wonder why it is that AMEC have not already been involved in that public education process, perhaps at

primary school level. I would suggest to you, and I would appreciate your reaction, that there ought to be some degree of agreement amongst AMEC members—or amongst members of the Chamber of Minerals and Energy, for that matter—that this is another mining pursuit, and a genuine one at that, and ought to be funded by members collectively to educate the public in relation to the nuclear cycle. Do you have a comment on that?

Mr Kennedy—I think that is a good idea.

Mr HAASE—I wonder why they have not done it. It seems amazing to me.

Mr Kennedy—Perhaps because there has been a moratorium on uranium exploration and mining in Western Australia. AMEC have probably seen their job as pushing the barrow of the active miners and active explorers. Until a few months ago, nobody was doing any uranium exploration in WA.

Mr HAASE—Do you concede that, had AMEC—or the Chamber of Minerals and Energy, for that matter—been more involved in the education process a decade ago, we might have converted the opinion in Western Australia and now be in the process of mining and earning dollars?

Mr Kennedy—That could be the case, yes, particularly as we have very fine deposits that are drilled out and really just awaiting the green light. That is certainly true of Yeelirrie and Kintyre because they are world-class deposits.

Mr HAASE—On the previous witness, the mine site in question was 135 kilometres north of Alice Springs, by the way.

Mr Kennedy—That is in the same general region as the deposit we have at Yuendumu.

CHAIR—Do you think it makes any sense? Do you think that state government can sustain an argument that, where a miner is extracting another mineral and as part of the extraction process also extracts uranium, they have to dump it back into the ground? Do you think that makes any sense?

Mr Kennedy—No, that is crazy. Western Mining did that to a degree at Roxby when they first started off. Roxby Downs is a series of different ore bodies, not just one big one, and they tended to leave some of the more uranium rich bodies alone and to concentrate on those towards the top that were more copper rich and gold rich. They may not have had an export contract for all the uranium they could produce, whereas now they can produce as much as they want with their ears back—and they are doing just that. They are producing more and more uranium each year. Rather than put it back in the ground, they tended to leave certain of the lobes of mineralisation alone.

CHAIR—It would make logical sense for any miner, no matter what they are mining—copper, gold or whatever—to extract any mineral on the way through. It is to their good, their shareholders' good, their employees' good and of course the company's good with regard to exports.

Mr Kennedy—This deposit we have in the Northern Territory has the same amount of vanadium as uranium. If we wanted to be coy we could call it a vanadium mine, but with the change of situation in the Northern Territory there is no problem now. The minister for mines, Mr Vatskalis, is a terrific guy. He was very enthusiastic and encouraging to us. Even before the federal government stepped in and took over he said to us, ‘Because you’ve got large Aboriginal equity in this proposed deposit of yours, we’d have a lot of difficulty not issuing you with a mining permit.’ We thought that was pretty darned good. And on top of that the federal government took over control of it again.

CHAIR—What level of activity and investment do you think would occur in Western Australia if the state government changed their stance in regards to the ban?

Mr Kennedy—It would be sensational. Gentlemen, if I can give this example. Through the little float of Energy Metals that we did three weeks ago we raised \$3 million. We sent back \$4½ million. At that stage we told the share registry, ‘Don’t even open any more applications.’ We were stunned by that. I think that, in a funny way, is the answer.

Mr HAASE—What is the impediment now for Energy Metals to commence mining?

Mr Kennedy—None. We are proceeding. We have started to do a little bit of reassaying to make sure we have the right equilibrium constant. We will be drilling in about three weeks time.

Mr HAASE—What is the style of extraction?

Mr Kennedy—I think it will be a couple of years. Sorry—the style of extraction. Initially it will be open cut, then underground. The grade is a little bit better than Ranger. But it is obviously smaller than Ranger. It looks like it has a lot of legs laterally, and depth.

Mr HAASE—So it will be suited to underground?

Mr Kennedy—Yes. Luckily it is positive topographically, so it lends itself to open cut mining. It is a beauty. It was drilled out the 1970s, like so many of these uranium deposit in Australia, by Agip, Urangesellschaft, Central Pacific Minerals and, interestingly, the Australian Atomic Energy Commission. They were one of the contributors.

Mr HAASE—It takes me in another direction. We have talked about the philosophy of various governments—previous federal governments and current state governments—in Australia that are impediments to the mining of uranium. Given that their philosophical outlooks changed, do there remain other impediments to exploration specifically for uranium? Another way of putting the question is this: do you believe that exploration needs any other artificial assistance?

Mr Kennedy—For uranium, no. The state governments—and I have to hand it to all of them—are all now generating far more databases than they used to. The federal Bureau of Mineral Resources used to do that, but the states do it now. The state mines departments turn out new aeromagnetic and radiometric sheets, and once you—

CHAIR—Are they in the main coming from Geoscience Australia?

Mr Kennedy—Yes, a lot of them are.

Mr HAASE—It is federally funded.

Mr Kennedy—Yes. It is sensational. It is great stuff. The state governments will now give you all of their geophysical surveys on disk. You can get them for just about nothing. The Northern Territory government is sensational with that. Instead of repeating the work that somebody else did five years ago you can get all of this on file now. The one impediment that is a constant problem and will not go away is native title. That is a problem and it does not matter which state you are in—particularly in the Northern Territory, WA and Queensland.

Mr HAASE—Yet you have successfully negotiated. Mind you, you are not exploring; you are developing.

Mr Kennedy—Yes, that is right. We actually bought into retention licences that have been existing licences for 30 years, in which the Aboriginal people had a 20 or so per cent equity. We bought their equity. They were stuck in that they had the equity and none of the other partners were public companies that had any money. We said, ‘If you want to put your equity into this float, all of a sudden you’ve got something you can do.’ I actually wrote it down, in case I got the question. We gave them 800,000 options in this company, \$20,000 cash and a pile of Jindalee shares as well. So all of a sudden these guys have something that they can physically make money out of, or sit on and be shareholders and contributors.

Mr HAASE—Have they made a contribution?

Mr Kennedy—No. They contributed their equity. They are beaut blokes.

Mr HAASE—They paid nothing for their equity?

Mr Kennedy—No, they took over, I think, from the Atomic Energy Commission and sat on it with—you might remember Central Pacific Minerals—the Rundle twins who were going to do the oil shale in Queensland. It was those guys. They became the operator for quite a few years and finally they went into liquidation. That was when we bought their equity from the liquidator, which was a pretty interesting sort of an exercise. We spoke to the Yuendumu community. There are 12 elders and a white guy of Dutch background who was there right in the beginning—he has gone a bit feral but he is a real good guy. He helped us to deal with these people and they are very happy. They trust us. We have already given them a bit of work and they realise that right now they have quite a bit of money potentially from the shares they have or alternatively they will have an income from what I think will possibly be the next new uranium mine in the Territory.

Mr HAASE—That would appear on the surface at least to contrast vastly with the situation of an existing uranium mine and its relationship with Indigenous peoples.

Mr Kennedy—I think you have to be very careful in dealing with them. These people have the contract to maintain the Alice Springs to Tanami road. So they have a bit of heavy equipment and they are sort of used to almost whitefella type work. They obviously are keen to improve the

lot of their community because the community is a typical one of these settlements; it is not very pretty.

Mr HAASE—How localised is this group of people you are speaking of in relation to the proposed mine site?

Mr Kennedy—They represent most of the area. We have about 16 kilometres of strike; it is a Wyoming roll-front type of deposit. The Yuendumu community speak for most of it but not all of it. Some of the people from Napperby are also involved there.

Mr HAASE—And the nearest community?

Mr Kennedy—It is Yuendumu.

Mr HAASE—What distance is that?

Mr Kennedy—Probably 30 kilometres.

Mr HAASE—Does that ‘group’ have influence in other communities within the area?

Mr Kennedy—No, there seems to be a bit of antagonism. The common link there is the Central Land Council.

Mr HAASE—Who will you pay royalties to?

Mr Kennedy—I would imagine to the Northern Territory government.

Mr HAASE—I would suggest to the Central Land Council.

Mr Kennedy—They will obviously have to be involved as well. They have their own geologists. The CLC is well organised.

Mr HAASE—They have a specialty process of extraction that is usually in relation to finance.

Mr Kennedy—Yes, that is a fair comment.

CHAIR—We have no further questions. Thank you for appearing before the committee.

Proceedings suspended from 2.23 pm to 2.41 pm

PEARCE, Mr Richard John, Managing Director, Nova Energy Ltd**SUGDEN, Dr Timothy John, Chairman, Nova Energy Ltd**

CHAIR—Welcome. Thank you for agreeing to appear and give evidence at the public hearing today. Although the committee does not require you to give evidence under oath, I should advise you that the hearings are formal proceedings of the parliament. I further remind you that the giving of false or misleading evidence is a serious matter and may be regarded as a contempt of parliament. I further remind you that the committee prefers that all evidence be given in public. However, at any stage you may request that your evidence be given in private and the committee will consider that request. I now invite you to make an opening statement before we proceed to questions.

Mr Pearce—Nova Energy is pleased to be able to meet with the committee and put forward some of its views on the strategic importance of Australia's uranium resources. Nova Energy is a recently ASX listed company, with current market capitalisation of over \$30 million. Nova Energy holds the uranium rights for tenements covering the Lake Way and Centipede uranium deposits, which are both highly prospective for uranium, with known mineralisation of well over 8,000 tonnes. Nova's primary focus is the development of these deposits. The company is fully supportive of an open and, more importantly, informed debate on uranium mining and welcomes this inquiry.

Nova's board reflects diverse skills, strengths and experience in the mining, finance and environmental management sectors, and in particular in uranium. It comprises the chairman, Dr Jim Sugden, who has worked at Olympic Dam and in a range of senior management positions with Normandy Mining Corporation, now Newmont, before becoming managing director of Agincourt Resources, who are the major shareholder in Nova Energy. Dr Vanessa Guthrie has a PhD in large-scale radioactive waste disposal solutions and an extensive background in environmental management within the mineral sector. I have had many years experience with Rio Tinto in strategy and operational roles, including operational experience in the energy group in coal and uranium in the US. Mr Peter Bowler has a great depth of knowledge of, and relationship with, the people in the Wiluna area, where our deposits are located.

Nova Energy recognises that uranium mining and nuclear energy are both contentious issues in the public's eye. This is in large part due to what we believe to be misunderstandings and at times misinformation about uranium and nuclear issues. Our strategy is very much to provide broader energy solutions for a sustainable world and the board and executive team's objective is to be a long-term player in the energy industry and to identify and develop resources with the primary focus on the uranium sector. Nova Energy believes that a responsible and vibrant uranium industry, owned, managed and regulated in Australia, is critical to the augmentation of safe and cost-effective energy globally for following generations.

Continued developments in operational health and safety in the mining industry mean that the risks in the mining and handling of uranium are well understood and standard operating procedures are well used. Similarly, advances in the nuclear energy generating technologies clearly demonstrate a growing maturity in that industry.

Nuclear power is undoubtedly part of a suite of sources of energy globally. It cannot and will not replace fossil fuels such as coal. Nova Energy Ltd believes that the company, through its plans to develop its uranium interests, can add to this diversity of energy sources, complementing existing fossil fuels, bioenergy and renewable sources. Nova's tenements comprise a range of mining and exploration leases and applications, including the mining lease at Centipede, which was issued prior to the current Western Australian government's policy to prohibit uranium mining. The company, however, does believe that the industry can only progress in a sustainable way through a supportive government policy and legislation at all levels which recognise uranium as an important commodity in the context of global energy needs world wide.

To date, there has been almost no debate on these issues in Western Australia. The company is nevertheless well placed to progress developing the Centipede project and to capitalise on the rapid growth in uranium demand and prices, subject to the economics of the project and, obviously, to achieving all appropriate approvals, including being granted an export licence by the federal government. Assuming successful development, Nova Energy's initial estimates of its Western Australian projects are that they would have the potential to contribute over \$200 million directly to state government, over \$300 million to the broader community and close to \$400 million in payments to local suppliers and services. In addition to these assets, Nova is also seeking opportunities for uranium projects elsewhere in Australia and potentially overseas to complement its Western Australian projects.

CHAIR—Thank you. I note that that in your submission you argued that renewable energy sources are required to complement other sources. I am posing this question because other witnesses and, I guess, some of the public have the view that we can solve base load power through wind turbines and all sorts of other things and then realise that they do not work when the wind does not blow. You went further in your submission to cite the German experience. Germany has something like 17,000 wind turbines with a capacity of 14,350 megawatts, the largest in the world in 2003, but it only provides four per cent of Germany's demand for electricity. What do you think should or could be done to inform the public that renewables do not have the capacity to provide the base load power that any country needs to sustain its electricity generation demands?

Dr Sugden—I would suggest education as No. 1. I regularly hear the view that it is a false dichotomy to suggest that it is either coal or nuclear—that renewables are a viable alternative. Certainly my understanding of electricity generation suggests that renewables will in very few cases meet the load of industrialised societies on a continuous basis. I think there just need to be some pretty simple messages put out to the public so that they understand that most renewables are cyclical and operate at fairly low levels and that the capital that would be required to even get close to current base load power needs, even if they were constant, is absolutely enormous.

CHAIR—Do you detect a shift in community attitudes towards nuclear power generation in the last 12 months? If so, what do you put that down to?

Mr Pearce—There is much more open discussion about nuclear power and its role. I think it is to an extent an external debate as far as Australia is concerned, and therefore there is very little direct experience of nuclear industry and nuclear power in this country. But there is much more

informed discussion going on and that inevitably is resulting in a changing sentiment as people understand the pros and cons of nuclear and other sources of energy.

CHAIR—Do you think that is because the community is now starting to appreciate that, if the world is going to try to stem the increase in global warming, the only electricity-generating capacity that emits basically zero CO₂ emissions is nuclear?

Mr Pearce—I think that message has been well and truly made in public forums. It is important, though, as Tim has stated and as we maintain, that nuclear is only part of that solution. It cannot in its own right meet all of the energy requirements in a global context; therefore, although it is a clean source of energy, it cannot replace CO₂-emitting sources, such as coal.

CHAIR—Why do you think there is the level of opposition to uranium mining in this state, Western Australia, coming from the state government?

Dr Sugden—It seems to be a fairly archaic view that is something of a hangover from the seventies. It is supported at the moment by what seem to be repeated concerns about terrorism and waste disposal and other sorts of fear mongering. I personally think that most of it seems to be irrational. Unfortunately, these fear-mongering messages seem to be the ones most commonly heard in the community, whereas the more rational, technically based arguments do not seem to be getting through. We wonder a lot about how we might change that.

CHAIR—Do you think industry and/or the federal government have a role in better informing the public of the options that are out there?

Mr Pearce—Absolutely.

CHAIR—That leads me to another matter that you touched on your paper, which is the new technology in nuclear reactor design. You note particularly the pebble bed reactor. From the committee's point of view, can you explain the advantages of the pebble bed reactor and where other technologies are going?

Mr Pearce—We do not profess to be technical experts on nuclear reactor design. However, I think in the UIC submission they explain some of the new technologies more fully. There is an acceptance that the new generation of reactors, of which pebble bed reactors are one, are considered safer, cheaper to build and environmentally a better option. The point we are trying to make is that the technology in terms of nuclear reactor development and nuclear power stations has advanced significantly over the last 20 to 30 years. That is often not recognised in the discussion about concerns around nuclear power and nuclear energy, which often go back to views based on 1970s technology.

CHAIR—We have had evidence before the committee, particularly in regard to the pebble bed reactors, that they are not only extremely safe but have the ability to be used for desalination plant power generation, which is a topic in Western Australia, of course. It seems that producing hydrogen is being promoted as the energy source of the future. On that basis, I am sure that the public are not aware of that. Would you agree with that?

Mr Pearce—Yes.

CHAIR—Would you further agree that the public has not understood anything else we have ever built, like the motor car for a start. Now that we are basically into the fourth generation of reactors, they are extremely efficient and very safe and the cost to produce has come down significantly. I guess they are not like a motor car, but how do we get the public to realise that, in all facets including nuclear reactors, they are now far better than they were in the sixties?

Mr Pearce—In terms of informing the public?

CHAIR—Yes.

Mr Pearce—I think the issue is similar to the broader uranium debate that, because we do not have, if you like, an indigenous industry in Australia, there has been in recent times no industry body to carry that debate. So it is incumbent upon industry bodies—be they the chamber of commerce or other groups—to be actively engaged in that public debate not only at a political level but also at a community level. I think that is clearly the role of government.

Dr Sugden—I think it also needs some simple comparisons. The airline industry is probably a very good one. If you look at the evolution of the airline industry from 1950, when the first domestic reactor was brought online, to what it is now and you look at the safety, you see that it is an extraordinary technical evolution.

CHAIR—It is almost like the start of the jet aircraft about the same time.

Dr Sugden—Interestingly, the Chernobyl reactor was the same basic reactor design as the very first reactor that was ever experimentally created in a laboratory in Chicago, I believe. So if you take a basic aeroplane design from the 1940s and compare it with a 777 Boeing now, it is an extraordinary technical evolution, and reactors have gone through the same process; yet I do not think people are generally frightened of flying.

CHAIR—You mentioned an indigenous industry. We are not likely to go down or need to go down a path of nuclear power reactors in Australia, simply because we have such abundant reserves of coal and, of course, our emissions are a mere blip on world emissions. We are looking at other areas like clean coal technology and that type of thing. So, unfortunately, one way or the other, we are not likely to go to nuclear power. There is no need for Australia to go to nuclear power. How do you think we are going to have a local industry to promote the cause, given that we are interested in exporting uranium to meet demand, particularly in the China region?

Dr Sugden—I rather like the idea that I heard Tim Flannery state on the radio the other day, that Australia needs a more advanced industry. If Australia wants to deal with the issues of knowing that the uranium is used responsibly, is used in the right countries and is not diverted into inappropriate uses and if Australians ultimately take the responsibility for waste products, the idea of having an industry that—

CHAIR—So you are looking at the whole fuel cycle.

Dr Sugden—Yes, the whole fuel cycle. So you do not necessarily have to have nuclear reactors to be more incorporated into the cycle. The idea of producing U308 concentrates in mines and having a high-tech, high-value industry that enriches uranium in Australia, exports fuel rods and then brings back those fuel rods to Australia for retreatment and/or storage strikes me as ultimately a very advanced, high-tech, high-value and responsible industry for Australia to head towards.

CHAIR—So you are talking about products all the way through?

Dr Sugden—Yes, which I think is a great way to do it. I do not know if Australia is ready for that. Simple yellowcake production and export is what is what we can do now. I would have thought ultimately that those are the actions of a responsible global citizen.

Mr HAASE—In that regard, would you concede to any degree that we have perhaps set the bar of aspiration a little low? Consequently, it has taken us a long time to move from this three-mine policy federally and, in Western Australia, a total ban on uranium mining. There is almost a ban on using the word, if we are to believe the media reporting the Premier today. If we had aspired a decade ago to a full cycle in secondary processing, given that we are not going to get involved in nuclear energy, do you think we might have arrived at the point of at least mining a lot sooner than we have? Do you think we have almost guaranteed the outcome we have today by setting the bar of aspiration so low?

Dr Sugden—Yes, I think so. If Australia had taken that step earlier and if such activities had been taking place here then I think the population as a whole would have got used to the idea and, over time, they would have seen that it was a very safe industry. Given that there would have been greater community acceptance, there probably would have been less opposition to the front-end process of simply mining it.

Mr HAASE—We lost the debate somewhere along the way, didn't we?

Mr Pearce—Yes.

Mr HAASE—Even though we have a very active Chamber of Minerals and Energy and AMEC broadly representing the industry, including yours, there seems to have been no public education program overtly entered into by those representative bodies. Could you comment on that? Is it an indication, for instance, that there is a lack of agreement amongst miners that the mining of uranium is a legitimate pursuit?

Mr Pearce—I am not sure that I would put it down to a lack of agreement between the miners. I would suggest that we have essentially lost a generation of the mine industry's involvement in uranium mining, and it is that that we are seeing now. It has not been represented in these industry bodies and, as a result, it has obviously not been part of the discussion until very recently.

Dr Sugden—There is also an economic factor in that. For the last 20 or so years, uranium has been at a very low price and there has been simply no reason for the industry to pursue the right to mine it. There was very little to be gained from it and so there was no reason to push it.

Mr HAASE—Fair enough. But, in losing the debate, we have allowed the public to have a perception of the industry and the whole nuclear cycle. Part of your submission states that the uranium industry is sustainable. But other submitters, for example, AMP CI Sustainable Funds team—the committee has numbered their submission 60—argue the opposite. They say that the nuclear industry is not sustainable because the long-term disposal of high-level radioactive waste has not yet been resolved; that, under the nuclear nonproliferation regime, safety cannot be guaranteed along the fuel cycle; that nuclear power generation has a high capital cost; and that there is a high cost of carbon to make it economically competitive. That last point is not to be found in your submission. Would you comment on the fact that the disposal regime has not been satisfactorily addressed yet? I would have thought that it had received a great deal of concentration and that it had moved a long way.

Dr Sugden—My basic understanding of the issue is that the technology to safely dispose of uranium waste is well developed. Countries like Sweden are certainly demonstrating that fact. When groups say that there is no solution and that it is an intractable problem, I think what they are really pointing at is that, whenever you suggest that there is a suitable site for disposing of uranium waste, someone will always be there saying, ‘Not in my backyard.’ That is the problem, not the technical issue. So I do not accept that there is no technical solution to uranium waste. I think it is just a human issue.

Mr HAASE—So there is no political acceptance of the technical solutions. Is that what you are saying?

Dr Sugden—There is always a minority at any location who will say that you cannot put it here, even though there is no particular technical problem. Then they will claim that that means one way or another that there is no solution. There is a solution, but it means that the minority groups who protest need to be educated in some way to believe that the risk is minimal.

Mr HAASE—They have not been and continue not to be convinced that there is not a huge risk. Earlier today, I put the situation that the mere mention of something having a half-life of 2,500 years scares the bejesus out of people. What does that mean in reality? Is there anything to fear from high-level radioactive waste?

Dr Sugden—It is all a case of management. There are many dangers and many risks in life. We constantly drive around in cars and we stand next to busy roads. Sure, you could get injured if you stepped onto a road. I suppose the same philosophy applies to uranium.

Mr HAASE—How dangerous is it?

Dr Sugden—I do not accept that there is a danger if it is properly managed.

Mr HAASE—But is that a hit-and-miss situation? Can you guarantee that it will always, if procedures are followed, be safe, or is there a risk of it being stored unsafely or there being a flaw in the process at some time that will create universal devastation?

Dr Sugden—I suppose nothing is absolutely risk free, but I believe it can be managed to a point where the risk level is trivial.

Mr HAASE—Comparable with?

Dr Sugden—Global warming would strike me as an extreme risk for humanity whereas a small amount of decaying uranium waste in the middle of a granite craton in the middle of Australia far from any life is of absolutely minimal risk.

Mr HAASE—What if a bird flew over that craton?

CHAIR—Hopefully it would be a swan.

Dr Sugden—I think the physics of radioactive decay are extremely well understood. All of the layers of materials that would encase the radioactive material would completely stop any radiation coming out. It certainly could not travel through 500 metres of rock and get to the surface.

Mr HAASE—So there would be no risk to a picnicking public member or a straying—

CHAIR—Sydney Swan?

Mr HAASE—geologist?

Dr Sugden—I find it unimaginable. Within a few hundred years the material that you have put down there goes back to the level of granite anyway.

Mr HAASE—But I am told that it has a half-life of 2½ thousand years. Doesn't that strike terror in the public's hearts?

Dr Sugden—I suppose, if you look at it in terms of a half-life curve, it means in general within 600 years it is down to such a low level of radioactivity that I believe it is little more than that of a granite benchtop in a kitchen.

Mr HAASE—How did it start out at the beginning of that cycle? Was it as innocuous as you say and not going to jump across the road bite me?

Dr Sugden—At the very beginning of the cycle it is highly radioactive and very hazardous to be in close contact with.

Mr HAASE—For how long? What would be the worst-case scenario if I strayed into the area by accident?

Dr Sugden—I do not think you would be able to get close to it—

Mr HAASE—There would be a fence.

Dr Sugden—unless you were absolutely committed to getting very close to it. I think one of the interesting facts is that, because there has been such poor community acceptance of waste materials, most nuclear facilities in the world have stored the high-grade waste around their

reactors in appropriate facilities, and most of these reactors are very close to large urban populations all through Europe and America. In that time, that high-grade radioactive waste has been busily decaying down to a level which makes it far less hazardous. Within 50 or 60 years has reached such a level that moving it around and putting it into long-term facilities is a very low risk. It is almost ironic that the material ends up sitting on the surface close to large human populations.

Mr HAASE—You see what I am trying to extract here. Even people directly involved in the industry find it difficult to put on the record, which will be researched and absorbed by members of the public, the hazards to the public of this industry as being as innocuous as a sitting next to a television screen for 12 hours a day. I believe that is the case, but it is difficult to express. Perhaps that is why we have lost the debate on this.

Dr Sugden—It is very easy to find the fear factor.

Mr Pearce—That is what we are all responding to.

CHAIR—Isn't the relevant point that you just made that high-level waste, after storage of, say, 50 to 100 years, returns to almost the same level of background radiation as the environment it came from?

Mr Pearce—As when it was mined originally.

CHAIR—I think the point that my colleague was making was that when people quote many hundreds of years it puts a fear factor into the community—no one can envisage managing it for that long. They can envisage doing it for 50 or 100 years, but the point that you have made is that after 50 to 100 years it is almost back to the same level as where it came from.

Mr Pearce—And it has been managed safely for the last 40-plus years in all the reactors and so on, particularly in the US and elsewhere.

Mr HAASE—My take on the whole debate is that the likes of our current Western Australian Premier believe that we are prohibiting the mining and export of yellowcake because we will somehow contribute to a world condition whereby, because of the long life with a high level of danger of this product and the fact that we cannot predict political stability—four-year cycles are a fair estimate—therefore we cannot be so irresponsible as to allow this affliction on the world, so they say: 'We will keep our uranium resources in the ground along with our heads and therefore create world peace.' That is how I see the argument—the supposed logic. I look for every occasion to destroy some of those myths.

Dr Sugden—I suppose Western Australia produces many products that can be used in irresponsible ways. We produce some of the aluminium that goes into Boeing jets that get used by terrorists. We produce hydrocarbons that can be used in ammonium nitrates and fuel oils that are used by bombers. We produce all sorts of other materials that can be used in irresponsible ways. We sell kitchen chemicals. So I think it is wrong to focus on the material itself. We need to focus on the way irresponsible people use those materials.

Mr HAASE—Would you say that the regulatory regime imposed by Australia on the distribution of its yellowcake to date, in cahoots with the rest of the world, is a good regulatory regime and that supply from this country and those countries is better than some errant supply that does not have similar regulation?

Mr Pearce—We firmly believe that the export licensing regime, the occupational health and safety regime from a mining perspective for the industry through to the export regime around uranium in this country is one of the best in the world and should give us all the confidence that we will only export uranium to where it is used for power generation, and that is well understood and can be tracked and monitored. The regimes exist to do that very effectively in this country.

Mr HAASE—You have just put a float through, haven't you?

Mr Pearce—Yes.

Mr HAASE—There was no problem raising funds?

Mr Pearce—No.

Mr HAASE—Is it a legitimate expenditure of funds to be involved in the public education process, do you think?

Dr Sugden—Yes.

Mr HAASE—Does your company do that?

Dr Sugden—It will be doing more. My view is that, as far as shareholder value goes, we have a uranium deposit that can be profitably developed and it will generate large amounts of value for shareholders and the people of the country and the state, so it is appropriate for us to work towards developing that deposit, and if that means public education then I think it is an appropriate use of shareholders' funds, to a degree. If we did not have a deposit in Australia then it would probably be more appropriate that we went out and found a deposit, but while we have one that can be developed then I think it is appropriate that our shareholders put trust in us to get the public to more readily accept the development.

CHAIR—Your Centipede lease was granted prior to the state government's ban. Are you intending to develop that? Do you think that the government ban on mining will stick? What are your plans?

Dr Sugden—It will probably take a year or two to bring all of our resources up to a dual compliancy level and then move towards a bankable feasibility study. There is probably no point in pursuing the right to develop the deposit until those studies are complete.

CHAIR—Are you doing those studies?

Dr Sugden—We are just starting on the resource development work now. Certainly the Lake Way deposit has a full feasibility study on it from the early eighties, so I suppose the amount of work required to bring them up to a bankable feasibility study level is actually not great. Not all

of our resources are within Centipede. At the moment I could not say with any certainty whether there is enough uranium in that one to justify development, if I could not be sure that we could develop the uranium on the other leases. At the moment, it is simply a matter that we are aware of, but I suppose we are not acting on it.

CHAIR—What are you going to do in the meantime—twiddle your thumbs?

Dr Sugden—We will just bring it up to a bankable feasibility level and meanwhile explore in WA for other deposits where we have some excellent leases. Of course we will be spending, I suppose, a significant weighting of our exploration funds in South Australia and overseas where we stand a better chance of being able to develop.

CHAIR—If it were not for the state government's ban, would you place that energy and investment in Western Australia?

Dr Sugden—Absolutely. That is where the best immediate low-risk shareholder value is, but at the moment we have to spread the risk. We have a political risk in WA, whereas we have an exploration risk in other places we go to. We just have to find the right balance between the two.

CHAIR—Governments obviously react to community perceptions. What level of community debate do you think would be needed and by whom for the WA government to take a different view?

Dr Sugden—I must admit I am not sure about how to get messages out to the community. We have certain strategies, and an educational web site is one of them, but I would expect that a very small portion of the population would actually see that. Newspaper advertising is another way, but we are not sure about that either because it could generate an equal and opposite effect from antinuclear lobbyists. It is a strategy that we need to develop.

One thing that I do understand is that there is seemingly quite a small and very passionate antinuclear lobby group in WA. At the other end of the spectrum there is a group of people, such as ourselves, who are quite comfortable with uranium mining and nuclear energy and we would like to see the industry developed. In regard to the middle—the bell curve, if you like, of the population—I am not hearing or seeing significant opposition. I think most people, even those who used to be antinuclear, are now saying, 'If it's the right thing for the environment and it reduces global warming and the world needs energy, I'm prepared to be re-educated and give it a second consideration.' I think there is room for a shift by the general population. Perhaps the perception that there is a lot of antinuclear feeling in the general population may actually not be quite right.

Mr Pearce—If I could add to that, we saw evidence in recent weeks in parliamentary debate locally about the lack of knowledge or understanding of a large number of local politicians on both sides of the house. I think part of the process of improving community awareness is working to inform our state representatives far more effectively so they can actually carry out that debate and discussion with their communities. I think that is equally important.

CHAIR—Are you and/or the industry involved in that?

Mr Pearce—We would actively look for any opportunity to engage in that.

CHAIR—Should it be you or the industry bodies who kick it off?

Mr Pearce—I think there is a role for both. There is clearly an important role for industry bodies to lead that. The extent to which any one company can assist and be active in that process is important and, as we said, it is a valid way to spend some of our time.

Mr HAASE—It might be a dual education process in fact: not only changing the opinion of the public at large but also making sure that political leaders within the state are aware of that progressive change. It strikes me as ironic that we have a greatly increased world price, we have world-class resources in ideal environmental locations and we still have this head-in-the-ground mentality that ignores shifting public opinion. Some have said that what is required is a way out and that that was very effectively found in the Northern Territory recently, where the federal government were the bad guys, supposedly, or at least were able to be blamed. Do you envisage a similar occurrence in Western Australia through some strategy?

Dr Sugden—My understanding was that it was not legally possible.

Mr HAASE—It is not possible under the same scenario.

Dr Sugden—I just do not know. I heard that it was conceivable that uranium could become a sort of strategic resource which was under the control of the federal government, but I really do not know whether there is any truth in that. If that occurred, it could conceivably overrule the state. But I do not know. You might know better than I.

Mr Pearce—The disparity between the states is an obvious concern for any mining company as it looks to spend its money to develop opportunities. A uniform approach to regulation across all states is something that we would all champion.

Mr HAASE—That would be the best outcome. Is the processing of basic uranium ore into yellowcake considered to be an expensive mining process in comparison with nickel, gold or any other similar mining operations?

Dr Sugden—No, I think it is probably similar to gold processing. The uranium deposits that we have are very shallow calcrete hosted deposits. They are generally between zero and down to about 10 metres. It is all in very soft rock and can be dug up. So the mining cost is incredibly low compared with what we currently do, which is mining hard rock 800 metres below the surface for gold. Crushing and milling is also very low cost because of the soft rock. The alkaline leach, solvent extraction and yellowcake precipitation is probably the most expensive part of the process. I could not put any dollar figures on it right now, but our basic numbers suggest that the margins would be very high for deposits of this type.

Mr HAASE—Which would place Western Australia well on the world stage for profit from supply.

Dr Sugden—The other wonderful thing about Western Australia is that where the majority of the large uranium deposits are located—Yeelirrie is the big one, and we are quite close to

Yeelirrie at Wiluna—all the infrastructure is there. The roads and airports are there, a gas pipeline runs right past our deposit, and the water aquifers and the communications are there. The amount infrastructural expenditure to get these things up and running is extremely low. It is an opportunity that is waiting to happen.

Mr HAASE—Does your organisation ever think of making that development more appealing to the Western Australia government by suggesting that you would have a residential work force or that you would fund Indigenous groups or anything of that nature? Traditionally, in the last couple of decades, such developments have seen simply the establishment of a camp—a satellite situation and fly-in, fly-out. I for one would like to see that trend reversed. I realise the difficulties involved in reversing the trend. Have you ever thought of gilding the lily?

Dr Sugden—The potential is always there. I know from experience, from running the Wiluna mine, that asking people to come and live up there is a big ask. Most people have got used to a lifestyle choice of fly-in, fly-out on more attractive rosters; and the rosters have got more attractive, so people can spend more time with their families in Perth as well as having a high-paid job out in the remoter areas.

At Wiluna, there may be some potential for more employees to be residential. We do have a few. But I think the big opportunity that presents itself is probably to have a greater engagement from the Aboriginal community at Wiluna. We have worked a great deal towards encouraging the development of Indigenous businesses. We assist the community in many ways: we put money into trust funds for the community, we part-fund doctors, we help the local school. But all of this is quite challenging in the current gold price environment, because margins are very thin in Australian goldmining these days. A business such as this—a new business that has very high margins—would have much greater capacity for assisting with community development from day one. Because it is such a simple mining process, you could envisage a very simple Indigenous mining business—just digging it up, putting it into trucks—and we could assist with the development of a business like that for the local community. I think that is exactly the sort of thing that the community needs up there.

Mr HAASE—That was my point exactly: the wide margin between costs and revenue that would perhaps allow you to offer such sweeteners. I am not sure whether or not your submission broached the subject of storage specifically, but I wonder if you would like to comment about the proposition that, if Western Australia were to involve itself in long-term effective and safe storage of nuclear waste, it would be an incredibly lucrative process that would allow vast expansion and improvement of basic health and educational facilities across regional and remote Australia.

Mr Pearce—I think we have a clear understanding that, as a uranium miner, we have an obligation. We are part of the full life cycle of uranium from mining through to eventual storage of by-products of nuclear fuel. I think, as Tim highlighted earlier, there are number of options that the industry can get involved in, from upgrading material through to potential storage. I think there is a responsibility as part of the overall debate about uranium mining to have a clear position, as an industry and as a government, as to whether it is acceptable in the community to ultimately store material, but I think we are obligated to have resolved those issues before mining occurs, whether storage is ultimately in Australia or elsewhere.

Mr HAASE—Do you think it is a lucrative process?

Dr Sugden—I heard from the Swedish experience that, once a commitment had been established to have an in-ground storage facility somewhere in Sweden, municipalities across the country were actually in competition for the business because it represented a lucrative, very long-term business for their local communities. I think that is what can happen once the population has a broader understanding and sense of comfort about the industry.

Mr HAASE—Does that admission in any way take the cream off the profitability or the economies of nuclear energy? If we start to face up to the high revenues involved in the storage of the waste and take into consideration the decommissioning of power plants et cetera, when we add it up do we get to a point where it is cheaper to scrub CO₂ out of coal power generation?

Mr Pearce—My understanding is that those costs are already factored into nuclear power generation in all countries. I do not know the exact figure, but that charge is already internalised in the cost of power generation, unlike CO₂, which is not included in the cost of coal power generation or any fossil fuel generation. So, to the extent that those industries are profitable and economically strong already, those costs are already included in that.

Mr HAASE—If we use an equal process in fossil fuel—for example, coal-powered generation—with all the costs to the environment, versus the nuclear cycle, with all costs, do you think nuclear would still emerge as less costly?

Mr Pearce—There is plenty of evidence to suggest that, yes.

Mr HAASE—Okay; that is good.

CHAIR—Time is up. Thank you very much for agreeing to give evidence today. If there is any further information the panel wants, the committee secretariat will contact you.

[3.51 pm]

PRATT, Mr James Douglas Ryston, Managing Director, Deep Yellow Ltd

CHAIR—Thank you for agreeing to appear and give evidence at the public hearing today. Although the committee does not require you to give evidence under oath, I should advise you that the hearings are formal proceedings of the parliament and that the giving of false or misleading evidence is a serious matter and may be regarded as a contempt of the parliament. I remind you that the committee prefers that all evidence be given in public. However, at any stage you may request that your evidence be given in private and the committee will then consider your request. I now invite you to address the committee before we proceed to questions.

Mr Pratt—Deep Yellow got into uranium exploration in December last year, when we acquired two projects from Paladin Resources in the Northern Territory. One of those—Napperby—has delineated mineralisation on it. It was discovered by CRA in the 1970s, and further drilling was done by Uranerz around the 1980 mark. The other project is North East Arunta, about 150 kilometres east-north-east of Alice Springs, which is a more advanced exploration project. High grade uraninite nodules have been discovered there in the past by PNC, a Japanese explorer.

We commenced looking for approvals to work on those two projects and were advised by our consultant, Dr Joe Drake-Brockman, who has worked for PNC, Uranerz and Paladin over the years. We also had assistance from Paladin. It took us some time to get those approvals—probably about six months. We needed approval from the Northern Territory mines department and from the Indigenous owners, represented by the Central Land Council. In the meantime, we have set about making other acquisitions in the uranium business. We have acquired a tenement and a database from Paladin in South Australia in the Lake Frome area, and we have acquired the uranium rights to Tanami Gold NL's ground in the Northern Territory. We have a lot of work ahead of us, mostly to do with approvals from traditional owners. We can get busy with exploring a large area in the Northern Territory. In a nutshell that is the work we have been up to.

Obviously a lot has happened in the last 10 months. We perceived a change in attitude in Australia towards uranium mining and a change in the debate overseas towards nuclear energy. But obviously we did not know exactly what would happen. In August Mr Macfarlane made his statement about uranium mining being able to go ahead in the Northern Territory and the Commonwealth taking over that. That has changed our outlook a bit. Now we will proceed more confidently and undertake more work in the Northern Territory. Previously we had been looking outside the Territory for other opportunities. We visited East Africa and acquired the South Australian project from Paladin Resources. Since then we completed a drilling program in August. We drilled 570 drill holes at Napperby on the Tanami Road in the Northern Territory. We currently are waiting for those results to come through. That brings us up to today.

CHAIR—You mentioned that in August the federal government took over the approvals process for uranium mining in the Northern Territory. Is it fair to say that as a result of that you are now prepared to concentrate your investments in Australia rather than offshore?

Mr Pratt—Definitely.

CHAIR—And is that certainty a welcome move from the industry's point of view?

Mr Pratt—There is no question about that.

CHAIR—On that basis, can I extract from you a comment with regard to the current Western Australian government's ban on uranium mining, given our huge resources in Western Australia?

Mr Pratt—My personal opinion is that it does not make sense. I really do not understand it. I am only guessing as to why it is in place. I have heard some statements that Dr Gallop has made about his own personal opinion. It really amounted to, from what I remember, the fact that he had reread a couple of books and he was more opposed than ever. I do not know what books they are or what it was that he read. From our point of view, and as we have stated in our submission, there are countries—and Australia is not one of them—that need nuclear power as part of their energy mix if they are going to increase electricity supply and keep control of greenhouse gas emissions. I do not quite understand why Australia would deny assisting those countries by simply mining uranium, which is a safe, simple thing to do.

CHAIR—Do you agree that community attitudes have changed dramatically in recent times with regard to uranium mining and nuclear power?

Mr Pratt—I do. I think we have seen a very large shift in the last 12 months.

CHAIR—What do you think is the reason for that? It is quite a dramatic shift in a short time.

Mr Pratt—It is. My personal opinion, and from talking to other people, is that it really has to do with the global warming issue. People are starting to see that as the bigger issue. I cannot remember names off the top of my head, but there have been prominent environmentalists saying now for some time—at least a year—that global warming is a much more imminent and large-scale threat than anything to do with uranium mining or nuclear energy.

Not only was there that but also there was a submission by the House of Lords Science and Technology Committee to the House of Lords around a year ago where the points were made that there is a lot of effort going into renewables, particularly wind, in the UK. The submission by the science committee put forward the opinion that it just was not meeting the targets and if the targets were going to be met for lowering greenhouse gas emissions while providing electricity then maintaining or increasing nuclear energy really had to be seriously looked at instead of being phased out. Tony Blair has had a little bit to say about the issue. These developments have gone on over the last 12 months, so it has built up. Getting back to your question, I really think it is that perception that global greenhouse gases and global warming is more of a threat than uranium mining. People who understand it also see uranium mining as a simple and safe thing to do, but I do not know whether that is really out there in the public consciousness. I think the global warming issue is much more serious.

CHAIR—How do you think the community picked up the link between global warming and nuclear energy?

Mr Pratt—It is down to the alternatives. What are the alternatives to greenhouse-gas-emitting electricity production? When people look for the alternatives, there is really only one for providing base load for large-scale cities—and that is nuclear.

CHAIR—Do you think those that promote renewable energy—wind and solar—realise that the broader community have not quite come to grips yet with the fact that it is not base load and, when the wind stops blowing, there is no power?

Mr Pratt—I think that awareness is growing. I am not sure it is the case that people by and large understand it. I think a lot more people understand that now than did 12 months ago, but I do not think the broader community really understands. A lot of people still think that renewables might be able to do a lot more than they actually can.

Mr HAASE—Your expertise is in geology and therefore exploration; not in power generation, transmission or waste storage or any of that nature. Is that right?

Mr Pratt—That is correct.

Mr HAASE—Let us talk about impediments to the development of the Australian uranium industry. Sure, we have broached the question of government philosophy and impediment—especially in the state of Western Australia, where they had a head-in-the-sand attitude over the issue—but at a government level in other areas there are land access issues. You are operating in the Northern Territory and have been operating with the Central Land Council, I imagine?

Mr Pratt—Yes.

Mr HAASE—I wonder whether you would like to make any comment about that process and its efficacy? Is it a process that you embrace, understand, agree with or should it be streamlined, changed in any way?

Mr Pratt—We have only had to deal with it twice. We have approval now for both our projects to do drilling. As I have said, we have completed drilling on one. It is pretty early stages. We have had one meeting with traditional owners that I attended. It was pretty clear that traditional owners are confused about uranium, not comfortable with it.

Mr HAASE—Could you elaborate? What is the cause of their discomfort?

Mr Pratt—I would find it difficult to elaborate. This is a part answer to your question about the difficulties: when you talk to the Central Land Council, you are not really allowed to talk to the traditional owners.

Mr HAASE—Do they usurp the traditional owners' authority?

Mr Pratt—I would not like to characterise it. We could really get into something here.

Mr HAASE—It was not my intention to put you on the spot or to have you put into *Hansard* anything that you might not want to—

Mr Pratt—It is a sensitive process.

Mr HAASE—In the broadest of terms, do think it is something that the federal government ought to put effort into making more effective, more efficient?

Mr Pratt—I certainly think that there can be effort put in. I would not put any blame on Indigenous landowners at all. I just do not see that they would have the educational background to understand what on earth is going on; they are just accepting somebody's word. Whether they accept mine or that of a local teacher who has some ideas—

Mr HAASE—Does it cost a junior explorer money to get access to country?

Mr Pratt—It does. We need to pay—

Mr HAASE—Do you think there is an understanding by the traditional owners of where that money will go to?

Mr Pratt—I believe so.

Mr HAASE—Do you think all the persons in the chain of those involved in the, loosely termed, ownership of or responsibility for that country are effectively and appropriately remunerated from the funds that you pay for access?

Mr Pratt—I believe so.

Mr HAASE—You think they are?

Mr Pratt—Yes.

Mr HAASE—Do you believe the remuneration that you have to pay is appropriate for exploration, when you consider the bleeding obvious—that is, that you may find nothing?

Mr Pratt—We have to pay about five per cent of our expenses to Indigenous land owners under the terms of the deed that we have with the Central Land Council.

Mr HAASE—Is that a static arrangement, or is it variable by the efficacy of negotiation on your part? Can you alter that five per cent?

Mr Pratt—I think if you started again you might be able to alter it. This is my first experience with it, and I do not have experience in other situations.

Mr HAASE—Have you found that those negotiating on behalf of the Indigenous party are very well resourced in this negotiation?

Mr Pratt—I think so.

Mr HAASE—Would you consider that as a junior explorer you are as well resourced as your opponent in the negotiation process?

Mr Pratt—I do not feel that we are in the box seat, no.

Mr HAASE—Some would say that was unconscionable, but there you go. We are involved in looking at making the whole native title process more effective and more efficient, so maybe there is some light at the end of the tunnel there for you.

Mr Pratt—Maybe.

Mr HAASE—It has been suggested that the absence of a government industry forum to discuss the mining and use of Australia's uranium is an impediment to the development of the industry. Do you have any thoughts or a point of view on that?

Mr Pratt—I have not considered that.

Mr HAASE—We have discussed at great length today what I put as losing the public debate on uranium mining in Australia. Do you believe that sufficient effort has been put into public education by, on one hand, industry bodies and, on the other, individual companies and government? Do you think that process has been attended to satisfactorily? Would you see any changes as being necessary?

Mr Pratt—I have not seen any education on uranium mining from government or from industry, apart from the submissions. There was an informally convened meeting earlier in the year where a few of the people whom you would have spoken to today got together and discussed whether we as a group should lobby the government to allow uranium mining and explain what is going on. My opinion at the time—and I still feel the same way—was that people are changing their minds. The Australian public are changing their minds. There has been some evidence of that. The local ABC ran an on-air debate, in which Wilson Tuckey was involved, along with two experts from the industry and an anti person—I think it was Liz Watson. They were on air talking about issues to do with uranium mining, and then they had an online poll. Five hundred people rang in, which I am led to believe by the ABC is a good result. There were four options: 'yes, you can start uranium mining today'; 'not now, maybe later'; 'no idea'; and 'definitely not'. Fifty per cent said, 'Yes, you can start now.' That is among ABC listeners in WA.

Mr HAASE—How recently was this?

Mr Pratt—This was in the last few months.

Mr HAASE—So that is very positive.

Mr Pratt—It tells me something. I do not get people ringing me up saying: 'Why are you going into uranium mining? You're crazy. That's dangerous. You shouldn't do it.' Amongst my peer group and amongst people I talk to I just do not get that kind of feedback. The ABC have been good enough to come out and do interviews with us while we were drilling out in the Northern Territory. They rang us for our opinion while I was out there. I have done a couple of

interviews with ABC Alice Springs. Once again, the overwhelming message I get from most people is, 'We don't really see anything wrong with uranium mining.' There are a select few anti people, and they seemed to be quite vocal, but their arguments are not good arguments. They trot out very vague generalisations, hoping that people will pick up on that, but nothing specific.

Mr HAASE—And, I believe, hoping that people will not ask too many in-depth questions, having them substantiate their accusations, because they usually cannot.

Mr Pratt—Exactly.

Mr HAASE—What do you think of the level of government-provided geophysical data currently in relation to mineral exploration generally in Australia?

Mr Pratt—In the Northern Territory it is quite good.

Mr HAASE—Are you aware of where that data comes from and how the provision of it is funded?

Mr Pratt—No, I am not.

Mr HAASE—It is the good federal government—that is where it is comes from.

Mr Pratt—Okay.

Mr HAASE—That was just as a matter of information. We are not talking exploration here, we are talking mining, but a regulatory regime is imposed certainly by the South Australian government, because they are actively involved in the mining of uranium and processing to yellowcake. Are you aware of the regulatory regime imposed by the South Australia government?

Mr Pratt—No, I am not.

Mr HAASE—Okay. Well, there is not much sense in asking you whether you think it is effective, over the top or inefficient. That is all. Thank you.

CHAIR—You note in your submission that uranium resources are notoriously difficult to discover. Could you expand on that?

Mr Pratt—I say that because I have had the good fortune to be involved with people in Paladin, and through our consultant, who have been in uranium exploration for a long time—30 years plus. That is their view of the world. Australia had an enormous amount of exploration in the 60s and 70s and turned up some great deposits, but the hit rate is a hit rate that indicates that these are difficult deposits to find. The remote-sensing techniques can guide you in, but there is a lot of work to be done on the ground. You can turn over a lot of ground before you start to find the deposits that will make you money.

CHAIR—Isn't that the same with most other mineral resources?

Mr Pratt—That is true. I guess uranium is going to fit more with your nickel and gold rather than your oil or coal, which tend to be huge deposits. In oil, if you believe what you read, we have almost reached the point where we will have less and less oil reserves in the world from now on. We have reached a peak. Uranium is more trying to find the small deposits in huge areas, as you do with nickel and gold. With nickel and gold you have a lot of small exploration companies doing a lot of work, and not many of them are successful. The trend over the last 10 years has been for the bigger companies to let the smaller companies do that exploration work, let them take the risk at that early stage and then come in when they have found something. It is a similar case with uranium. It is a risky venture to spend a lot of money on exploration. We have seen this year a lot of small exploration companies get up because people are wanting to invest in that risky side because there is a huge upside if you are successful.

CHAIR—But without any further discoveries I think Australia has something like 40 per cent of the world's known economic reserves. That is a fair old slice

Mr Pratt—That is a fair old slice.

CHAIR—I am just wondering about the statement that uranium resources are notoriously difficult to discover when we have that slice of the world supply.

Mr Pratt—There are two things. One is that a lot of that is in Olympic Dam and could not be gotten out of the ground next year. It is going to take a hell of a long time for that to be accessed; it is a huge lump—an iceberg sitting under the ground. The other aspect is that, even though we have all of that and we are mining Olympic Dam and Ranger, the supply-demand gap that is projected for the next 20 years is quite big. Apparently there is no supply without Australia opening up to bridge that gap.

CHAIR—Some would argue that there is, but not at the price of our economically viable sources.

Mr Pratt—That is right.

CHAIR—There are huge reserves in Western Australia, but for now, unfortunately, it would appear that they are locked up.

Mr Pratt—Yes.

Mr HAASE—What would you say to the proposition, which is still held by a number of members of the public in Western Australia and by the Western Australian government, that, regardless of the evidence about the reduction of greenhouse gas emissions and economic advantage for Western Australians, the risks are too great and we should simply leave it in the ground, step away and never approve uranium mining in Western Australia? I realise you are from the Territory, but what would you say to that sort of final word on the industry in Western Australia?

Mr Pratt—I just do not think that makes any sense at all.

Mr HAASE—For what reason?

Mr Pratt—My personal view of the world is that, as I stated earlier, Australia is in a position where it has coal to supply its electricity needs for hundreds of years and can turn to alternative methods of reducing its CO₂ emissions, whether that is by stopping the clearing of trees or whatever. But Australia is not an island in the world; we are part of the global community. We assist other countries in many different ways. There are countries out there at the moment that have no option but nuclear electricity if they are going to lower greenhouse gas emissions and increase their electricity supply. Finland has made that decision, and that is a pretty advanced economy. There are a lot of people going through the process. If those people need a reliable supply of uranium from somewhere, there is only one country in the world that is a stable liberal democracy—people would be comfortable that that country would regulate its uranium supply to a safe level and make it reliable—and is also well endowed with uranium resources. I do not understand any state in Australia or Australia itself being able to say to another country, ‘Sorry, you can’t have our uranium.’

Mr HAASE—So what do we tell Dr Gallop?

Mr Pratt—I think Dr Gallop has to justify his position.

CHAIR—Thank you very much for agreeing to give evidence today. If the panel need any further information, the committee secretariat will contact you.

Mr Pratt—It was a pleasure. Thank you very much.

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

That this committee authorises publication of the transcript of the evidence given before it at public hearing this day.

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

That this committee authorises publication of evidence given before it at the public hearing in Sydney on Friday, 16 September.

Committee adjourned at 3.58 pm