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REPORT OF PROCEEDINGS BEFORE

STANDING COMMITTEE ON STATE DEVELOPMENT

INQUIRY INTO NANOTECHNOLOGY IN NEW SOUTH WALES

At Sydney on Monday 4 August 2008

The Committee met at 1.00 p.m.

PRESENT

The Hon. Tony Catanzariti (Chair)

The Hon. M. R. Mason-Cox
Reverend the Hon. F. J. Nile
The Hon. M. J. Pavey
The Hon. C. M. Robertson
The Hon. M. S. Veitch

CRAIG CORMICK, Manager of Public Awareness, Australian Office of Nanotechnology, Department of Innovation, Industry, Science and Research, and

CRAIG JAMES PENNIFOLD, Head, Innovation Division, Department of Innovation, Industry, Science and Research, sworn and examined:

The Hon. MELINDA PAVEY: I will get proceedings underway in the absence of the chairman, who has been delayed due to a problem with the airline. If you should consider at any stage that certain evidence you may wish to give or documents you may wish to present should be heard or seen only by the Committee, you should inform us of that fact and the Committee will consider your request. If you do take any questions on notice today, the Committee would appreciate it if a response to the questions could be forwarded to the Committee secretariat by Monday, 25 August. I understand you will be making a presentation relating to the recent survey on national community attitudes about nanotechnology. Prior to that

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would you like to make an opening statement?

Mr PENNIFOLD: Thank you for the invitation to appear before the Committee. I apologise that due to unforeseeable circumstances a senior departmental officer was unable to appear on 6 June. I wrote to the chair of this Committee on 10 June 2008 advising of our absence and, in that letter, included a prepared opening statement and answers to the indicative questions that the Committee had forwarded to the Australian Office of Nanotechnology. These are in addition to the submissions that the Australian Office of Nanotechnology made on 2 April 2008. Since then there have been some key developments so I welcome the opportunity to update you in person.

On 11 July 2008, Senator Kim Carr, Minister for Innovation, Industry, Science and Research, released two documents supporting policy and regulatory activity by the Commonwealth Government. The first is a review of possible impacts of nanotechnology on Australia's regulatory frameworks, which we refer to as the Monash report. The second is the Australian Government approach to the responsible management of nanotechnology, which we refer to as the objectives paper. Both of these documents can be accessed through the website of the Australian Office of Nanotechnology. Together they provide a clear blueprint for how the Commonwealth Government will be addressing key issues relating to nanotechnology and its regulation.

On 29 July 2008 Senator Kim Carr announced that the new \$75 million Climate Ready Program was open for applications. Grants of between \$50,000 and \$5 million are available for a range of eligible projects, including enabling technologies like nanotechnology and biotechnology that address the effects of climate change on people and the environment. My colleague Dr Cormick will present you with findings from the latest study into Australian community attitudes about nanotechnology, and this will cover trends from 2005 to 2008. It was undertaken this year by Market Attitude Research Services. The study is being released today and is available for download from the Australian Office of Nanotechnology website.

In talking to the Committee today I would like to outline and clarify the role of the Australian Office of Nanotechnology as well as the topics we are able to talk about. The Australian Office of Nanotechnology is a small team of officers within the Department of Innovation, Industry, Science and Research that is implementing the national nanotechnology strategy, which aims to facilitate a whole-of-government approach to nanotechnology. The office is comprised of eight people covering coordination, policy and public awareness activities. The national nanotechnology strategy has four key objectives: To address the health, safety and environmental impacts of nanotechnology on regulations and standards; to undertake public awareness engagement programs to provide balanced advice on nanotechnology; to establish a nanoparticle metrology capability at the National Measurement Institute; and to facilitate a whole-of-government approach to nanotechnology.

The Australian Office of Nanotechnology is responsible for coordinating government policy around these objectives and, through the national nanotechnology strategy, has distributed funds to other departments and to regulators. The office is primarily the Government's coordination body on nanotechnology policy and, as such, we are unable to answer questions about specific regulations. Such questions are best directed to the regulatory agencies themselves. I will do my best to answer any broad questions you may have about nanotechnology and regulation.

In appearing here today I hope to be able to explain to you how the Government is implementing the national nanotechnology strategy. You will appreciate that as Commonwealth Government officials we are unable to comment on the Government's deliberations in developing policy. The Public Awareness and Engagement Section of the office works closely with community groups, researchers and the public to increase awareness and understanding about nanotechnology and its potential. It also seeks to encourage informed public debate through improved awareness and understanding of social and ethical issues regarding the use of nanotechnology.

Finally, as outlined in our submission, the office is committed to working closely with States and Territories through our Nanotechnology States and Territories Committee. This committee had its second meeting on 22 July 2008 and we were pleased to hear about developments in New South Wales and other States. The committee confirmed the terms of reference for the group and it was agreed that the focus of future activities will be industry development, international engagement and communication between States and Federal governments. Thank you for the opportunity to appear before you today.

The Hon. MELINDA PAVEY: Dr Cormick, would you like to make your presentation?

Dr CORMICK: Thank you very much. The data we received last week, the final report for 2008, so we have tracking statistics here to show from 2005, 2007, 2008. You can see not just the data but the way trends are moving amongst public attitude. I have the whole report here but I will run through it rather briefly so you will see the whole data, but will draw your attention to some of the key items. Please stop me if you want to ask questions as we go.

The key things you will see from it are that we have very low knowledge but very high expectations of nanotechnology. One of the key messages is that when it comes to public attitudes about nanotechnology, it is not about the technology, it is about how it is used or going to be. Methodology: We surveyed by random telephone poll 1,100 people and tried to get a proportion direct across Australia compared to the Australian Bureau of Statistics proportional spread. The

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overview findings between 2005 and 2008, strong positive feelings about nanotechnology have been expressed for perceived nanotechnology benefits. We should reinforce there it is about perceptions of benefits rather than actual benefits. The perception in the public's mind is what the debate is all about.

The Hon. MELINDA PAVEY: During your telephone conversations with the 1,100 people, did the researchers give an explanation about what nanotechnology is?

Dr CORMICK: We do, but I will show you that a little way into the survey. I will give you that definition in a moment.

The Hon. MELINDA PAVEY: I am surprised that 93 per cent of people know what it is.

Dr CORMICK: No, that is not what the question says. I will show you that as well in statistics. People are actually answering the question on an emotive base of, "I believe nanotechnology is pretty damn good. I like the sound of it." When they are quizzed, "Do you know that it is?" No, not so well. The two biggest benefits to see are medical technology and environmental technologies. They are perceived to be the most positive use of nanotechnology. Again, that shows it is not the technology that has the most positive use; it is medical benefits and environmental benefits that people are supporting.

A large majority of the Australian community also gave high levels of continued trust towards scientists at 80 per cent—very high—for explaining risks about nanotechnology; government agencies and regulators rate at 61 per cent; NGOs rate at 64 per cent. Finally, the Internet and general media were the main source of information people were getting, as they are from any new technologies.

New issues explored in 2008 looked at the complexity of nanotechnology—would it be too difficult to understand. Nanotechnology is so new there might be problems for public safety or worker safety, 51 per cent agreed with that. The general public is not being kept well informed about nanotechnology, 37 per cent. Nanotechnology regulation safeguards not keeping up with the development of nanotechnology, 20 per cent; and food labelling should provide information about nanotechnology used, 21 per cent. They are expressing mild concern across these issues; so no great concern across any of those.

The Hon. MELINDA PAVEY: Twenty-eight per cent were greatly concerned about food labelling?

Dr CORMICK: That is right; that is the one that stands out, and I will come back to food several times through the presentation and show you where food stands out as an issue. More detailed qualitative examination of this issue also identified the following expectations: the adequacy of safety testing of consumer products and materials which were made using nanotechnology. People expressed views that it was common sense to test for risks. The impact of nanoparticles entering the environment: comments were expressed again that any potential health risk should be assessed and government agencies and manufacturers should keep the public informed.

The Hon. CHRISTINE ROBERTSON: So it would be the government's fault again.

Dr CORMICK: It often came back to the Government should be looking after these things. Nanotechnology use is largely self-regulated by those industries using nanotechnology, was another comment received. And most comments expressed the view that governing body regulation was needed and that profits should not undercut public safety. The last two points that came out of the more qualitative end of the research: workers and researchers involved with nanotechnology are potentially exposed to nanoparticles. The comments we received related to the view that any potential health risk needs to be addressed by relevant authorities and manufacturers providing information about consumer products that include the use of nanotechnology. Most people expressed concern because they did not think consumers would be told enough, either through government agencies or manufacturers keeping the public informed.

Outcomes from intensive consideration of nanotechnology: What we did through the study, we asked people at the start of the survey, "Are you excited or hopeful about nanotechnology or concerned about it?" Then we asked them again at the end of the study, and we actually found an increase. So 86 per cent were initially very positive or excited, and it rose to 92 per cent, which is interesting when you look at the data coming out of Europe and America that says the more people understand nanotechnology the more concerned they become—maybe so—but when they are engaged on nanotechnology through any form of dialogue it seems their support goes up.

The Hon. MELINDA PAVEY: So you went back to the people you surveyed?

Dr CORMICK: The same people at the end of the telephone survey, once they have had a chance to express their opinions are asked that same question again.

The Hon. MELINDA PAVEY: So you were not going back to respondents—

Dr CORMICK: No, the same telephone poll: the first questions and last questions. Into some of the data: We looked at tracking people's attitude to nanotechnology compared to different attitudes, and I put that in a graph for you so it

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is a bit easier to see. The five technologies looked at were nanotechnology, climate change, cloning, general foods and stem cells, where green is the most positive, red is concerned, the rest were alarmed and neutral don't know. Concerned and alarmed we had two different ratings to: nanotechnology rated the highest across the channel, the whole thread there, followed by stem cells and climate change research. But people were very positive towards nanotechnology.

Key detail trends: "Overall how positive are you towards nanotechnology?" There is that statistic I just showed you—78 per cent broken down to 25 per cent were very positive and 53 per cent fairly positive, and neither positive nor negative 6 per cent; fairly negative and very negative only 2 per cent; and little or no interest in science and technology 14 per cent. So there was not across a spread of the population a great high concern at the first level.

Trends and public opinion: There we see from 2005-2008 those fairly positive about nanotechnology had gone from 81 per cent to 83 per cent to 86 per cent. So we are seeing a tracking trend rising.

The Hon. MELINDA PAVEY: They were the same questions each year?

Dr CORMICK: The same questions each year, that is right.

Reverend the Hon. FRED NILE: But not the same people?

Dr CORMICK: Presumably not the same people. It is a random poll: we do not know what chance we have of getting someone again, but it would be extremely rare of a thousand people. "Have you heard the term 'nanotechnology'?" "Yes" has been rising slightly and then unprompted definitions—we asked people to tell us what it was—some people said micro or small science of technology, medical devices, neutralisation and the iPod. iPod Nano was mentioned many times, but it is decreasing. We found three years ago that was probably the number one mention of the community, now it is decreasing.

"Have you heard the word 'nanotechnology'?" 51 up to 66 per cent, so it is increasing across the community; people are aware of the word "nanotechnology". "No" has gone from 49 down to 34 per cent; so there is certainly more awareness of nanotechnology in the community—at least the term. We then asked them if they are aware of the word "nanotechnology", to get more of a breakdown of it. We asked the questions, "You've heard of the term but don't know what it means?" "I know what nanotechnology means, I do not know how it works", "I know in detail what it means and how it works", "I don't know, I can't say", or "I have never heard the word 'nanotechnology'" There you have it in a graph to make it a bit easier to read.

In fact "I've never heard of nanotechnology" diminished from 49 to 34 per cent over three years; "I've heard the term but don't know what it means" has moved around between 28, 24, 29—so rather stable. "I know what it means, I don't know how it works" has had quite an increase from 19 per cent to 29 per cent, and "I know what it is and I know how it works" doubled, but from a very low base—4 per cent to 8 per cent. These are the trends where they are moving across the community. The largest one, of course, is the jump from "I know what it means, I don't know how it works".

All people interviewed were then asked to express, if they wished, any comments about nanotechnology, and these were the comments expressed: positive comments based around more comment first of all, 79 per cent chose not to, but those who did, 17 per cent made positive comments and 1 per cent made negative comments; another 3 per cent were uncertain. And comments along the lines of "Very useful for society as a whole", "An exciting area", "The Government should be doing more R and D", "Has great potential as long as risks are managed", "It involves very small particles".

The definition we now gave at this point in the survey was a definition of nanotechnology for respondents: Nanotechnology is science at a very small scale. It refers to a new array of devices and materials. Its key parts are less than 10 nanometres, about 10,000 times smaller than the width of a human hair. Its potential is not just about being able to miniaturise things. Working at a scale a million times smaller than a pinhead allows science and researchers to tune material properties at the atomic level, making them behave in different ways to create new materials and products. There is the standard definition for people coming to the rest of the survey.

The Hon. CHRISTINE ROBERTSON: Where did you get that from?

Dr CORMICK: We got that from the CSIRO, from memory. I can check that and confirm it.

The Hon. CHRISTINE ROBERTSON: Yes, if it could be referenced it would be useful to us.

Reverend the Hon. FRED NILE: Is that unusual, the 73 per cent making no comment?

Dr CORMICK: Not at the start of a survey. You tend to find as surveys go on people engage at a much deeper level, and people hate to seem dumb in a survey. That is why when you are framing the questions you are very careful to frame them in increments of knowledge so that there is an answer given in each one, because people upfront are often very cautious in giving information until they engage with you in the topic and know what you are after. The following outcomes arose: "Which of the following do you believe would be the most important potential benefit of nanotechnology?" and they

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went through: "To improve medical treatments" has gone up to 79 per cent, and "Improved technologies for the environment", which I raised before. Those two stood out way above everything else. The others are much lower: consumer products, materials, improved food products much smaller, and security and defence capabilities.

I will show you a slide later on where we graph attitudes across different applications of technologies and you get to see across the scale which ones rate high and which ones rate low across a whole array of applications. It gives a really good feel for the way that people look at them. Here is the chart and I have got that in mapped data or in a slide. It is probably easier to refer to the graphs from where you are sitting. Protective suits against chemical or biological weapons rates about 75 per cent, which gives it a slightly favourable across the rating scale. Miniature surveillance devices, however, rates very poor—around 34 per cent; it is one of the lowest. The next one is breaking down garbage, which rates very high in an environmental application—about 90 per cent. Filters to control pollutants—again environmental application—96 per cent. Food packaging that monitors condition, 74 per cent—middling. But change in nutrients in food drops down, and drops down in the last year, an enormous drop from 55 to 32 per cent. Computers and clothes or goods was the only one that rated lower at 31 per cent. Stain on fabrics, middling at 51 per cent. Machines to clear arteries of blood or cancer, 94 per cent, and implants for diabetics 94 per cent.

What we can see looking at it is different applications of nanotechnology have very different attitudes in the public. When you ask the question, "What do you think of nanotechnology?" the answer you get will be quite different once you start breaking it down to applications. Again, it is not about the science of nanotechnology; in most people's minds it is "What are you doing with it?" is the question; and once you define what you are doing with it the question then comes into either health or safety issues, depending on what you are doing with it. When we talk about health and medical applications or environmental applications there is much less perception of risk. When you start talking about food applications you see it rates much lower, so a higher perception of feeling there is any risk concerned.

Also, we point out that the three different questions there relating to food rate very differently. People are much more supportive of nanotechnology in food packaging than they are in food and much more likely to be supportive if there is a benefit from the nanotechnology in the food rather than, say, a cosmetic appearance benefit from it. We also looked at detailed questioning conducted prompting questions to investigate further underlying concerns about nanotechnology.

"Based on what we have been talking about in relation to nanotechnology, do you have any concerns relating to the following issues? The complexity of nanotechnology makes it difficult to understand"—most people were not concerned, mild concern 29 per cent, greatly concerned 5 per cent. "Because nanotechnology is new there might be problems for public safety or worker safety"—not concerned 29 per cent, 51 per cent mildly concerned, 8 per cent greatly concerned. So quite a difference there. "Is the public being kept well informed about nanotechnology?"—39 per cent not concerned, but 37 per cent mildly concerned, 11 per cent greatly concerned. "Nanotechnology regulation safeguards not keeping up with developments of nanotechnology"—17 per cent not concerned, 20 per cent mildly concerned, 4 per cent greatly concerned. "Food labelling should provide information about nanotechnology"—33 per cent not concerned, 21 per cent mildly concerned and 28 per cent greatly concerned.

The Hon. MICHAEL VEITCH: That middle one, 49 per cent were unsure.

Dr CORMICK: Yes, 49 per cent were unsure, which is very high. Asking a regulatory question of the public, I think you will find often the detail is a bit beyond them, so you get that type of answer. "Which best describes how you feel about potential implications of nanotechnology?"—excited, hopeful, concerned, alarmed. We looked at that previously and we showed a breakdown over the years from excited and hopeful 81 per cent to 83 per cent and 86 per cent, and negative went from 14 per cent, 13 per cent, 9 per cent for both concerned and alarmed. Alarmed was fairly low across the population at 2 per cent each time.

CHAIR: You said this was different from overseas research.

Dr CORMICK: I have some American statistics at the end that I can show you. It is a little bit different, but not greatly different. "Trends in public opinions"—neutral concern to positive. We looked at before and people are overwhelmingly positive towards nanotechnology still. "Level of agreement with statements made about nanotechnology trends 2005-2008." We have got here "majority agree" are boxed, "majority disagree" are boxed. So you can see very simply which they are, and we have the three-year trends as well. "I don't think I will see the impact of nanotechnology in my lifetime"—most people disagree with that by a large majority. "Nanotechnology applications will have a positive impact on employment and the economy of Australia"—support for that has increased. It has gone up from 55 per cent to 68 per cent, down to 63 per cent.

The Hon. CHRISTINE ROBERTSON: They agree with that?

Dr CORMICK: They agreed with that. "I would definitely like to know more about nanotechnology and its potential applications"—that has actually dropped a little bit, 79 per cent, 74 per cent to 71 per cent. "Products produced with nanotechnology will cost too much"—fairly even. "I still do not understand what nanotechnology is or how it could be used"—most disagree with that and it has been dropping. "I believe nanotechnology will improve the future quality of life in Australia"—that is still rating very high, 77 per cent, 83 per cent, 79 per cent. "It is important for me to know if the products

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I buy are made with nanotechnology or include some form of nanotechnology"—strong high agreement on that one. "I am concerned about the unknown risks involved in the use of nanotechnology"—that has been dropping and still sits at 65 per cent agreement. "I am concerned about the health, safety and environmental risks of nanotechnology"—this was not asked in the first few years, only asked this year, and 59 per cent agree with that, 27 per cent disagree.

How does that look in terms of a scale? You can see they all sit fairly high, close to 50 per cent or above, except the last one, and excited and hopeful very high. "I believe nanotechnology will improve the future quality of life in Australia—very high. "I am concerned about the unknown long-term side effects"—starting to diminish a bit but still moderately high. "Nanotechnology will have a positive influence on the economy and employment in Australia"—that is rising. "The benefits of nanotechnology outweighing the risks" have been increasing. I have got a slide to show the risk-benefit proportions. We have a breakdown of those concerns about nanotechnology benefits or risks—64 per cent have no concerns. Benefits we can break down; risks we can break down. "Potential for bad effects"—concern about nanotechnology in food was really the only one that was named and unsure, lack of information, potential risks could outweigh positive impacts.

"How important do you believe the government agencies in Australia should monitor nanotechnology developments, provide funding, provide funding to public universities and institutions, provide regular information or regulate the development?" I have that as a graph to make it easier to read. Green is very important, orange is fairly important, purple not too important, blue not important/don't know. What stands out overwhelmingly in the people's minds is that government should be doing the top three and the last one, which is regulating nanotechnology, providing information to the public about nanotechnology, providing funding to public institutions like universities. It drops a bit more when we see providing funding to private enterprise for nanotechnology, but still way over the halfway mark. Monitoring nanotechnology development is still sitting high as well.

CHAIR: Did they nominate any taxes they would like to go up?

Dr CORMICK: No, funnily enough. That actually is pretty standard, this finding, on anything when you come to where should government money be going. It is a pretty standard spread you get on this one—the public good above private good. "Perception of Government agencies and regulators in providing information about nanotechnology: The public would be kept regularly informed about nanotechnology risks and benefits, do you agree or disagree?"—47 per cent agreed, which is rated by the research company as a weak outcome. "If problems occurred with products using nanotechnology consumer warnings will be given out"—people however believe that and overwhelmingly supported and agreed with that. "If negative impacts occurred from nanotechnology in the environment or in health and safety, public warnings would be implemented"—again people strongly believe that would happen as well. "How much trust do you place in the following telling you about the risks of nanotechnology—business leaders, government, scientists, manufacturers, news media, non-government organisations?"

I have a graph of that to make it easier. Green is a lot of trust, orange is some trust, purple not too much trust, red no trust. Business leaders you will see rate more to the not too much trust; government agencies and regulators rate fairly well; scientists rate the strongest, very, very strong; manufacturers and distributors of consumer products middling, very comparable to business leaders; news and media reports middling; and non-government organisations rate very comparable to government agencies, very high in a lot of trust, 19 per cent lot of trust; government agencies 10 per cent. "Where do you get your information from?" We asked an enormous array of information and the majority comes from the mainstream press rather than the internet, which was interesting. A lot of new technology the internet outrates the mainstream media, but this one 80 per cent, with 55 per cent rated the internet.

At the conclusion of the interviews conducted we did intensive investigations. Of 100 people we asked follow-up questions when they were able to give us more dialogue and discussion. The first one we asked about was the adequacy and safety of testing of consumer products—41 per cent no concern, 59 per cent concern. Here are some sample quotes that people were giving us to get a flavour of the type of responses. "I felt okay about this because consumer products testing always seems to be very thorough"—female 40 to 49 years, disability pensioner in Perth. "On the other hand I have a small amount of concern, but only because it is new. Nanotechnology potential exists for unknown factors"—60-year-old-plus retired male in Townsville. "Impact of nanoparticles entering the environment"—54 per cent no concern. "I don't have any concerns because a lot of particles enter the environment anyway and it is only when problems occur you need to worry"—50- to 59-year-old male employed full time in Adelaide. "I am mildly concerned because I am not sure of the situation except that sounds possible that the particles could live in the environment and not break down"—male 60-plus retired living in Adelaide.

I will skim through the rest. We will give you these as a document and you will be able to go through them in detail. Summarising some of the key findings, "The adequacy of safety and testing of consumer products made using nanomaterials"—we looked at these at the start of the presentation. People expressed views that it is commonsense to test. People said that any potential health risks should be assessed and government agencies and manufacturers should keep the public informed. Most comments expressed the view that government body regulation was needed. As to outcomes from the intensive follow-up interviewing, as I said before, before the interview we asked them how excited, hopeful, concerned, alarmed they were about nanotechnology and how were they after the interview or after they had a chance to voice their opinions. Across the scale, those who were excited went from 21 to 27 per cent, hopeful stayed around about the same 65 and 65 per cent, concerned dropped from 7 per cent to 3 per cent, alarmed rose by 1 per cent from 2 to 3 per cent and neutral

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went from 6 to 8 per cent. In general there was a slight increase across the board for excited. That is how the trend looked. That is an increase in support. That is broken down into more detail.

A key one we asked was risk and benefit analysis. I have a graph to explain this one a bit easier. The first question asked was "Do the risks in nanotechnology outweigh the benefits, or do the risks of nanotechnology equal the benefits, or do the benefits of nanotechnology outweigh the risks, or don't know?" Over three years the perception that the risks outweigh the benefits dropped from 8 per cent down to 3 per cent, the risks of nanotechnology equalling the benefits has dropped quite a lot from 35 down to 18 per cent, and the benefits of nanotechnology outweighing the risks has risen from 39 to 53 per cent. Interestingly, those who say "I don't know" has risen quite a lot as well, probably mostly coming from the risks equalling the benefits.

Conclusion: high level of belief within the Australian community that nanotechnology will provide long-term benefits of the quality of life in Australia and ensure economic and employment benefits. Few risks or concerns about nanotechnology are foreseen, although most people recognise that risks could arise and should be addressed. If I summarise that situation, we have very high expectations for nanotechnology, a moderate level of concern and a very low level of knowledge. That creates an environment where information campaigns are very hard to push but emotive campaigns run very easily. That again is equal with the type of information that people are giving us. Any questions?

The Hon. CHRISTINE ROBERTSON: I have a question about people's perception that employment and the economy will improve. I think it is impossible in this form of longitudinal study to change it. Do you think people have any perception of the massive potential for total change in employment?

Dr CORMICK: No. I think that is very apparent also from having done the public forums around Australia. They were very interesting. We had over 300 people of what I would call the engaged public who had much more knowledge about nanotechnology. They had some understanding and talked about that level of where this could go, the impact on society as a whole, employment, manufacturing, right across. They were talked to originally by experts and taught to often raise those topics, so you are talking to engaged public who then became more informed. The general public, I do not think that is yet on their radar.

The Hon. CHRISTINE ROBERTSON: I understand you do not make political statements. This issue is very important when you are trying to structure policies and a regulatory model at the State level. Do you have any ideas how to address this issue or get more information?

Dr CORMICK: What I can answer is when you are putting together a public awareness campaign of any type it is very important to pitch from the point of the public's understanding of the issue rather than from the agency's point of understanding of the issue. You often find you are firing into space, as it were, when you are trying to present from an agency point of view without understanding what the public perception or receptiveness for information is.

Reverend the Hon. FRED NILE: Did you ask a question in the survey as to their source of knowledge about nanotechnology? Was it from newspapers or scientific programs?

Dr CORMICK: We did ask where they got their information from. I will step back to that one.

CHAIR: It was 89 per cent from radio and television.

Dr CORMICK: That is right. Mass media was very, very high.

Mr PENNIFOLD: Rather than the internet.

Dr CORMICK: Rather than the internet, which was surprising in a way because we have found in the past with biotechnology and other applications the internet has become the dominant form of information. From most people's point of view it was mass media.

CHAIR: We will return to the formal hearing.

Mr PENNIFOLD: To add another comment to the question that was asked, what it means is that in any strategy, be it at a national or State level, there is certainly the need to foster informed community debate. We see that as an important part of any such strategy.

CHAIR: How do we do that?

Mr PENNIFOLD: We can talk about how we have done it and we are happy to do that.

CHAIR: Would you?

Mr PENNIFOLD: In the objectives, which we have released, there are three aspects to the strategies. This is a

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ministerial statement. This is what I refer to about the Australian Government approach to the responsible management of nanotechnology. The three aspects—the first objective relates to protecting the health and safety humans in the environment. The third one is about achieving economic and social benefits. The second objective is about fostering informed community debate. So that what we are talking to people about through a variety of mechanisms is about the benefits and risks. It is about providing information to school kids, to the community in general. I might ask my colleague to expand on some of those activities.

This is through a number of media, written media and direct engagement. We are looking at pod casts and those sorts of things as we suspect that different age groups will get their information in different ways. We are certainly working hard to ensure that the decision-making processes that we have got in terms of community engagement are very open and transparent and we engage stakeholders. Dr Cormick can talk about the types of people that we have had at these forums, which include scientists, regulators and representatives of community groups.

The Hon. MELINDA PAVEY: Is there an attitude within the Australian Nanotechnology Office to actively respond to alarmist information in the community? For example, the committee has received evidence in this inquiry from the Australian Manufacturers Union that they wanted a moratorium on any nanotechnology, and particularly some of the Green groups are out there raising concerns that if left unchallenged or unquestioned it could drive down the public perception of nanotechnology. What is the view of the Australian Nanotechnology Office on responding to claims against nanotechnology?

Dr CORMICK: We very much say the information we put out is balanced and factual. So if we are talking about any applications, if they are a risk, we talk about the risks and the benefits. I think a lot of it is about achieving public trust in the first instance, and that comes from being able to be seen as "yes, you do supply both sides of the story when needed".

The Hon. MELINDA PAVEY: Do the results suggest that changes or modifications in the message are required in relation to nanotechnology?

Dr CORMICK: Changes to which message?

The Hon. MELINDA PAVEY: The benefits about what government is doing in terms of nanotechnology and engaging in debate publicly?

Dr CORMICK: It is actually a very large question you have asked, and a lot of work is going on internationally towards answering it. How do you best engage the public on nanotechnology? We know it is different to the way you engage the public with biotechnology. It is different to the way you engage the public about microwave technology. It is entirely new and it is broken up by a lot of subset factors you need to ask, that is, the level of engagement of the public to start with. Are they receptive to information? Are they receptive to education? Do they have issues that are very hot in their mind like environmental, health and medical and food-based? And you almost have to have different messages for different areas, based on how they break it down. As nanotechnology is not one technology but it is an application that runs across many, many uses, the same people almost have to have that breadth built into your strategy to understand how you are reaching the public.

The Hon. MELINDA PAVEY: In 2007, the survey report included two recommendations to encourage nanotechnology stakeholders to promote through public awareness campaigns examples of beneficial nanotechnology developments, and then develop strategies to quickly and honestly address emerging unfounded criticisms. Do you believe that that same recommendation still stands?

Dr CORMICK: It depends again on the organisation and who is responsible to it. If we are entering into a media debate and we are getting information that is plainly alarmist or false or misleading, yes, we will correct that information as we need to. Again our ambit is balanced and factual information, but again it is based on an issue of public trust where we say the public do have the democratic right to make up their own mind. So it is not about over-promoting the technology to the public, it is about providing more information that they can make sensible decisions based on balanced factual information.

The Hon. CHRISTINE ROBERTSON: This may be outside your area, but is the Federal Government doing anything about planning for the very probable workplace changes that will happen because of the introduction of nanotechnology? I refer to less persons being used in factories, different businesses going under and different ones being established but not necessarily with the same employment levels? Has any work been done at all?

Mr PENNIFOLD: We have not looked at the specific changes that the introduction of these new technologies would make in particular workplaces so there is not any specific planning in place to address what those changes might be.

The Hon. CHRISTINE ROBERTSON: Some scientists sell the changes to the workplace and the requirement for less employees as a plus for the process and that is why I am interested whether that issue has arisen?

Mr PENNIFOLD: I think it is inevitable that with any new technology being introduced there will be both brand

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new opportunities and new products. We are already seeing that in the information technology area where nanotechnology offers the potential for faster and faster usage of communications in IT. So there will certainly be changes in those sorts of products. We can see some benefits coming through from, for example, even better anti fouling paints for the ship building industry. They might just work into existing businesses being better at what they are already doing. But we have not done a comprehensive review of how that might affect the industrial business structure in Australia.

The Hon. CHRISTINE ROBERTSON: It is important to provide information in specific issues relating to nanotechnology. I refer to the fact sheet "Nanotechnology working on the smallest things". Will you provide an update on when the fact sheets will be completed? Will you advise why the topics, food, ethics, occupational health and safety were selected? Will there be any other fact sheets?

Dr CORMICK: We have one facts sheet up at the moment which is "Nanotechnology working on the smallest things". We have three more, which are very close to finalising production, the ones you have raised, occupational health and safety, food and ethics. We have another set behind that, the third stream we are looking at probably based around issues like nanotechnology applications. We are largely deriving the topics out of feedback we get from public forums. It is when people tell us they are the information they want things on. We are therefore responding to public need and finding information on those things.

The Hon. CHRISTINE ROBERTSON: Are you working with international bodies to get standardisation or are you referring to previous fact sheets? What is the process?

Dr CORMICK: We are working with national and Australia-wide agencies and that is why sometimes we are a little bit slower to arrive than we would like because we want to make sure they are right. They go through a very rigorous process. They have been commented on by everybody who needs to comment on them, and then they still have to be in plain English at the end of that process. It is going to take a little bit of fine-tuning but we want to make sure what is given to the public is the best possible thing to give to the public. We have looked at some overseas models in terms of fact sheets and we have found some that we think work extremely well and we have found some we think do not work very well at all. I think the difference is often if they come from too science-a-point-of-view or rather, getting into great detail on the science, without getting into much detail of what the public is really looking for—again we use the public as our sounding board for those.

The Hon. CHRISTINE ROBERTSON: Is the Internet the major way to get this information out?

Dr CORMICK: Not necessarily. We also use them in public forums. For the next three days we are taking part in Science in the City just over here outside the museum and we will be having information on nanotechnology, handing out fact sheets to teachers to pass on to school children. We have schools resources. The Internet is only one of the many means we would use.

The Hon. CHRISTINE ROBERTSON: Have you assessed the reach?

Dr CORMICK: In terms of those we give to groups we know. There we have an assessment of reach because we simply count how many we have printed and given out. We also have an initiative we are working with Melbourne University which is a gene and nanotechnology information service on a free call number or fax, hot line or email. We also work with community groups like Rotary, schools group and that way we can very carefully monitor what information has been sought from us and what information we are giving out and track that.

The Hon. CHRISTINE ROBERTSON: Are you able to measure hits on the Internet?

Dr CORMICK: At the moment we are having problem with our Internet provider being able to give us that. I was hoping today to come with Internet data for that but we were told it will take a while to collate that data.

The Hon. MATTHEW MASON-COX: Is your communication campaign in schools reactive? Do schools come to you or do you go out to them?

Dr CORMICK: It is a good question and there is not a plain simple answer to it. We went and talked to school teachers in the first instance and we know, having talked to the Australian Science Teachers Association for some years, it has been telling us teachers are looking for resources on nanotechnology because kids in the classroom, particularly at upper secondary, are saying "We want to learn about nanotechnology". The teachers are asking "What is out there to use?" They go to the Australian Science Teachers Association "We are looking around for resources" and they are calling for different pieces. So we did a stocktake across Australia and said "What exists out there at the moment?" We found a couple of different models. The best one was developed by St Helena's School in Victoria, funded with NanoVic money and the Victorian Government. We looked at that and it was a very good model. One of the teachers won a Prime Minister's science prize for the nanotechnology module they had done.

Our thinking was "Okay, let's pick that up and let's make it a national resource". What we are doing at the moment is working with the Australian Science Teachers Association and curriculum developers in each State are developing that so

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that it will fit each State's curriculum. We are developing that now at the first level and by August/September we hope to have the first draft of that completed whereby we will be able to trial it within the States. We are working with education departments in each State and then based on that trialling we will develop a full resource that can be used in each State at the upper secondary level teaching nanotechnology.

The Hon. MATTHEW MASON-COX: Are you confident they will take that up as part of the science curriculum?

Dr CORMICK: The feedback we had we know that they want to take it up. The issue often is making curriculum relevant. If you give a schoolteacher a resource "Here is a great resource" the question we often get back is "But how does it fit in my curriculum?" If you develop it with the curriculum developer and they say "We need this in my curriculum"—

The Hon. MATTHEW MASON-COX: Something said for a national curriculum, I suppose, but I will not go there. In terms of public forums and the like, do you have a forward program organised?

Dr CORMICK: Over the past 12 months we have done one public forum in each capital city. We have done seven forums and tracked about 317 people around each State. We have partnered with different people in the States and we had a variety of speakers. We are now putting together a report based on that to help us decide what we do for the next 12 months. It may be that we decide that they worked wonderfully. We may want to go to regional areas. We might want to work with existing groups, like Probus, University of the Third Age, so getting the feedback and understanding the success of it will be the next stage.

The Hon. MATTHEW MASON-COX: Is it your intention to continue with the telephone polling on a yearly basis?

Dr CORMICK: The public attitude research is always fundamental, not just for understanding what the public thinks but for evaluating your methodology. Whether we choose to go ahead with exactly that type or monitor it and change it, we have another year to choose what is the best method for doing that.

The Hon. MATTHEW MASON-COX: What is your budget for your communication strategies?

Dr CORMICK: The total communication strategy for the year ahead is going to be \$400,000.

The Hon. MATTHEW MASON-COX: Do you think that is sufficient?

Dr CORMICK: Sufficient for achieving what? Would have to be the answer back to you.

The Hon. MATTHEW MASON-COX: What do you hope to achieve with the \$400,000?

Dr CORMICK: We are going to make it seem like a million dollars.

The Hon. MATTHEW MASON-COX: Interestingly we are contemplating the Federal approach as opposed to the approach of different States. What is your view on how State's control nanotechnology particularly with communications?

Dr CORMICK: Okay, we work very closely with the States. The forum we held here we partnered with the Ministry here to do that. We talk to them quite a lot. Whenever we can we get together and have meetings, we move interstate and travel together so we get a feel for what is happening State to State. Across Australia at the moment there is a lot of interest in getting involved in nanotechnology communications from the State agencies. We find they are very receptive partners to work with.

The Hon. MELINDA PAVEY: Is Victoria the leader?

Dr CORMICK: It is a hard question to say leader because some engage in different areas. For instance, Queensland is doing a lot in terms of nano dialogues. They are doing discussions and dialogues on nanotechnology with different community groups and seeing what comes out of those. They are doing different things. It is actually very hard to say which one is leading in terms of the other one. If we pool all the data across all the States together we are going to know an awful lot about how to engage with the community.

Mr PENNIFOLD: I think the other thing we want to do is to also draw the different States and Territories together so rather than it be the Federal Government driving it all the States can learn off each other which is why we have set up that regular committee to bring the officials together so that they can talk about what they are doing in each State.

Reverend the Hon. FRED NILE: Do you have annual meetings with Ministers for Education, for example, and have an input with such Federal meeting and with State Ministers?

Mr PENNIFOLD: As you can appreciate, nanotechnology is a very cross-cutting issue. We have had meetings at

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the Federal level of the different Ministers that deal with different aspects of nanotechnology from industry and innovation to environment and health issues and so on. There are meetings between the Commonwealth and State and Territory Ministers where these sorts of issues can be raised as well.

Reverend the Hon. FRED NILE: I was thinking particularly of education Ministers.

Dr CORMICK: I can refer to the model that we developed a similar resource for on biotechnology and that went to the national education Ministers for their endorsement.

Reverend the Hon. FRED NILE: That would be a big help in opening doors.

Dr CORMICK: It can make a big difference. It is important sometimes to have the product first rather than the concept.

Reverend the Hon. FRED NILE: Just a general question: Has your department run similar awareness campaigns with respect to other areas of new science, such as genetic modification [GM]? If so, are there any worthwhile comparisons or differences that can be drawn?

Dr CORMICK: For the past nine years I have been managing Biotechnology Australia's public awareness program. We have learnt a lot from engaging the public on biotechnology. What we were doing was largely regarded internationally as one of the world's best models in terms of public engagement on biotech issues. What really stands out is that nanotech is going to be different. I think those countries that are looking at nanotechnology and saying that it will be just like GM or just like stem cells are going to be in for a surprise. They are going to find that they will have a lot of trouble engaging with the public with what they are working on.

The Hon. CHRISTINE ROBERTSON: Why?

Dr CORMICK: There are a couple of key issues. Firstly, it is what is called upstream engagement in that we are largely having the public debate before nanotechnology is all around us. It is still very early days for nanotechnology. You might say the GM debate almost happened after GM had been developed, so we are having a debate on the concept. It is different in a couple of ways because public feedback can be fed into product development and policy development, but that cannot happen the other way around. That is one big difference. Also, because nanotechnology is so broad and across so many different applications we cannot talk about nanotechnology; we have to talk about nanoenvironment, nanohealth, nanofood, nanomanufacturing and some very different things.

The Hon. MICHAEL VEITCH: Specific disciplines within that framework.

Dr CORMICK: Even within those, are we talking about nanoparticles, are we talking about nanofibres? It is very much more complex.

The Hon. MICHAEL VEITCH: I want to ask some questions about the review of the regulatory frameworks that is going on. I understand a number of Federal agencies are involved in a review of the regulatory frameworks at a Federal level. Are you able to update us on how that is progressing?

Mr PENNIFOLD: Yes. Minister Carr announced on 11 July the release of what we are calling the Monash report, which is a review of possible impacts of nanotechnology on Australia's regulatory framework. That is the long title, which is why we call it the Monash report. It is a little bit easier.

The Hon. MICHAEL VEITCH: That is on your website, as you mentioned in your opening address.

Mr PENNIFOLD: It is on the website. Australia is one of the first countries in the world to actually do a review right across its regulatory systems. It was commissioned by the Australian Office of Nanotechnology and it was publicly released about a month ago. It looks at the systems from food to industrial chemicals and so on. It was a very comprehensive study and its author, Graeme Hodge, I think appeared before you earlier. It identifies both the strengths of the current system and a number of triggers where some further work needs to be done.

The Hon. CHRISTINE ROBERTSON: Why was Australia so "quick off the mark"?

Mr PENNIFOLD: The reason for that was the Commonwealth approach to nanotechnology stemmed in a number of steps from a report from the Prime Minister's Science, Engineering and Innovation Council, which identified nanotechnology as a very important area for Australia, but in doing so suggested we move forward not only on the economic and social benefits but take direct account of the risks—the health and safety aspects—and also community attitudes. Right from the very beginning we have seen that we cannot move forward in just one of those areas; we need to move forward in all. Very early on in the piece we got the national academies to start looking at our regulatory system. Consistent with what you saw earlier, some areas are seen as much stronger than others. For example, the registration of drugs is a very strong process through the Therapeutic Goods Administration. They identified at a more general level where those strengths were

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and so we saw the next logical step, particularly as regulators wanted to look more at where the issues lay, was to have a third party come in and independently look across our regulatory systems. You will see from the report they looked at not only the Commonwealth systems but at one or two State agencies as well to draw out what needed to be done.

The Hon. MICHAEL VEITCH: Obviously you have identified some amendments to the regulatory framework. Are you able to talk us through some of those?

Mr PENNIFOLD: The report says Australia's regulatory frameworks are generally well suited to the task of regulating technologies, and they have a 10-year outlook on that. It made the point that all regulatory frameworks that apply to conventional products and chemicals also apply to nanomaterials and nanotechnology-based products, and recommended that while there is no immediate need for major changes to the regulatory regimes there are areas that will potentially need amending. It was quite clear in identifying what they called half a dozen triggers. Each of the regulatory agencies at the Commonwealth level is now working its way through that report. We commissioned it as some internal work for regulators who wanted to get on the front foot and deal with these issues. Now we are progressing our way through each of those and each of the agencies has a work plan in place to address how those particular triggers apply to them and what needs to be done as a result.

The Hon. MICHAEL VEITCH: In your previous response you mentioned there were a couple of State agencies involved in the process as well. How do you intend to consult and liaise with the State agencies around any regulatory framework amendments or changes?

Mr PENNIFOLD: I think there are two levels. We have the committee I referred to at quite a high level, which deals with what I suppose you would call the coordinating agency in each jurisdiction. Below that each of the regulators has quite a significant relationship with their counterparts in each State. This is where the complexity of the regulatory system comes in. We would expect that they would be working with their State counterparts, whether it be in workplace safety, food or wherever the situation lies.

The Hon. MICHAEL VEITCH: Dr Cormick, in relation to your response to Matthew's question about the forums you had around Australia, how did you source the participants for those forums? How were they engaged or invited?

Dr CORMICK: Is that the audience rather than the panel of speakers?

The Hon. MICHAEL VEITCH: Yes.

Dr CORMICK: We had feedback from those who attended. We went for multiple sourcing, but most people came based on two things: first, they saw an advertisement in the newspaper; and, second, they received an email invitation. Whichever State we went to, we made sure an ad was placed in the appropriate local media, and we asked for advice from the State as to which they thought would be the best in Darwin or the Northern Territory or Western Australia so that people would see it. We also got hold of science networks, the equivalents of CSIRO clubs, and had them send out email alerts. So we looked at multiple targeting as best we could to get across to as broad a population base as we could.

The Hon. MICHAEL VEITCH: In response to Christine's question about the fact sheets on the Internet, what mechanisms do you have to engage with people who have sourced those fact sheets to determine whether they were worthwhile or not? Do you have some sort of research mechanism?

Dr CORMICK: We do that when we are working one-on-one with people. They were given out and people were asked for feedback on them. They are very useful. We have worked through our gene and nanotechnology information service, which is very good at getting feedback on them. I would ultimately like to have a website that was able to get feedback as well, because you are always measuring success on how well it worked with your target audience.

The Hon. MICHAEL VEITCH: That is right. A hit on the website does not necessarily mean that people have actually found the information beneficial or could understand it.

Dr CORMICK: That is right.

The Hon. MICHAEL VEITCH: That is why I was wondering what level of detail you have.

The Hon. MELINDA PAVEY: In relation to regulatory reviews, in evidence the Committee heard of other regulatory reviews related to chemicals under the national chemicals environmental outlook framework, and a Productivity Commission review of regulation of chemicals and plastics at a Council of Australian Governments [COAG] level. Can you advise on how these reviews are practically related to the overall process of the nanotechnology regulatory review?

Mr PENNIFOLD: Sure. The information I have is that the Productivity Commission is currently finalising its study into chemicals regulation in Australia. As you would know, a draft report was released in March 2008 and a final report is scheduled to be released on 7 August 2008. This study is intended to inform the work of the COAG Ministerial Taskforce on Chemicals and Plastics regulation. One of the recommendations of the draft report was that the

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Commonwealth, States and Territories should establish through the Australian Health Ministers Conference a standing committee on chemicals comprising representatives of all ministerial councils that have responsibility for chemicals regulation.

The draft report proposes that such a committee would address emerging issues like nanotechnology. We are still awaiting the final report. At this stage I am unaware of nanotechnology being considered in the context of the national chemicals environment framework. This has been the responsibility of the National Industrial Chemicals Notification and Assessment Scheme [NICNAS] and I think Dr Healy of NICNAS might have addressed this issue when she spoke to you on 10 June.

The Hon. MELINDA PAVEY: In relation to NICNAS, we have had some evidence that, as you indicated, at some stage it expressed a preference that chemicals should initially be assessed at an entry stage into Australia on their physiochemical rather than on the bulk chemical form from which they are derived. How do these views and preferences from State agencies feed into this regulatory review process?

Mr PENNIFOLD: NICNAS is really taking the lead on that at a Commonwealth level, so that will be a matter for NICNAS to look at. I think this relates to one of the potential triggers that were identified in the Monash report—that is, the trigger is a significant quantity or weight—and they are looking at their regulations to determine whether that should be amended and, if so, in what way.

The Hon. MELINDA PAVEY: You have mentioned Senator Carr's report, which was released on 11 July. We have previously asked questions of the Commonwealth in relation to nanotechnology. You said the Government may choose to elaborate its views on nanotechnology from time to time, which obviously you have done with Senator Carr's announcement and the Commonwealth Government's approach to the responsible management of technology. What was the reason behind the decision to issue the document at that time?

Mr PENNIFOLD: I think we were pursuing a strategy that had been publicly released—the national nanotechnology strategy. We saw a number of issues emerging through our community engagement activities. We closely monitor what is happening internationally and we also had in train the sort of work coming through what we call the Monash report. We thought we had reached the point where it would be useful for the Government to start articulating what the next stage of the strategy would be and how we should go about promoting it. That is why we used the words "from time to time the Government may choose to do so". This was released and represented the Government's view at that time. As we learn more and go on, the Government may choose to issue some more information. It underlines that the Government is very keen about the responsible management of nanotechnology. We have those three objectives and certainly there are many parts of the community that will focus on one of those three, but at a Government level we need to take all of those issues into account.

The Hon. MELINDA PAVEY: In that document under objective 1 it states: "Protect the health and safety of humans and the environment. It was noted this objective will in part be achieved by continuing to apply a precautionary approach consistent with Australia's international obligations, including the Rio Declaration". For the purposes of our inquiry can you provide an explanation of this precautionary approach and how it should be applied?

Mr PENNIFOLD: Yes. The precautionary approach is widely applied in regulatory frameworks as part of a risk management approach and in some cases it has been explicitly embodied in legislation. One example of that is the Gene Technology Act 2000.

The principle states that "in order to protect the environment the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation". This is the most widely recognised international definition of the precautionary approach, which Australia has endorsed. It is set out in Principal 15 of the Rio Declaration of the United Nations Conference on Environment and Development.

So, it is a very carefully balanced set of words. It is internationally agreed and is an international obligation on a number of nation States, including Australia. That is really the basis on which we move forward on our regulatory approach. As you will see, the first objective in the Government's statement is to ensure that there is scientific certainty, or scientific information, that will back up our intention to move in the regulatory space.

The Hon. MATTHEW MASON-COX: Mr Pennifold, there are lots of understandable motherhoods in this area of new scientific endeavour, et cetera, in relation to Minister Carr's announcement on nanotechnology. We now have a report and regulation. What is the road map from here in terms of the next steps in your view that we should take in relation to regulation of nanotechnology?

Mr PENNIFOLD: The road map from here is that each regulatory agency at a Commonwealth level is considering those triggers and the Monash report in detail on the potential regulatory gaps. This will be a long-term effort across multiple regulators and agencies. So, from here on in we will be collecting that information from those regulators. We have a regular forum in which they come together and we will then feed that information into where our gaps in knowledge are.

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We will talk to the people who provide research funding.

The Hon. MATTHEW MASON-COX: In order to research those gaps?

Mr PENNIFOLD: Yes, now we have identified where the gaps might be, there are certainly some areas where there is a lack of scientific knowledge. We will look at not only a national level but also an international level as to how we might best fill those gaps. In evidence before the Committee the CSIRO said it has been engaged within a project in the OECD where this is the sort of activity that is happening on a global scale and a number of countries are trying to work together to start looking at these and other issues that are facing everyone in this area of nano technologies.

The Hon. MATTHEW MASON-COX: There are lots of disparate elements, if you like, of the coordinating Commonwealth body. Bringing that together is a challenge. What timeframe do you have in mind to move it forward in those regulatory areas?

Mr PENNIFOLD: I understand that the OECD work is due to start quite soon. The work that our regulatory agencies undertake is already under way. So we will draw that together over the course of the current year. Then we will provide some advice to Government about what else needs to be done. You would be aware that funding for the current national nanotechnology strategy expires as at 30 June 2009 and Minister Carr has asked that the review of the national innovation system look at this issue of platform or enabling technologies to determine what should be the best approach to take after that date.

The Hon. MICHAEL VEITCH: To follow up on that, the timeframe question is a very good question. We are talking about new issues with 12 months to start some of the work. Is there a view of a five-year or 10-year process for filling in the gaps in regulatory frameworks?

Mr PENNIFOLD: The national nanotechnology strategy rolls out to 30 June. The individual regulators right now are going through the Monash report and looking at those triggers and what they need to do. Over the course of this year we will develop the plan that takes us out to where we need to be. A lot of the research that will be necessary for effective regulation of this nature will be fairly medium to long term.

The Hon. CHRISTINE ROBERTSON: With that timeframe what happens to your social research program? Does it stop in 2009?

Mr PENNIFOLD: The Government will need to make a decision about what happens after.

The Hon. CHRISTINE ROBERTSON: So it belongs to the initiative that finishes in 2009?

Mr PENNIFOLD: That is correct.

The Hon. CHRISTINE ROBERTSON: That is very interesting.

Reverend the Hon. FRED NILE: Regarding toxicology testing and assessment, the Committee has heard a lot of evidence that this is a very important area and that toxicology infrastructure is limited and would be unlikely to meet the anticipated increased need. It is also suggested to the Committee, particularly by ANSTO, that a national facility with a hub could provide an independent testing service to industry that would be worthwhile. Do you have any views on the need for an independent testing service industry?

Mr PENNIFOLD: We have not independently assessed whether there is a need for that. At the moment there is a range of work carried out, supported by the National Health and Medical Research Council and the Australian Research Council and also this work within the OECD that I mentioned earlier. It may well be that a centre would be an appropriate way forward, but we have not really done any work in that area to demonstrate the case as to whether that is needed.

Reverend the Hon. FRED NILE: Would you make a recommendation in due course? Would that come out of your innovations area?

Mr PENNIFOLD: As we start looking at how the Government needs to respond in the areas identified in the Monash report, we will look at what further action is needed to provide the scientific basis for moving forward. I imagine it would be one of the issues that come forward.

Reverend the Hon. FRED NILE: And you will have to make recommendations on what budget would be needed?

Mr PENNIFOLD: Yes. Something of what has been considered would be a fairly major expenditure and therefore we would need to go through the budget process.

Reverend the Hon. FRED NILE: Do you have a rough estimate of what that might be?

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Mr PENNIFOLD: No, I am not sure what is proposed. When I read some of the transcripts, some people were talking about characterisation facilities, others were talking about toxicology, so I was not exactly sure what was being proposed. We have not had a firm proposal put to us and been able to evaluate it.

The Hon. MELINDA PAVEY: It would not have to be under consideration at a Commonwealth level? New South Wales would be the natural home for toxicity or characterisation testing, given our ANSTO facilities. That was evidence given by lot of experts, that New South Wales was the relationship between ANSTO and CSIRO as the natural home for such a unit and should be a world leader in toxicology testing. Do you have any thoughts on that statement from a Government policy point of view?

Mr PENNIFOLD: This is where we need to see what sort of centre is proposed. We are not shying away from the idea that we need to do more scientific research. We need to be clear on what that scientific research is, would you actually set up a centre, would it be in one place or would it be more of a hubs and spokes type model? Those a source of proposals have not been put to us and we have not looked at them. It may well be.

The Hon. MELINDA PAVEY: Who would need to put that to you for you to consider it?

Mr PENNIFOLD: We might develop internally. It could come through from a State or States, through the regular process we have with them. We may well look at it in terms of where we go in responding to the Monash report, if the regulators point out to us that there is a major failing in this area and that we might need to do something. Certainly it is true that the regulations we have on human health and safety require that toxicology work, is done. For example, the Therapeutic Goods Administration requires that work to be done rather than necessarily required to be done in Australia. That is why you would need to look at the business case as to exactly what needs to be done and how you would this go about meeting that need.

The Hon. MICHAEL VEITCH: If it is not done in Australia what other jurisdictions would it be conducted in? The United States, or Germany?

Mr PENNIFOLD: Anywhere around the world.

The Hon. MELINDA PAVEY: Who is doing it around the world, toxicology and characterisation?

Mr PENNIFOLD: Toxicology work is done in Australia. Toxicology work is done right throughout the world, not only in nano areas but also, for example, drug development more generally.

The Hon. MELINDA PAVEY: In the nano area, in terms of characterisation and toxicology, is anyone doing it particularly well throughout the world?

Mr PENNIFOLD: I do not have enough information to answer that question.

The Hon. CHRISTINE ROBERTSON: Were you asked about the precautionary principle while I would outside this room?

Mr PENNIFOLD: Yes.

The Hon. CHRISTINE ROBERTSON: The Committee has a spiel about metrology capability. Funding under the national nanotechnology strategy for metrology was originally \$6.25 million over four years. Subsequently it was reduced to \$3.12 over two years. In evidence the Committee heard many times that there will be an increasing need for infrastructure for the characterisation of nano materials. The Australian Government approach under Objective 3 states that it will support nanometrology accurate measurement as an essential resource for providing industry and regulators with world-class measurement facilities that support the development management and monitoring of nano technology. The evidence from the NMI stated that the funding provided to them is designed to begin the process of establishing a much-needed infrastructure in Australia.

In evidence the Committee heard many times that there will be increasing need for the infrastructure for the characterisation and measurement of nano materials. It was explained to the Committee that funding provided to the NMI was designed to begin the process of establishing a much-needed infrastructure in Australia. My question is: How is it anticipated or planned that this need for additional metrology infrastructure will be met? That was a mouthful, was it not!

Mr PENNIFOLD: I understood the question right at the end. The National Measurement Institute [NMI] is the division within Senator Carr's department, so we know their work quite well. The need for a national metrology facility was a core part of both the original national nanotechnology strategy and more recently in the statement that was released by Senator Carr. The current funding for the overall strategy which includes funding for the National Measurement Institute to undertake this activity continues through to 30 June 2009. The information I have is that that will enable the NMI to finalise the design and to begin to build an atomic force microscope, which will provide traceability for dimensional nano scale measurements in Australia. So we will be able to look at the nano scale.

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The NMI's atomic force microscope will become the national reference instrument from which other standards will be developed. It will also enable them to establish a small scientific team to implement the nano metrology program, to interact with Australia's nanotechnology community and to support regulatory frameworks. So, the issue for what will take place post 30 June 2009 will be part of Government's response to what happens to the funding of the overall national nanotechnology strategy.

The Hon. CHRISTINE ROBERTSON: Okay. At the beginning of this inquiry it was firmly impressed on us—and I guess most of us agreed—that is, certainly New South Wales and certainly should not be setting its own standards and measurements, it should be nation-wide. During the progress of this inquiry it has become more and more obvious that it should be an international standard agreed to. You are talking quite firmly about national standards being set. Could you open that up a bit?

Mr PENNIFOLD: I think the NMI is an active member of the international standards setting bodies as well.

The Hon. CHRISTINE ROBERTSON: In your mind, are they competing or working with, to have international standards?

Mr PENNIFOLD: Working with. They are the national accredited measurement institute that would have sister organisations in other countries. They work on the International Standards Organisation. So, the standards they would be developing would eventually become international standards or would draw on standards that others have developed. So, we are not looking at establishing different standards in Australia to those internationally. But this is a new area so the standards are still in the development stage.

CHAIR: The reviews for those sorts of things, are they likely to happen earlier or later? What is good timing for those reviews, do you think?

Mr PENNIFOLD: Just to clarify, are you talking about reviews of standards or a review of the national nanotechnology strategy?

CHAIR: Review of standards by these committees?

Mr PENNIFOLD: I think the work is underway right now. I am not familiar with the work program of the International Standards Organisation. But there is work underway right now, they are progressively looking at characterisation work, and so on.

CHAIR: Is it ongoing or is it a particular time frame? They say we will review all this in a particular two-year period?

Mr PENNIFOLD: To my knowledge, my understanding is it is an ongoing work program.

The Hon. MELINDA PAVEY: What is the expectation currently on how the toxicity of locally engineered nanomaterials will be assessed?

Mr PENNIFOLD: Sorry?

The Hon. MELINDA PAVEY: What is the expectation currently of how we measure locally engineered nanomaterials?

Mr PENNIFOLD: The regulators require certain standards to be met, including toxicity, they will need to continue to be met, as they have in the past, by companies, be they Australian or international companies, who want to sell product in this country. In this case, the toxicity, if that is what needs to be covered in getting products to market, will need to be undertaken, whether it is in Australia or overseas.

The Hon. MELINDA PAVEY: For example, we heard evidence during the inquiry about concerns from consumer groups and Friends of the Earth on dummies, pacifiers, that have zinc contained within them for hygiene and sanitation reasons—

The Hon. CHRISTINE ROBERTSON: Silver.

The Hon. MELINDA PAVEY: Silver—and I suppose there is concern within the community when they hear this that there is silver in dummies. How is that assessment process for those products that are manufactured overseas being done for our local consumers?

Mr PENNIFOLD: If the regulator requires toxicity tests or any other test to be done for a product entering Australia, they will be part of the requirements for coming here. I am not familiar with the regulation of these particular

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devices. But that would be an issue for the regulator. Once they determine that that needs to be done to sell that product, the company wishing to do so would need to undertake that activity. In this case, if it is additional toxicity testing, they would require it to be done. They would not necessarily require it to be done in any particular place but it would need to be done to a required standard.

The Hon. CHRISTINE ROBERTSON: I guess on these issues the science is not necessarily there. The precautionary principle will pick up but the science is not necessarily there for the scientific testing of the risk. That makes it difficult when they come to us with a case that this is a bad thing.

The Hon. MELINDA PAVEY: You do not even know the dangers, some people would say.

The Hon. MICHAEL VEITCH: That is slightly reflected in some of the responses to the survey—that 49 per cent unsure.

Mr PENNIFOLD: I suppose there are two things. Does the relevant regulation require it to happen and, if it does, where then is that testing undertaken? So, if the regulator required testing of a certain sort to be done, they would require it to be done, be it for imported or for locally produced goods.

The Hon. CHRISTINE ROBERTSON: Which goes back to possibly obstructing product.

The Hon. MELINDA PAVEY: And trade.

The Hon. CHRISTINE ROBERTSON: And scientific research—that original question brought up in the presentation, because you are saying err on the side of—instead of just precautionary principle you have the regulators saying go and test this and it cannot be tested and therefore the product does not continue to be produced. Am I not making sense?

Mr PENNIFOLD: Certainly under our regulatory system, if there is a risk to human health and safety, they will require regulation testing to be done or they will label things appropriately once they know there is a risk or they have assessed there is a risk there. They will draw on the best information available in the world as to whether such risks exist. That is why we have linked in through the OECD and other processes to what is going on internationally.

The Hon. MELINDA PAVEY: But there are other examples that get the community concern, and having an appropriate response from the Government—the research shows us that they expect the Government to have the answers and make sure the public is safe. If we are letting this in and we have not had some sort of answer to that particular product—and given that silver has been used in medicine for 100 years as part of our standardisation process, I do not know whether it is something that should be included in the fact sheets: That this has been looked at by the international community, and the silver passes through the body—I do not know. It is when you do not have an answer, that is when the fear is created.

Mr PENNIFOLD: We understand that, which is why we are trying to move forward to fill that scientific gap. In the OECD and the area that the evidence was given by the CSIRO are two of the areas where Australia is interested in participating in. One is zinc oxide, which is used in sunscreens, and the other was in nanosilver, which is now used in a number of areas.

The Hon. CHRISTINE ROBERTSON: Namely, washing powder. They are talking about it in washing powder.

The Hon. MELINDA PAVEY: And in fridge doors. It is not an easy debate, and I am sure Dr Cormick has been placed in many radio interview situations where he is up against the emotion versus the boring logic of why we have not tested something?

Dr CORMICK: That is true. When it comes to emotion versus information, it is not always an equal playing field. All you can do is make decisions based on the facts you have with you at the time, and giving people the best facts is the best way to do that.

The Hon. CHRISTINE ROBERTSON: But that is not necessarily the way—I cannot think of the proper word that is not defamatory—that some individuals within the community who want to make trouble for the fun of it utilised because they will use the emotive track every time with no fact.

Dr CORMICK: That is true.

The Hon. MICHAEL VEITCH: The survey results showed earlier, when you compare GM and nanotechnology, that people at the moment have a fair bit of faith and trust about nanotechnology but the support for GM technology is pretty low. The Friends of the Earth and other groups are using that emotive debate about GM and transferring that now to nanotechnology and saying they are the same thing or there are asbestos-type bill issues, and that is the whole spectrum of nanotechnology, which makes your survey an interesting thing.

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Dr CORMICK: I always said the best way to know what the public is thinking is to ask the public rather than have someone tell you what the public thinks. Find out from the public by asking.

The Hon. MELINDA PAVEY: If we send out someone to explain it, it must be a scientist—no politicians.

The Hon. MICHAEL VEITCH: They are the most trusted.

CHAIR: Can we have that tabled?

Dr CORMICK: Yes, certainly.

Reverend the Hon. FRED NILE: Say you were being questioned about the dummy, would you be able to say, yes, it has been tested and there is no health issue?

Dr CORMICK: I would have to refer it to the relevant regulator, if someone out of the blue threw a product at me and said has this product been tested? It is not my area of expertise to know what products are tested. I am aware that the regulation in Australia is considered very strong globally. The Monash report has said that the regulation we have at the moment to what we know at the moment is very good and very rigorous, but we have to watch out in the future. So, with regulation of anything, whether we are looking at heavy metals, toxicity in water, toxicity of nanoparticles, do you trust the regulators? The regulators in Australia are doing a good job. Globally we know yes, it is a very high quality of regulation and they are doing the best they can with the knowledge that is available.

The Hon. CHRISTINE ROBERTSON: Yes, and that is the issue for us when we look at the final report.

Reverend the Hon. FRED NILE: But you would not know about any specific item?

Dr CORMICK: I personally would not know unless I had been recently talking to the regulators and found out where they were at.

Reverend the Hon. FRED NILE: Do you think that should be part of the fact sheets?

Dr CORMICK: We know with particular issues that are high in people's minds. One we are working on at the moment is food. Nanotechnology in food is very high in people's minds. That is an issue. They want to know what might be done to the food. They want to know what safety techniques are in place. For their minds we talk about that risk benefit analysis they have. Is this a benefit, putting nanotechnology in food? Are the regulators making sure it is safe? They are the things they want to see when making their evaluation, whether they approve of it or not.

The Hon. CHRISTINE ROBERTSON: But this would not relate to local product. This is about a thing list.

Dr CORMICK: It could relate to a product if we started having nanotechnology products in Australia in foods. They could then ask a specific question about a specific thing. A lot of the work at the moment is still at the research level.

The Hon. CHRISTINE ROBERTSON: Like a particular food in a little jar with a name?

Dr CORMICK: It could be, if such a thing was on the market.

CHAIR: What is the Department of Innovation, Industry, Science and Research doing to support the commercialisation of nanotechnology?

Mr PENNIFOLD: Certainly the information we provided when we looked across the IISR portfolio, there is something like \$170 million a year that is provided in the area of nanotechnology. Some of that is more at the research and development end, but the work, for example, that the CSIRO is doing, a lot of that through the niche manufacturing flagship is looking at the area of product and scientific development. There are general programs available through our program delivery arm called AusIndustry; in the venture capital space in some grants such as I mentioned earlier on. We have just announced some new Climate Ready grants which will cover off on certain applications of nanotechnology and biotechnology; and the research and development tax concession also provides support. We do not have nanotechnology commercialisation programs per se but certainly nanotechnology companies can access the programs we have in those areas. In one of our earlier answers we identified the sort of work we have been doing specifically in the nanotechnology sector, from capability studies to supporting participation by firms in international trade shows and the like. And that is what we are doing under the auspices of this nanotechnology strategy.

CHAIR: Is there anything either of you would like to mention before we wind up that you feel needs to be said?

Mr PENNIFOLD: No, I think we have had a very comprehensive discussion this afternoon.

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The Hon. CHRISTINE ROBERTSON: Do not forget to table your presentation.

Dr CORMICK: No, I have it on a CD.

(The witnesses withdrew)

(The Committee adjourned at 2.44 p.m.)