REPORT OF PROCEEDINGS BEFORE

GENERAL PURPOSE STANDING COMMITTEE No. 5

INQUIRY INTO THE M5 EAST VENTILATION STACK (2001)

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At Sydney on Tuesday 1 May 2001

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The Committee met at 9.00 a.m.

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PRESENT

The Hon. R. S. L. Jones (Chair)

The Hon. R. D. Dyer
The Hon. J. H. Jobling
The Hon. J. R. Johnson
The Hon. M. I. Jones
The Hon. J. F. Ryan

CHAIR: This is the first hearing of the second inquiry of this Committee into the M5 East ventilation stack. Before the hearing commences, the Committee will deal with two procedural matters. As of 5.00 p.m. yesterday the Committee had received 167 submissions. In order to better inform all those persons interested in the Committee's inquiry and to allow stakeholders, including government agencies and interest groups, and witnesses to view the submissions received, I require a motion from a member of the Committee that the submissions be made public.

The Hon. J. H. JOBLING: I move such a motion.

CHAIR: Secondly, the Committee is still awaiting submissions from a number of government agencies. The Committee understands that there are still members of the community who wish to make submissions. I therefore require a motion from a member of the Committee that the closing date for submissions be extended to Friday 4 May.

The Hon. J. H. JOBLING: I so move.

PAUL JOHN FORWARD, Chief Executive, Roads and Traffic Authority of New South Wales, Centennial Plaza, Surry Hills, sworn and examined:

JAY SUSANNE STRICKER, General Manager, Environment and Community Policy Branch, Roads and Traffic Authority, 260 Elizabeth Street, Surry Hills, and

JOHN RAYMOND ANDERSON, Engineer and Project Manager for the M5 East, 270 Bexley Road, Earlwood, affirmed and examined:

CHAIR: Did you each receive a summons issued under my hand in accordance with the provisions of the Parliamentary Evidence Act 1901?

Mr FORWARD: Yes, I did.

Ms STRICKER: Yes.

Mr ANDERSON: Yes.

CHAIR: Are you conversant with the terms of reference of this inquiry?

Mr FORWARD: Yes.

Ms STRICKER: Yes, I am.

Mr ANDERSON: I am.

CHAIR: If you consider at any stage during your evidence that in the public interest certain evidence or documents you may wish to present should be heard or seen only by the Committee, the Committee would be willing to accede to your request. Do you wish to make a brief opening statement or submission?

Mr FORWARD: I would, thank you. I would like to thank members of the Committee for the opportunity to speak to the Committee and I would like to draw the Committee's attention to the submission that the RTA has lodged to the Committee—not only the submission itself but also the attachments, which I think provide a lot of useful information. I would particularly like to draw attention to annexure D, a report from Connell Wagner, on the latest technologies available throughout the world on treatment of emissions from motorway tunnels. Also in annexure D is a report from Flagstaff, independent consultants commissioned by the RTA to outline the cost of providing electrostatic precipitators in road tunnels, particularly the M5 East.

I also draw your attention to the report of Bernard Bongiorno, QC, who was also commissioned, similarly to this Committee, to do an investigation on behalf of the Victorian Government into the need for treatment in the Domain and the other tunnel associated with the

Citylink project in Melbourne. That report provides an up-to-date and detailed assessment of the current state of the technology of electrostatic precipitators and their use in a limited number of road tunnels in Europe and Asia. I particularly draw the Committee's attention to the recommendations and conclusions in the Bongiorno report because I think they are particularly relevant to this inquiry.

This project has a long history that goes back over 50 years. Most people who live in that area will be only too well aware of the history of the project so I will not go through the details here. Nevertheless, I would like to point out that during the mid-1990s the Government of the day made a decision to put the project into a four-kilometre tunnel and therefore to bypass the Wolli Creek Valley. This added an additional $200 million to $300 million to the project. I think that demonstrates the importance of the environmental outcomes that not only the Government of the day but also the RTA was wishing to try to achieve with regards to this project.

I think it is important that the Committee understands the role of the RTA. We have many obligations in developing roads and managing roads. We are the proponent and the operator of these roads. We are not the standard setter or the goal setter; we are the operator of the projects. The other agencies involved who will be in front of you in the next couple of days are in fact the standard setters. The RTA must meet the standards and we will meet the standards on this project. The conditions of approval set by the Department of Urban Affairs and Planning are very detailed. Over 150 conditions are set on the RTA. Those conditions are attached to our submission. They are some of the most stringent conditions ever set on a road project in Australia, let alone the world.

I draw your attention to those conditions and the need for the RTA to satisfy those conditions. There are a number of requirements if in fact the emissions do not reach the goals and I draw that to the attention of Committee members. They will be met. The ventilation system has been looked at extensively not only by the RTA but a number of experts. The purpose of the ventilation system is to dilute not concentrate the gases. This will be done through drawing fresh air in via the tunnel portals and specially built air intake. This will mean that the air in the tunnel is breathable for motorists and workers but also then diluted, when it is actually then spread out through the ventilation stack.

One of the conditions imposed on the RTA includes the development of strategies to manage and improve the air quality of the whole subregion. It is a far broader responsibility on the RTA. With projects like the M5 East it has generally been able to prove that significant and immediate improvements to the subregional air quality are delivered when the motorways are opened. This was certainly the case in Melbourne with the Citylink project and the Eastern Distributor in Sydney. It should be remembered that at the moment traffic has to pass through over 26 sets of traffic lights. This stop-start through local streets clearly causes an increase in the levels of particulates throughout that community. By reducing this stop-start motoring, there will be an immediate improvement in air quality throughout that subregion. The goals that the RTA meet are, in fact, set by Federal and State government experts on the best information available.

As I said before, the RTA treats these conditions very seriously. We are monitoring the actions of other road authorities with regard to emissions and trying to keep up to date with the best available technology. In June 2000 the RTA invited a number of world experts and the community to attend a couple of ventilation workshops at which we were trying to understand the latest technology in this regard. In terms of investigation, the alternative tunnel ventilation systems proposed and the new technologies, the RTA has established working relationships with many of these road authorities. A senior executive of the RTA is a member of the international road tunnel group of experts and is able to keep up to date with the latest developments in technology. The RTA has also extensively investigated systems and technologies used overseas and has commissioned a number of reports to do this. We have also sent experts from the RTA, including the previous chief executive, to observe and interview key developers of this technology.

Remember, some 95 per cent of particulate matter in the local environment does not come from the tunnel. Hence, the focus from the RTA on the broader regional plan that we are looking at. At present there is no proven—and I stress no proven—system in operation in any tunnel in the world that would deliver a significant reduction in waste gases. At the international tunnel workshop and during our communications with many road authorities we have asked for this evidence as to the impact on admission treatment systems on the outside air. Bongiorno in his study in Victoria,

likewise, attempted to collect this information. He was not able to collect any scientifically valid information that proved the effectiveness of these technologies. We are still waiting on responses from the Norwegian Government that will outline the impact and the ability of these technologies to improve ventilation systems and to improve air quality.

I draw your attention to the Bongiorno report that in detail goes through each of the tunnels in Norway. In many cases the systems have been supplied. Electrostatic precipitators have been installed in a number of tunnels, but in many of those tunnels the systems have been switched off or they are operating on a very limited basis. In some cases they are not even working any more because they are not required. So, we will continue to monitor events overseas. You are aware that one of the conditions of approval requires the RTA to make allowances for retrofitting of any formal technology that is required. I have observed the tunnel. I have observed the spaces that have been allowed in the ventilation system. There is space for retrofitting. That has now been accepted and I believe our world experts have also confirmed that point of view.

Can I just summarise quickly some of key points we would like to make here. The M5 East air quality goals have not been set by the RTA. They have been developed by experts to protect the most sensitive members of the local community. Sydney's air quality is very good by international standards. The M5 East stack will not make the air quality in the Turrella Valley any worse. In fact, air quality in that region has improved over the past decade or so.

An air quality management plan is being developed for the area. This will assist in improving local air quality. The RTA is now drawing on a great deal of experiences in building road tunnels. This includes the Sydney Harbour Tunnel, which has a stack in the pylon of the Sydney Harbour Bridge, the eastern distributor, which opened more than a year ago, Melbourne's City Link Tunnel and Perth's Northbridge Tunnel—all tunnels with emissions, all tunnels with ventilation stacks, and none of those tunnels has any form of treatment in it. They all meet the goals that have been set. Evidence from these projects is continuing to show that air quality goals set for the M5 East can and will be met.

CHAIR: The RTA has been negotiating in the past few weeks with a number of builders and manufacturers of electrostatic precipitators [ESPs] and you have had a number of quotes. Are you aware there are proposals to put in a number of ESPs in Europe and at least one in Vietnam? Are you aware that there are proposals to put ESPs in the Tiergarten tunnel in Berlin, the Petuelring tunnel in Munich, the Mittlerer ring tunnel in Munich, the Mont Blanc revamped tunnel, the A113 tunnel in Berlin, the Entlastung tunnel in Starnberg, and also, I believe, the A86 in Paris?

Mr FORWARD: I can only refer to the work that we have asked Evans and Peck to do for the RTA, which looked at tunnel ventilation in Europe and in Asia; the work that Connell Wagner has done for the RTA and the work that is contained in the Bongiorno report. If I can just quote from Bongiorno's report where he says:

> It is misleading to prefer the Norwegian and Korean experiences as examples of proven technology effectively reducing particulates in air expelled to the environment from road tunnels.

He goes on to say:

> It could not be said that electrostatic precipitators are generally in use in Norway either for the cleaning of air in tunnels or for environmental reasons, nor can it be said that they represent proven technology in such applications.

It may well be that a number of these road projects have been looked at for electrostatic precipitators but if I read correctly from Bernard Bongiorno QC's report, he is saying in many instances they have been implemented, they have been put in tunnels, but they are no longer required and have been switched off.

CHAIR: But Connell Wagner have referred to not one of the European tunnels and you have referred to very old information. I wonder why Connell Wagner referred only to the old Flagstaff report of Bongiorno and did not do any actual research itself at all. So, this is out of date already.

Mr FORWARD: Well, we have asked for a new report to be prepared this year which will undertake a more investigative study. I think it is fair to say that Mr Bongiorno did a very exhaustive

study, not only himself, but he employed experts to advise him. He also went on a tour of these sites, and remember that his report was tabled in the Victorian Parliament towards the end of last year. From our point of view this is one of the most up-to-date reports available. His terms of reference were very relevant to this Committee and touched on many of the issues this Committee is now looking at. We will continue, as part of this exercise, to ask our experts to advise us on the latest developments in technology and, as I said, we will be commissioning a new report towards the middle of this year.

The Hon. J. F. RYAN: Mr Forward, why is it that every time you people have a report literally dozens of tunnels are never referred to? We have community groups, who are hardly overseas experts with enormous amounts of money to travel overseas, who are able, by making relatively cursory inquiries through such things as the Internet and other things of that nature, to list dozens more tunnels that are not referred to in the Bongiorno report or the Connell Wagner report or the Flagstaff report. They just come up with dozens of additional examples. When will someone have an open inquiry that makes sure you capture all the data, not just the bits of it that are convenient for the arguments being pursued? In most instances, many of those reports have been commissioned by people with a particular axe to grind. That is, they do not want tunnels filtered. It is very rare to find people who are prepared to go as wide as the community is and capture all the data on all the tunnels—the numerous tunnels in Japan and so on. They just do not rate a mention in your experts' reports.

Mr FORWARD: Mr Ryan, may I respond in a number of ways. First of all, I would be delighted to see a report that demonstrates on a scientific basis that these technologies make a difference to the external air. We have asked for those reports. We have written to the Norwegian Government and asked for those reports. We have physically sat next to the experts in the Norwegian Government and asked them to table those reports. My advice is that those reports do not exist. My advice is—

The Hon. J. F. RYAN: Well, what about—

Mr FORWARD: Can I go on, please.

The Hon. J. F. RYAN: Well, I—

The Hon. R. D. DYER: Point of order: The witness should be entitled to reply to a question that has been asked without interruption.

The Hon. J. F. RYAN: I just ask that he respond briefly. He is responding at length on information that is already in his submission.

The Hon. R. D. DYER: At this stage Mr Forward's response is shorter than the Hon. J. F. Ryan's question.

CHAIR: Please continue.

Mr FORWARD: If this Committee can find those reports, the RTA will be more than happy to analyse and consider them. We understand the Norwegian Government has not done an overall assessment of the effectiveness of these technologies. It is currently doing one on one of its tunnels. My understanding is that that report is not currently available. You also asked about independent inquiries. I do not think Mr Bongiorno had any axe to grind. He was a totally independent person who conducted a very detailed inquiry and was asked to look at the levels of technology throughout the world. He toured and looked at those technologies. We have sent experts overseas also looking at those inquiries and studies. We are reporting to the best of our ability. We have an open mind on this matter.

Can I also point out that many of the responses on the level of treatment come from the manufacturers of these electrostatic precipitators, who clearly have a market objective in mind—to try to market and sell their technologies throughout the world. I would not regard them as necessarily independent. I think a lot of comments that have been made have come from these manufacturers. Mr Bongiorno makes reference to that in his report, and I draw your attention to some of the comments on that.

The Hon. J. H. JOBLING: Mr Forward, you are relying on technology. Would you agree that what was new technology five years ago is now currently in practice and what was past practice is now out of date and obsolete? Would that be a fair statement?

Mr FORWARD: You are assuming there have been increased developments in this area of technology. From the evidence I have been able to see, I think the techniques have been much the same. The concepts and technologies, from my understanding, I do not think have actually developed a lot over the last five years. There is one particular significant development, which we are watching very closely, and that is the scale of air, the volumes of air the technologies are actually able to treat. Now, the M5 East would require a particular scale, which is yet to be seen in a number of these tunnels that we refer to. Traffic volumes in a lot of these European tunnels are a lot less than the M5. So, in fact whilst in theory many of these technologies work, full-scale operational trials is a different matter. It is yet to be seen whether in fact the volume of air that would be required in the M5 East can actually be treated by these technologies in terms of any proven scientific evidence that they can treat them.

The Hon. J. H. JOBLING: That is what I wanted to go back to specifically. I thank Mr Forward for raising the words "scientific evidence". With a background in science I put to you these questions: What is the scientific evidence? What is the basis of it? How can you draw a conclusion about new technology until it has been actually operational for two, three or five years? Following that, it would seem to me that that is basically, along with cost, what your entire argument rests on at this stage.

Mr FORWARD: We can observe only what is happening overseas where this technology actually has been installed and ask the road authorities for the evidence that they make a difference to the external air. At this point in time I repeat I have not seen any scientifically based independent study that actually demonstrates they make a difference to the external air. At the Roads and Traffic Authority's [RTA] international travel conference in June 2000 we asked one of the manufacturers to actually table any evidence that he has and he was not able to do so.

The Hon. R. D. DYER: Has the RTA seriously, and I emphasise that word, looked at alternative tunnel ventilation systems and technology? How many tunnels in other jurisdictions have electrostatic precipitators [ESPs] fitted to meet external air quality goals?

Mr FORWARD: The RTA has seriously looked at this. We think it is an important initiative for the RTA to have the most recent and latest information on it. We have sent people overseas to talk to various road authorities. As I said before, we have one of our senior executives on the PIARC International Tunnel Committee that has world experts on this committee keeping up to date with tunnel emission technologies. We are continuing also to employ consultants to provide us with advice on a yearly basis on what developments are happening around the world on this basis. So, it is not just the RTA doing it; we are actually employing people to advise us of the latest developments in technologies. You asked about how many tunnels have been installed with this technology. Once again, I can only quote from the most recent study from Bernard and Bongiorno that points out that over 99 per cent of the world's tunnels do not have any form of filtration and you can only identify one or two that in fact had been using electrostatic precipitators to treat the external air.

A number of these electrostatic precipitators have been put in to treat the internal air in tunnels for visibility reasons, that is, in a number of these countries they have metal-studded tyres to maintain traction during cold and snow conditions and when they are driving along roads dust particulates are released, which makes visibility in the tunnels difficult or can make it difficult. Consequently, some of these electrostatic precipitators have been fitted to treat the internal air, not the external air. Very few have been installed to treat the external air. And even then, as I said before, a number of these have actually being turned off. One in Norway only operates 4 hours a day and the cost effectiveness of that, as I understand it, is currently under investigation by the Norwegian Government.

The Hon. R. D. DYER: What does the RTA estimate to be the cost of fitting electrostatic precipitators to the M5 East ventilation system, firstly, prior to the project's completion and, if required, after completion of the project?

Mr FORWARD: The cost of installing them was in fact the subject of a study by Flagstaff Consulting Engineers. Flagstaff are a group of engineers in Melbourne. The RTA does not generally work with Flagstaff. To my knowledge we have not employed them before. We did that because we wanted somebody who was totally independent and we did not want to be accused of employing a consultant that we will be working with on future occasions. We believe they provided a very honest and accurate estimate, and once again it is only an estimate, of installing these electrostatic precipitators. The cost of installing the equipment, that is, the capital cost, was $36 million. To do it before the project was completed would possibly add another $30 million. So, we could be up to as high as almost $70 million. It is $36 million and $30 million. So, we could add extra up to almost $70 million if the project were installed with electrostatic precipitators before it was opened because of the volume of work that has currently been undertaken by the consultants. It would be more cost-effective in fact to install them after the project was completed.

The Hon. R. D. DYER: No doubt you are aware that the Victorian Government looked at the issue of installing an ESP in the Burnley tunnel. Are you aware of the outcome of the Victorian Government's investigations?

Mr FORWARD: Yes. The Victorian Government, after its extensive investigations of this matter, believes that in fact the installation of electrostatic precipitators was not required; that the emissions from the Burnley and Domain tunnel were clearly meeting standards that had been set. They were way below standards. In Victoria those standards are regularly monitored and information is made available regularly to people to illustrate that in fact the standards are being clearly met and, therefore, to install a technology, which, in the words of the Victorian report, was still not proven technology, was in fact regarded at that point in time as not necessary.

The Hon. M. I. JONES: With all the examples that have been studied and reported to you, and all of the technology which you have reports upon, are any based upon tunnels where exhaust stacks have actually been built in a valley surrounded by homes on a higher level to those stacks? This is a unique case. You have inferred there is no appropriate technology available that can completely remove from the air the dirt that will come out of the stack. Therefore, do we not have to admit that the stack has simply been built in the wrong place?

Mr FORWARD: Wherever a stack is built it is always an issue clearly for the community irrespective of what happens. The Eastern Distributor stack that has been built a lot closer to residences is way below the standards. It meets the standards and is way within those standards and has clearly not caused any real problems in terms of the impact on the external air around them. I am confident that in this case it has been placed, as you say, in a valley, albeit an industrial area.

The Hon. M. I. JONES: It is surrounded by residential houses.

The Hon. J. F. RYAN: No it is not. It is a residential area with a park next to it. There are a couple of factories, but above it is residential.

Mr FORWARD: I have been there several times and I know the area very well.

The Hon. J. F. RYAN: So have I. There are two or three factories and the rest are residences and a park. That is not called industrial.

Mr FORWARD: No matter where we will put a ventilation stack there will always be an argument about where is the right place to put it.

The Hon. M. I. JONES: So you are happy that the position of the stack in that valley is the best option?

Mr FORWARD: Clearly, the stack is located on a number of criteria. I think weighing up all that criteria and weighing up the standards that have to be met and remembering, once again, the RTA does not set the standards, weighing up all those standards will be met and if not, then there are certain things that have to be done by the RTA. I am absolutely satisfied that, weighing up that criteria, that is an appropriate place to put the ventilation stack.

CHAIR: But was the decision about placing the stack a political decision anyway? The original three-stack proposal was obviously politically unpalatable and you claimed responsibility for making the decision to have one stack at an extra cost of $30 million. Who authorised it to $30 million? Did the Minister or you as head of the RTA?

Mr FORWARD: The decision was made by the RTA.

CHAIR: By you?

Mr FORWARD: An advice provided to the Minister and the Minister accepted that advice.

CHAIR: And he accepted the extra $30 million without blinking an eye?

Mr FORWARD: Can I say that the previous Government accepted that we would achieve a better outcome by putting the road in a tunnel. Now, that was an extra $200 million to $300 million that was spent on that particular project to provide a better environmental outcome—in actual fact, to preserve the Wolli Creek valley. Now they are significant decisions that are made. It is a zero sum game. There are always limited funds available and any money that is taken into another project and added to it comes off other projects. The RTA budget is fixed and, therefore, the Minister very seriously considers any additional costs that might be imposed on any project. This project has already had a considerable amount of money spent on it over and above what would have been spent if it would have been spent on the original alignment.

CHAIR: So the quotes you have now for putting in the filtration after the construction of the stack and, presumably, after the opening of the road, are much less than the $70 million-odd you claim before the opening, which includes delay costs? The delay costs are a considerable part of that costing of $70 million?

Mr FORWARD: Delay costs are a part of that, yes.

CHAIR: How much?

Mr FORWARD: I am not quite sure of the exact detail of that.

CHAIR: You do not know?

Mr FORWARD: I have not got the exact detail. Certainly John Anderson, who is the project manager, would have the detail.

Mr ANDERSON: Assuming that the filtration system is installed after the current work on site is completed, then the capital cost of that is $36 million.

CHAIR: I understand you have quotes varying from $13 million to $27 million on various kinds of filtration. The $13 million option is for filtration at the portals. I understand there are no extra building costs attached to that, it is just a net $13 million. You are aware of that, presumably?

Mr ANDERSON: There have been a number of estimates that have been quoted by others. I cannot quote specifically on that $13 million. The estimate we have prepared is based on preparing a filtration system at Turrella between the vertical shaft coming up from the ventilation tunnel and the fan house. That estimate is $36 million. If one were to start modifying the existing tunnel with construction which is well advanced, then depending on when that was done, there would be significant additional costs. I cannot comment on that today unless I know specific details.

CHAIR: What about the actual ESP at the portals? That has been considered by the RTA after all and I am sure you would be aware of those?

Mr ANDERSON: The position with the design is that in terms of RTA consideration of the issue, the best place for the filtration system, given the constraints that the tunnel ventilation system operates under, is to place it at Turrella. There are a lot of other issues that need to be considered in

any design of a ventilation system. There are some significant in-tunnel issues that need to be considered and it is not that easy just to install electrostatic precipitators at portals or anywhere else without taking those into consideration from a design point of view. So, the RTA's position is that the best location for that system is at Turrella and the cost of that would be $36 million.

CHAIR: Thirty million dollars?

Mr ANDERSON: Thirty-six million.

CHAIR: Have you received quotations varying from $13 million to $27 million for the portal? Where does the $36 million come from?

Mr ANDERSON: The $36 million is the estimate that was prepared by Flagstaff based on the site that I have mentioned. I am unaware from where the figures you are quoting have come.

CHAIR: How old is the quote?

Mr ANDERSON: There have been various figures quoted by the community that have ranged from eight or nine.

CHAIR: These are from the RTA. Presumably you are aware of what the RTA is doing? Presumably the left hand does know what right hand is doing?

Mr FORWARD: You need to look at the total cost of installation and some of the figures that I have seen tossed around and quoted—

CHAIR: From your own people?

Mr FORWARD: No. Can I complete my answer? Some of the figures that I have seen that have been mentioned are only the equipment costs. The $8 million that was tossed around by some overseas experts was, in fact, clearly only the equipment costs, not necessarily the costs of the full filtration. In fact, we have to be very careful with these figures. Often they are quoted totally out of context and not even with half the story. The electrical work, mechanical work and civil works to accommodate the equipment are often conveniently left out of the picture. You have to quote the full story. I do not think it is fair to bring to us a figure out of context which we are clearly not quite clear of the full amount that you are actually quoting. If you would like to provide those figures to us we can give you a detailed report on it.

CHAIR: They are in your own documents.

Mr FORWARD: If you can point them out to us we can give you a detailed report on them. I am concerned that it may well be that they are being quoted out of context and not looking at the full installation costs and operation costs of the equipment.

CHAIR: Can we get a breakdown of the $36 million estimate?

Mr ANDERSON: The estimate is in the Flagstaff report.

CHAIR: Surely that is out of date? Do you have quotes more recent than that?

Mr ANDERSON: A component of the cost in the Flagstaff is the ESPs. The cost of ESP actually came from CTA, the supplier of ESPs in Norway through their Australian agent Alston. There are also other components in that cost that cover the additional fans required to make up the pressure drops that are influenced by the ESPs. So there are other costs such as additional fans, civil costs in terms of providing housing, issues of noise and vibration which have to be managed and they all cost money. The breakup of that cost is in the Flagstaff report.

CHAIR: Do you have quotes from other organisations? If so, are you conveniently ignoring them?

Mr ANDERSON: I just mentioned that the costs for the ESPs comes directly from CTA. We have also had other costs from other suppliers which generally confirm that the Flagstaff figures are of the right order. People are misled by this whole issue because there are a lot of other factors that need to be costed, and I have just mentioned a few of those. The major one is that you need to provide substantial additional fans to support the ESPs because ESPs introduce a pressure drop into the ventilation system and that needs to be supplemented by additional fans. There is not enough capacity within an existing ventilation system to be able to allow the operation of the ESPs. Therefore, those costs to which I have referred in terms of additional fans influence greatly the total estimate of costs. That is all documented quite clearly in the Flagstaff report.

CHAIR: Was Dr Dickel also contacted in 1999?

Mr ANDERSON: Most of the discussions that I have had with Dr Dickel has been in the past two or three months. There has been an exchange of correspondence between Dr Dickel and his people and myself discussing various issues in relation to the installation or possible installation of the CLAIR system and that has been very fruitful for both parties, I believe. There were a lot of issues in our tunnel that clearly Dr Dickel and his group did not understand because every tunnel is unique, and this tunnel is different to some of the tunnels that Dr Dickel has been used to working with. That has been quite constructive. To answer your question directly they also have a relationship with Howden in Australia who are suppliers of fans. Some of the prices that they provided as indicative costs I believe, for those particular components of the Flagstaff report do not surprise me because CTA provided those sorts of figures initially to Flagstaff anyway. Flagstaff did not develop these costs themselves. They approached suppliers of equipment in this industry overseas and based their estimate on those.

Mr FORWARD: This demonstrates that the RTA has continued to dialogue with overseas manufacturers. We have continued the dialogue and we will continue to investigate the best available technology. Mr Chairman, you say that the Flagstaff report is out of date but in fact the Flagstaff report was made available to the RTA towards the end of last year.

CHAIR: Unfortunately, with old information.

Mr FORWARD: Maybe it is five months old and we apologise for that but five months old is still relatively up to date information. We made the point that it is only an estimate. Yes, if we were required to install them—and it can be proven they will make a difference—we would have to get a firm quote before they could be installed. It demonstrates that the RTA has continued to pursue overseas technology in this regard. The suggestion that the RTA has put it aside, can I say, is clearly not correct.

CHAIR: You quote only Norway all the time and do not mention Germany or France.

Mr FORWARD: The evidence that I have is that there are no electrostatic precipators installed in any road tunnels in France. I do not know why we would go to France. However, if you would like us to visit France—

CHAIR: Or even Japan?

Mr FORWARD: We certainly have made contact with the local representatives of some of the Japanese companies so we have, in fact, continued to contact the Japanese. In fact, I sat through a presentation with some of the Japanese manufacturers of this technology.

The Hon. J. F. RYAN: Mr Anderson, do you recognises this email that you sent on 16 March 2000 to Ms Jay Stricker:

> Jay
>
> Further to the notes I sent you on the Conditions for the meeting with EPA/DUAP, I forgot the obvious one—the issue of exceedences for PM10 under Condition 72.
>
> Basically the condition cannot be met, as you are aware, because of background levels exceeding 50 ug/m3 from time to time.

> While I would not have said this 12 months ago, the way that it has been managed on the M5 East, by recognising in the Reps report and the DUAP report, that the goal would be exceeded has worked reasonably well. I don't think quoting a number of exceedences in the conditions is the way to go as would be difficult to determine what the number should be.
>
> For community perception it would be better to make a statement in the condition that recognises that the goal will be exceeded from time to time but that the M5 East should not be the "cause" of the exceedence.
>
> Regards John

Mr ANDERSON: I would understand the view expressed there generally, yes.

CHAIR: Did you hear Mr Forward say that he was confident that the goals set by DUAP would be met but you appear to suggest that condition 72 will not be met?

Mr ANDERSON: Not at all.

CHAIR: There is no point mincing words, the e-mail says:

> … the issue of exceedences for PM10 under Condition 72. Basically the condition cannot be met …

I put it to you that that is almost an admission that the RTA is putting its stack in a place which is inappropriate because the air conditions are already in excess of the goals set by DUAP in the first place. Have you said in a private conversation within the RTA things that you have not been prepared to admit to this Committee through your chief executive officer?

Mr ANDERSON: That is not correct. I was saying that it has always been the fact that from time to time the goal will be exceeded, whether by a bushfire or some other event that occurs from time to time, maybe once or twice the year and sometimes not at all. I cannot comment on the actual development of the goals: that is not an issue for the RTA, as Mr Forward has said. That is an issue for the regulatory authorities that have set those goals. It is quite clear to me—and what I have said there—that the goals will be exceeded from time to time and the key point is if that can be demonstrated to be due to the M5 East or not. The goals will be exceeded. The NEPM goals on which that goal is based recognised that there would the exceedences from time to time. I cannot comment, as I said, on the actual background to those particular conditions: that is an issue for DUAP. What I said in that email is that it is important that the issue of whether the exceedences is due to the M5 East is the real issue and that is what we are currently doing in terms of developing a protocol for how an exceedencedue to the stack will be determined.

The Hon. J. F. RYAN: The community will not be too concerned about the fact that the goals are not going to be met and who caused the problem but what the community has been asking all along is whether this is an appropriate place to place a stack when the RTA itself admits that the goals will not be met, even under the current circumstances? Why would you add a point source which by your own admission adds another 5 per cent pollution load to the area? You insist that this is first, appropriate, and second, the best place to locate this stack when you already admit that it is not. The point is not who causes the problem but whether it is appropriate to locate a stack like this in a place that you admit will from time to time already have a pollution load which exceeds what the health department and the EPA regard as appropriate?

Mr FORWARD: Can I respond to that? In the past five years the goals have not been met on three occasions, on my understanding—twice last year and once in 1995-96—for all sorts of reasons. That is why the RTA is required to develop a subregional air quality management plan to try to look at the whole valley and see what can be done to improve the air quality in the whole valley. If you do not want a stack we go back to putting the road above ground through the Turrella valley.

The Hon. J. F. RYAN: That is not the only option?

Mr FORWARD: We can not have the road.

The Hon. J. F. RYAN: You had a three stack option which had the stack distributed quite differently than all the one point source. There are other options which has been eliminated for political reasons, not environmental reasons.

Mr FORWARD: As I said earlier, they are assessed on a variety of criteria and in fact there are very strong requirements placed on the RTA if it can be proven that the goals are exceeded because of the emissions from the ventilation stack. That is all incorporated into the conditions. It is all there and it is a matter that DUAP will be monitoring, along with the EPA, very closely. We will have monitoring stations within the ventilation stack to be able to determine what additional load the vent stack is imposing on the local air shed.

The Hon. J. F. RYAN: The community also wants to know how many exceedences are going to be considered too many? People accept that there might be exceedences from time to time generally in Sydney but what bothers these people is that there is a provision in your conditions of approval that say that if air quality goals are not meet then it will be necessary to install electrostatic precipitators. The problem of the community is that there is no benchmark which can be objectively measured which enables them to determine that if they accept the stack they know with some confidence that the precipitators are going to be fitted in and not based on some cost benefits analysis, or somebody's idea of what is a reasonable thing. They want an objective benchmark which, when it is exceeded, people will have the confidence of knowing that the Government will be obliged to insert the precipitators?

Mr FORWARD: We are the operator of the road and we are working with the EPA and DUAP to establish a protocol which the director-general of the Department of Urban Affairs and Planning is required to sign off on. It is her approval that has to agree to the protocol. The level of exceedence is clearly a matter for the EPA and DUAP.

The Hon. J. F. RYAN: Are you aware that some of the air quality monitoring, going back to the international conference you held which was ultimately summarised by Mr Dix rather than the provision of a public transcript—

Mr FORWARD: A public transcript is available on the web site.

The Hon. J. F. RYAN: I am not aware of it. Is it a transcript of everything that was said at the conference?

Mr FORWARD: Yes, verbatim.

The Hon. J. F. RYAN: Are you aware of very strong criticisms of the air quality modelling on which the development conditions are placed by the CSIRO?

Mr FORWARD: We are aware of the CSIRO report that was commissioned by DUAP; I assume that you are referring to that report.

The Hon. J. F. RYAN: I am referring to the report that has been given to this Committee as a submission.

Mr FORWARD: Fundamentally, I believe that report says that, from its point of view, the goals will be met.

The Hon. J. F. RYAN: The property value guarantee is another area that I would like to ask about.

The Hon. R. D. DYER: Mr Forward, what in your view is the RTA's role in meeting environmental goals for the M5 East project?

Mr FORWARD: The goals are set by the Department of Urban Affairs and Planning in consultation with EPA and the Department of Health. We are required to meet those goals. Other conditions require us to monitor air quality in the Turrella area and make that information publicly available so that it is obvious whether the goals are being met. Procedures can be put in place if we do not meet those goals. So there are a variety of issues that DUAP has placed with the RTA as part of the conditions.

The Hon. R. D. DYER: Do you believe the M5 East in operation will meet the air quality goals set by the regulatory authority?

Mr FORWARD: From the advice that I have been given and from the modelling that I have looked at, I can only say yes. If you look at the modelling that was done on the Eastern Distributor and the Harbour Tunnel and the similar modelling that was done on the Domain tunnel in Melbourne and the Burnley tunnel, you will see that they clearly all meet their goals. The modelling is done on a very conservative basis—in other words, looking at a worst-case scenario—and in all of those cases the air quality is much better than in the modelling. Yes, they have all met their standards and I am quite confident that we will meet those standards in the M5 East tunnel. There will be exceedences on the odd occasion, but not necessarily because of the M5 East vent stack. If there are bushfires in that area, as occurred last year during the time of the Olympics, the air shed for Sydney will clearly exceed the standards.

The Hon. R. D. DYER: Are the goals that have been set strict enough? How do they compare with the air quality goals in other jurisdictions?

Mr FORWARD: My understanding is that they are very strict—some of the strictest in the world. They are based on World Health Organisation standards and not only have been set by the EPA but are part of an Australian standard. A national environmental protection measure has been set for the level of particulates. So it is not just a matter of levels being set by one New South Wales authority; they have been set in consultation with all the various environmental authorities throughout Australia. They are very strict standards.

The Hon. P. J. BREEN: By your own admission, the conditions that have been set by DUAP, the EPA and the Department of Health are very strict. Is it not the case that if there are exceedences—even on one occasion—under the terms of the DUAP approval, electrostatic precipitators must be installed retrospectively?

Mr FORWARD: That is a matter for DUAP.

The Hon. P. J. BREEN: Is that not a condition as things stand at the moment?

Mr FORWARD: I think it is a matter that you should ask EPA and DUAP about. They are the regulatory authority and they will tell us whether they think electrostatic precipitators should be set.

The Hon. J. F. RYAN: They say they would ask you whether the cost is prohibitive; it is not just DUAP, is it?

Mr FORWARD: It is not just a matter of cost either; it is a matter of whether these things will make a difference.

The Hon. P. J. BREEN: If your protocols are followed and if there are exceedences, what proposal or plan do you have to install electrostatic precipitators?

Mr FORWARD: There is provision in the civil works for the project to install them. We have made contact with consultants who are able to design where the precipitators should go and how they would fit in. That could be done relatively quickly if they were required.

The Hon. P. J. BREEN: I want to ask about your comments in connection with the Bongiorno report. You said that Bongiorno says that 99 per cent of the world's tunnels have not been fitted with electrostatic precipitators. You then went on to say that, in those tunnels that have been fitted, the precipitators have been installed to treat internal not external air mainly because of the effect of studded tyres on the road. May I assume from your comments that you believe electrostatic precipitators do work in the sense that they filter air internally in tunnels?

Mr FORWARD: I think it is a matter of the standard they need to meet. We are talking about issues of visibility, which is some of the larger part particulates versus some of the smaller

particulates. It is a matter of the standard they must meet. I think the standard in the tunnel for visibility reasons is quite different from the standard outside the tunnel.

The Hon. P. J. BREEN: Is there not also the question of whether the air is breathable? That is the issue too, is it not?

Mr FORWARD: I understand that they meet the standard in the tunnel for the air to be breathed. That is a requirement. Yes, they are there and they have been able to treat internal air.

The Hon. P. J. BREEN: So they do work so far as internal air is concerned?

Mr FORWARD: Once again, it is a mixed result. In some tunnels they have been turned off.

The Hon. P. J. BREEN: Clearly, if you cannot see and they then switch it on and you can see, it works.

Mr FORWARD: I think it is a matter of degree. Even though they were installed initially in order to improve the visibility and the internal air quality, they have been switched off in many tunnels. In Norway the main cause of the problems with visibility in tunnels is metal spiked tyres. I understand that those tyres have now been banned from Norwegian roads. In other words, they have tried to get at the problem at source.

The Hon. P. J. BREEN: Is that the reason why they have switched off the electrostatic precipitators?

Mr FORWARD: They are trying to get at the problem at source. The question is: Where do you best attack the problem? They are saying that you attack it at source. In Australia, we have improved petrol standards and improved emission standards from motor vehicles, which are once again attacking the problem at source. Air quality has improved since we have had unleaded petrol and reduced the sulphur content of petrol. We are continuing to improve air quality. It is far better to attack these problems at source; it is more cost effective and a more efficient way of treating the problem.

The Hon. P. J. BREEN: Can you tell the Committee what you are doing to attack at source the question of whether the air in the M5 tunnel will be breathable?

Mr FORWARD: I have no doubt whatsoever that the air in the M5 East tunnel will be breathable.

The Hon. P. J. BREEN: Why do you say that?

Mr FORWARD: We do not have any of the same problems as Norway.

The Hon. P. J. BREEN: But you have only one emission stack.

Mr FORWARD: You could not argue that the air in the Harbour Tunnel is not breathable.

The Hon. P. J. BREEN: It is not 4½ kilometres long.

Mr FORWARD: It is a relatively long tunnel. These things are designed to ensure that the air is clearly breathable, and all the studies that I have seen on this particular project demonstrate that the air in the tunnel will be breathable. That is clearly not an issue.

The Hon. P. J. BREEN: What about the Burnley tunnel in Victoria? Is the air in that tunnel breathable?

Mr FORWARD: I can only quote the Bongiorno report, which clearly says that it is. It meets all the standards.

The Hon. P. J. BREEN: I do not believe the Bongiorno report addresses this question, but I understand that the No. 1 problem with the Burnley tunnel is that the air is not breathable. I understand that the Burnley tunnel was switched off for some three or four days after it was opened in order to deal with the problem.

Mr FORWARD: The Burnley tunnel has had a number of problems but, as I understand it, they were not to do with air quality. There was a leak in the tunnel, and I suspect that is why it was turned off. That is a far more significant problem for the operators of that tunnel.

The Hon. J. F. RYAN: What happens if there is a traffic jam?

CHAIR: The Department of Urban Affairs and Planning submission to this Committee says that the department reiterates that, if the EPA goals are exceeded, electrostatic precipitators will be installed within six months.

The Hon. M. I. JONES: What do you expect the blow-out in cost will be in excess of the original tenders for the M5 East project?

Mr FORWARD: At the moment the project is on budget and on time.

The Hon. J. H. JOBLING: I refer you to the CSIRO investigation report at ET/IR304R, which deals with the air quality impact of emissions from the M5 East tunnel. That report—which was fairly damning about where the stack was placed—by the CSIRO concluded that there was a difference between the physical and the numerical model because the physical model did not consider wind speeds as low as the numerical model. The report concluded that it was not possible for the RTA to rely on the physical modelling to prove that the numerical modelling predictions were conservative estimates of real-world conditions with the M5 East stack operating. What do you have to say to the CSIRO? This reputable body suggests that you are relying on something that you are unable to rely upon.

Mr FORWARD: The Department of Urban Affairs and Planning commissioned that report. It weighed it up and agreed at the end of the day to approve the vent stack. As a result of its considerations, it agreed to increase the height of that vent stack from 25 metres to 35 metres. That is an issue for DUAP; it was its report. Once again, I am very confident that we will meet the standards. As Mr Jones has already pointed out, if the standards are not met—which I think is highly unlikely—certain procedures will have to be put in place.

The Hon. J. H. JOBLING: It will be somewhat late; we will find out that they do not work six or 12 months after the event. While it may be a CSIRO report, what about the RTA's attitude? Condition 73 of clause 8 of the approval contains an interesting recommendation requiring the RTA to investigate the option of portal emissions subject to meeting appropriate air quality goals. How will you do that?

Mr FORWARD: I will ask John Anderson, our project manager, to give you some details about that.

Mr ANDERSON: Basically, that has already been undertaken in part by the people who undertook the numerical modelling for the project. The work they have done to date indicates that in the short term there is not a lot of potential for emitting at the portals because obviously whatever is emitted at the portals needs to meet the goals. Because portals are not particularly good at dispersing pollutants, there is not a lot of opportunity to do that. There may be an opportunity in time as engine performances continue to improve. However, as of today, it is unlikely that there will be any potential for emitting at the portals.

The Hon. J. H. JOBLING: In view of your answer, I remind you that portal emissions would not be allowed under the present conditions of approval and that in fact it would require a modification process, which would necessitate a public assessment process. So, on the one hand, you are looking at the option of portal emissions but, on the other hand, that is completely against the present conditions of approval. What is going on?

Mr FORWARD: If I may answer that question. We were asked by DUAP to consider portal emissions but we have ruled them out at this point in time.

The Hon. J. H. JOBLING: You have definitely ruled them out. Are you giving an unequivocal undertaking to this Committee and to residents that under no circumstances will you propose portal emissions?

Mr FORWARD: At this point in time.

The Hon. J. H. JOBLING: That is the qualifier.

Mr FORWARD: It is not the RTA that would approve it. We say "at this point in time" because who knows what vehicle emissions will be like in 10 or 20 years.

The Hon. J. H. JOBLING: Exactly. Overseas trends suggest and you said in your opening comments that faster traffic that does not have to stop and start at traffic lights should reduce pollution. However, is it not a fact that world experience with faster roads is that there is more traffic that, within five years, exceeds the status quo? Therefore, will this particular tunnel not be principally a by-pass for heavy traffic with heavy particulate emissions? Which way are you having it?

Mr FORWARD: The volume of traffic in the tunnel is clearly regulated by the size of the tunnel and the road network around the tunnel. The model has been built on the assumption of maximum traffic through the tunnel. If you look at what is happening with the Australian standards, not only for petrol but for motor vehicles, clearly the fleet is becoming cleaner. It is not just my evidence; it is the evidence from Environment Australia and the assessment it has done on air quality in the various capital cities. The fleet is becoming cleaner, petrol is becoming cleaner and emissions are becoming less problematic.

CHAIR: But an increase of PM2.5 is a considerable increase in the very tiny PMs. The big ones may be reduced, but the small ones are actually increasing with the new fleet.

The Hon. J. H. JOBLING: It is not a valid argument.

The Hon. J. F. RYAN: The CSIRO actually argued that they could be worse. In its submission it concludes that further uncertainties are mostly towards higher emissions and therefore air pollution as a consequence.

The Hon. J. H. JOBLING: One thing concerns me. In all your submissions and your verbal submissions to us, basically, you are arguing that the RTA is only the operator; you are not the standard setter, that it is all somebody else's responsibility. You might have asked them, and you have not tested their results. You will rely on them. Indeed, what it comes back to in the CSIRO report, it is my understanding in discussions with the Department of Urban Affairs and Planning [DUAP] you argue that they were of a highly technical nature and you disputed a number of the conclusions and argued that they are of academic opinion, rather than necessity of established fact. Where does this ultimately leave the RTA? Are you arguing mea culpa? Are you prepared to guarantee that you have genuinely sought the answers from these other bodies or have you simply sent them in a file and said, "Does this look okay? Please sign off."?

Mr FORWARD: Can I ask you what your question is?

The Hon. J. H. JOBLING: My question is the responsibility—and you well know what the question is. I want to know what is the ultimate responsibility of the RTA and its undertaking to the citizens of New South Wales and the people where you are putting this stack.

Mr FORWARD: The RTA's responsibility is to meet the standards and whatever conditions are made.

The Hon. J. H. JOBLING: You do not set any standards.

Mr FORWARD: No, we do not. We must meet the standards. We are not the poached and the gamekeeper.

The Hon. J. H. JOBLING: I suggest that you are playing both.

Mr FORWARD: No, hardly at all. I totally disagree with that. I suggest you ask the question to the Department of Urban Affairs and Planning and to the EPA. We are the operator of the road. We must meet the standards that are set for us. We will meet the standards.

The Hon. J. H. JOBLING: You have no opinions of your own; you just take all of these things and do whatever you are told.

Mr FORWARD: No.

The Hon. J. H. JOBLING: That is what you said to me.

Mr FORWARD: No, I did not say that.

The Hon. J. H. JOBLING: Yes you did.

Mr FORWARD: We have opinions of our own and we will argue them with some of these agencies, but at the end of the day it is their decision. It is not my decision. It is not the RTA's decision. It is not the Minister's decision. The standards are set for us, not the roads Minister. The standards are set outside that portfolio. We must adhere to those standards. We will adhere to those standards, and if we do not there are certain procedures that have to be followed.

The Hon. J. F. RYAN: I wish to ask some questions relating to the property value guarantee. First, just as background, how much did the 1997 property value guarantee cost?

Mr FORWARD: On which project?

The Hon. J. F. RYAN: That is the M5 East, the property value guarantee given in 1997 to people who were affected by the tunnel passing under their property.

Mr FORWARD: I do not have those exact details with me today but I can provide them to the Committee.

The Hon. J. F. RYAN: It would be some millions, though, would it not?

Mr FORWARD: I am not sure. I would not want to hazard a guess. Of course, at this point in time that guarantee is still available, so I am not quite sure what the final figure will be.

The Hon. J. F. RYAN: How much has the RTA budgeted for the most recent property value guarantee?

Mr FORWARD: We have estimated that it could cost up to $10 million.

The Hon. J. F. RYAN: Some people might suggest that that would be a fair contribution to the cost of an electrostatic precipitator.

Mr FORWARD: It is perhaps 25 per cent.

The Hon. J. H. JOBLING: Is there any money in this year's budget for that or is it just a figure in the air?

Mr FORWARD: The requirement is that it comes into play when the motorway is open.

The Hon. J. H. JOBLING: So 2002?

Mr FORWARD: 2002.

The Hon. J. H. JOBLING: February 2002, so it must be in this year's budget?

Mr FORWARD: Part of the project budget for the M5 East. It is part of the project cost. Where else would it be? It is in part of that budget.

The Hon. J. F. RYAN: The new property value guarantee sets a benchmark distance of 400 metres from the stack. How was the distance of 400 metres selected?

Mr FORWARD: That was a Government policy decision.

The Hon. J. F. RYAN: Did the RTA provide some advice to the Government determining why 400 metres was an appropriate distance?

Mr FORWARD: There were a number of options pursued. At the end of the day the Government made a policy decision on that.

The Hon. J. F. RYAN: On what environmental grounds was the distance of 400 metres selected?

Mr FORWARD: The decision to apply a property value guarantee on this area was done on a basis of goodwill on the Government. It was not a requirement. Many of the residents had said that they were concerned that they might have some dilemmas if they wanted to sell their properties. In fact, as a matter of goodwill the Government then provided that guarantee. It was not based on scientific data; it was based on perceptions that they might have a problem. Can I say also that while the statement from the Minister talks in terms of a 400 metre radius, there are also considerations on hardship grounds outside that area.

The Hon. J. F. RYAN: But not far outside.

Mr FORWARD: That is not specified. The statement says that people outside the area, on hardship grounds, will be considered.

The Hon. J. F. RYAN: The CSIRO has apparently advised that the highest concentrations of NO^2 gases are expected to occur as impacts on the nearby terrain which is approximately 500 metres from the stack. Would it not have been more appropriate to choose a distance of 500 metres or 600 metres?

Mr FORWARD: The decision for the property value guarantee around the vent stack was made on a matter of perception of the impact of the presence of the stack, the visibility presence of the stack on property values.

The Hon. J. F. RYAN: What were the guidelines which had set it at 400 metres and not 500 metres or 600 metres? What made the difference? Obviously the Government is not going to commit itself to expenditure without working out whether it will cost more at 500 metres, 600 metres or even 200 metres, for that matter. Why was the distance of 400 metres selected?

Mr FORWARD: As I said, that was a Government policy decision.

The Hon. J. F. RYAN: Who provided the Government with the advice that 400 metres was an appropriate level?

Mr FORWARD: We provided advice on a variety of options that could be considered by the Government. At the end of the day the Government decided that 400 metres was adequate.

The Hon. J. F. RYAN: What made the difference between 400 metres, 500 metres or 600 metres?

Mr FORWARD: That was a Government policy decision on that matter.

CHAIR: What options did you provide?

Mr FORWARD: We had a discussion with the Minister on that basis, and at the end of the day it was his decision and a Government decision, and that was it.

CHAIR: What options did you provide? You said you put a number of options.

Mr FORWARD: What options did we provide? Clearly the options were no property value guarantee and a number of radii outside the distance of the stack.

The Hon. J. F. RYAN: What made the difference between each radius?

CHAIR: Money?

Mr FORWARD: That is a matter that the Minister made. I did not make that decision; it was a Government policy decision.

The Hon. J. F. RYAN: But you would have provided the Minister with some basis on which to make that decision. I presume the Minister did not wake up and think 400 is a nice round number. He would have been provided with advice which said that 400 is a better choice than 500, 600 or 300, based on some criteria. Was it air quality goals, was it real estate value, or was it the budget?

Mr FORWARD: It was certainly not air quality goals. As I said, it was based on the visibility of the stack from those properties.

The Hon. J. F. RYAN: How was it determined what the visibility of the stack was from 400 metres or 500 metres?

Mr FORWARD: It was fundamentally on the ridge line. From those properties the vent stack was visible; from other properties it was not visible.

The Hon. J. F. RYAN: So was that to be the determining factor in terms of hardship as to whether you could see the stack or not?

Mr FORWARD: No.

The Hon. J. F. RYAN: Why are there criteria about hardship that might relate to whether or not there were people with asthmatic conditions in the household? Why is that an issue if it is all about visibility and perception?

Mr FORWARD: This is a gesture of goodwill from the Government for people who are having difficulty selling their property and it can be attributed to the presence of the stack to consider their cases.

The Hon. J. F. RYAN: Why does the Government not knock itself right out and make a gesture of goodwill and actually filter the stack?

Mr FORWARD: We have already had this extensive debate. There have been extensive inquiries in other States that have questioned whether in fact the stack works. If you want to spend $40 million of taxpayers' money on a placebo, then it is a very expensive placebo.

The Hon. J. F. RYAN: Why spend $10 million of taxpayers' money on something which is related to a real estate perception when the issue that the community is complaining about is not the value of their homes by and large but the value of their health. It might be said that you are addressing the wrong issue.

Mr FORWARD: That was the Government policy decision, not one that the RTA made.

The Hon. J. F. RYAN: Are you suggesting that the RTA would like to be independent of that decision?

Mr FORWARD: No, of course not.

The Hon. J. F. RYAN: If it could be demonstrated that there might be environmental or scientific reasons as to why 500 metres or 600 metres might be a better choice, is that not something which the Government might consider in goodwill or that the RTA might advise the Government that it should be a goodwill gesture that it makes?

Mr FORWARD: My understanding is that the decision was made on matters of perception and visibility of the stack, not on health grounds.

The Hon. J. F. RYAN: Are you aware of the statement made by the Minister, in his press release, that as a family man he would be concerned about living in that area himself?

Mr FORWARD: I am not aware of the context in which that statement was made.

The Hon. J. F. RYAN: You are not aware that he made that statement?

Mr FORWARD: I am not aware of the context in which that statement was made.

CHAIR: Why is this guarantee different from the other guarantee?

Mr FORWARD: Once again, that is a Government policy matter. There are a number of property value guarantees on different motorways going back to the days of the Liberal Greiner Government on the M2, and the conditions of that are also quite different from some of the other property value guarantees.

CHAIR: The people who live within this area will have their property stigmatised by the stack and they will be penalised up to $20,000 or $30,000 as a result of that stigmatisation. So the actual guarantee is not worth as much as it looks like. When properties are sold below the current value other people's properties will be devalued as well. It seems that you should go the whole hog and pay the whole cost, not just part of the cost.

Mr FORWARD: The RTA will in fact pay what was the market value before the stack was there. If people are unhappy with the price the RTA puts on the property, then they are free to get an independent valuation made on that property. Where other stacks have been placed—the harbour tunnel and the Eastern Distributor—there has been no noticeable impact on property. In fact, property values around the Eastern Distributor and around the harbour tunnel stack have considerably increased over time.

CHAIR: Not all of them.

The Hon. J. F. RYAN: On the same day on which the Minister made this announcement, there was an announcement by the CMFEU union that it would remove a black ban which had been placed on works on the stack site. Is there any relationship between those to events?

Mr FORWARD: I know there were discussions between members of the CMFEU and the Minister. The CMFEU was certainly representing the community at that particular point and it did ask the Minister for a number of considerations, one of which was a property value guarantee.

The Hon. J. F. RYAN: Is it a fair consideration that the property value guarantee was in fact a political fix?

Mr FORWARD: That is not a question I can answer.

The Hon. P. J. BREEN: Can you say whether the Government has taken any advice about its culpability in terms of legal claims under either environmental laws or public nuisance laws?

Mr FORWARD: I think that is a matter of privilege.

The Hon. P. J. BREEN: Do you think it is a matter of privilege when the taxpayers ultimately will be paying any compensation?

Mr FORWARD: I am happy to take that question on notice.

The Hon. J. F. RYAN: You might recall that one of the issues considered by this Committee in its first report was the offer of a property value guarantee. Advice was given to the Government members of the Committee, I understand from the RTA, that it was not appropriate to offer a property value guarantee. Some fairly extensive reasons were given as to why it was not appropriate to do that and they were influential in causing this Committee not to make that recommendation. Why is it now appropriate for the Government to offer any property value guarantee but it was apparently a disastrous position for this Committee to recommend exactly the same thing in its first report?

Mr FORWARD: As I have said before, that was a government policy decision made by the Government, not by the RTA.

The Hon. J. F. RYAN: Surely, if it was going to be a bad decision for this committee to make to offer a property guarantee, surely it stands to reason that it is not a great decision on the part of the Government to do the same thing?

Mr FORWARD: I am not commenting on government policy matters.

CHAIR: A question on subregional air quality. Condition 80 required that the subregional air quality plan included in the determination of treatment options, the current ventilation stack modifications to the current stake that would that allow heightening of the plume during worst-case conditions. Why were these removed from the brief to Sinclair Knight Mercer the day before it was activated, and who made that decision?

Ms STRICKER: It was considered by the steering committee that the investigation into treatment options was being undertaken as part of the annual review process, and therefore did not need to form part of the brief for that particular plan.

CHAIR: When commenting on the removal of nitrogen dioxide from the tunnel exhaust it is claimed that there is little benefit to be gained because of the conversion of nitrogen oxide to nitrogen dioxide in the atmosphere. How rapidly does that occur?

Ms STRICKER: I am not an air quality expert. I can only say that my advice is that the rapidity of that conversion depends on a number of factors, and I would ask that you seek that information from the EPA.

The Hon. J. F. RYAN: With regard to the international conference or seminar of international experts, did the RTA make any attempt to find people who would be sympathetic to its position to attend the international convention? By sympathetic to its position, that is sympathetic to a position of not sealing the tunnel? Was any attempt made to ensure that there would be people who would be experts who would be sympathetic to the position?

Mr FORWARD: We sought to have the world experts at that conference, and we also agreed that the community were able to, at RTA expense, nominate a number of experts of their own choosing to attend the conference, and that happened.

The Hon. J. F. RYAN: Is Mr Didier a consultant to the RTA who assisted in the preparation of this conference?

Mr FORWARD: I am not aware of a Mr Didier.

The Hon. J. F. RYAN: I am sorry, Dr Didier Lacroix. Is Mr Garry Humphrey a person who works for the RTA?

Mr FORWARD: Yes.

The Hon. J. F. RYAN: I have a copy of a comment from Mr Humphrey to Mr Didier, which says,

> On a separate matter, we are looking for an international ventilation specialist with experience in air cleaning equipment to come to Australia on short notice (next week if possible) to support our position on the adequacy and integrity of ventilation through a stack without air cleaning. The person would need to be able to communicate well in English and present material on current European practice to key stakeholders. Could you be available and comfortable to do this or could you nominate someone. RTA would pay all costs. It would be expected that it would be unreasonable to ask someone to come this far without staying at least a week.
>
> Regards
>
> Garry Humphrey

Is it possible we could take that as a message that they were trying to find someone to come to the conference to put the RTA position?

Mr FORWARD: I think we had something like eight international experts there and, to my understanding, at least three or four were nominated by the community. It is fair to say that we were after a variety of views, and a variety of views were put forward at that workshop.

The Hon. J. F. RYAN: How many other people were asked whether they were going to be able to represent the RTA view before they attended? Were all of them or some of them?

Mr FORWARD: The community was asked to nominate a number of people who also attended that workshop and clearly no doubt the community was after people who were able to represent its view. We were after a fair and honest debate. We were after a broad cross-section of views being presented, of world experts, and I believe that is what took place at that conference.

The Hon. J. H. JOBLING: A moment ago you indicated to the Committee that Mr Humphrey is known to your department or works for the RTA? Is that correct?

Mr FORWARD: That is correct.

The Hon. J. H. JOBLING: If the document that Mr Ryan has just read from was to be taken at face value, there is a deliberate attempt in that document to produce a witness to support the evidence that would come before a committee. What action are you now going to take to investigate this and come back to the Committee with an explanation of how such a document originated, and to explain to the Committee and, indeed, the Parliament if need be why the RTA set out to bring witnesses who were in direct bias rather than bringing a cross-section, in fairness? It has every mark of needing to go to ICAC.

Mr FORWARD: Can I say that in fact we invited a large number of people to that workshop of which, I have already said, three or four were nominated by the community. There was a cross-section—

The Hon. J. H. JOBLING: Bear in mind, I will interrupt you here because in view of that document, which quite clearly sees that the RTA set out to support a committee of the Parliament, that document should be referred to ICAC and Mr Forward should be obliged to appear before ICAC to explain himself and his department.

The Hon. R D DYER: Point of order: The Hon. J. H. Jobling is making an assertion in his question, namely, that there is an attempt to support the witness. That is his view. It is not my view, and it may well not be the view of the witness.

The Hon. J. H. JOBLING: And therefore there is no point of order.

The Hon. R D DYER: The Chair is here to determine whether there is a point of order. I am simply putting to the Committee that the member is putting to the witness his own view, and the witness is entitled to disagree from that view.

CHAIR: The witness can certainly disagree, if he wishes to.

The Hon. J. F. RYAN: Do you not think, to ask the question another way, that the emergence of a message, such as this one, casts some doubt on how objective a procedure the international forum was, given that the RTA, apparently, was scouting the world trying to find scientific experts who would put their view, and finally the conclusions of the committee were ultimately summarised by a person called Mr Arnold Dix, who is a lawyer, who put an RTA-like view in Victoria, and is well known for doing that sort of thing. The community is somewhat reasonable in asking questions about how objective the process of the international forum was, given the emergence of data of that nature. It was not exactly the coming together, an open invitation to open scientific minds to reach a conclusion, was it?

Mr FORWARD: Can I say that also at that workshop was Mr Arndell, who is the manufacturer of this Norwegian technology. Clearly, he also presented a particular view, trying to promote his own technology. We welcomed his presence there.

The Hon. J. F. RYAN: But my concern is that the RTA who is telling us that this was their show, this was essentially funded by the RTA, you are telling us that you went out to find international experts to support your view. Of course I expect the community to bring people who are going to support their view, but it was not their particular show. This was your event, funded by you, expected to have some sort of goodwill that it would be objective, yet at the same time that you are doing that it would appear that you have at least a conflict of interest: you are scanning the world trying to find someone who will put what is described in this e-mail as your view.

Mr FORWARD: There were eight people at that conference who were experts in this area, and many others who were in invited from around Australia.

The Hon. J. F. RYAN: How would we know which view was to be considered the majority view, given that the forum ultimately did not reach any conclusions? What happened was that someone wrote the conclusion for it, which was not circulated to members and asked for them to agree to. Given that the forum did not reach any conclusion, how are we to know that one view is to be preferred over another?

Mr FORWARD: It was an open debate. It was on a number of days. There were many people there putting a variety of positions.

The Hon. J. F. RYAN: I put it to you that it was not even open debate.

Mr FORWARD: I am sorry, it was.

The Hon. J. F. RYAN: Because there was an attempt made, as I understand it—

Mr FORWARD: I do not agree with that.

The Hon. J. F. RYAN: The media were not permitted. There was an offer, I believe, to videotape the conference, and I think the cost was somewhat modest. It was offered by another government department, and it was specifically refused because these comments were not wanted on the record in the manner in which they were made.

Mr FORWARD: That is not correct.

The Hon. J. F. RYAN: Who—

Mr FORWARD: Can I answer the question? You have made a very important assertion here, which is in error. The whole conference was recorded and a transcript was taken of the whole conference.

The Hon. J. F. RYAN: In what way was the conference recorded, in what form?

Mr FORWARD: Recording equipment was used.

The Hon. J. F. RYAN: Tape?

Mr FORWARD: Yes.

The Hon. J. F. RYAN: An audiotape?

Mr FORWARD: Yes.

The Hon. J. F. RYAN: Is it not a fact that DUAP offered to videotape the entire conference at a cost of about $2,000 and that that offer was specifically refused?

Mr FORWARD: I am not aware of the cost of the DUAP. But one would have to question why you want it videotaped when it is already being recorded and a transcript was made available. We are not trying to hide from anything here.

The Hon. J. F. RYAN: As a member of Parliament I know that transcript can do different things from an actual verbatim videotape recording. I think one needs only ask the Hon. Max Willis, the former President of the Legislative Council, how different video perception can be to transcript.

Mr FORWARD: First of all, can I correct a comment that Mr Jobling made? He said it was a committee of the Parliament. It was certainly not a committee of the Parliament; it was the conference that the RTA put together to try to stimulate some debate in this area. Can I say from that point of view it was quite successful in stimulating some debate. It was one that was attended by Mr Bernard Bongiorno, who also used the information from that inquiry to stimulate further investigation on behalf of himself.

The Hon. J. H. JOBLING: For the record, my reference was made to information coming before this Committee, and I can assure you that this is a committee of the Parliament.

Mr FORWARD: I accept that.

(The witnesses withdrew)

(Short adjournment)

SUE MARY HOLLIDAY, Director-General, Department of Urban Affairs and Planning, 1 Farrer Place, Sydney,

SAM HADDAD, Executive Director, Department of Urban Affairs and Planning, 1 Farrer Place, Sydney, and

MARK DAVID HATHER, Team Leader and Technical Adviser, Transport and Telecommunications, Department of Urban Affairs and Planning, 1 Farrer Place, Sydney, sworn and examined:

CHAIR: Did you receive a summons issued under my hand in accordance with the provisions of the Parliamentary Evidence Act 1901?

Ms HOLLIDAY: Yes.

Mr HADDAD: Yes, I did.

Mr HATHER: Yes, I did.

CHAIR: Are you conversant with the terms of reference of this inquiry?

Ms HOLLIDAY: Yes, I am.

Mr HADDAD: Yes, I am.

Mr HATHER: Yes.

CHAIR: If you should consider at any stage during your evidence that in the public interest certain evidence or documents you may wish to present should be seen or heard only by the Committee, the Committee would be willing to accede to your request. Do you wish to briefly elaborate upon your submission or make a short statement?

Ms HOLLIDAY: Yes please. Thank you for giving us the opportunity to appear before the Committee. The Department of Urban Affairs and Planning is pleased to continue to participate in this inquiry into the M5 East ventilation stack. I want to highlight the key points of the department's full submission, which, as you know, has been tabled separately. The inquiry will be aware that the M5 East project was independently and comprehensively assessed by the department and approved by the Minister in December 1997, subject to 150 conditions. The approval included the single stack located at Turrella. The department's view is that the infrastructure is of strategic importance in terms of providing accessibility to the growing population and employment areas of south-western Sydney. It would also remove a significant proportion of through and heavy traffic from local streets in the area, including Kogarah, Rockdale, Arncliffe and Bexley, including up to 70 per cent relief on some local streets.

In recognising the strategic importance of the project, we have endeavoured to ensure that the outcome is sustainable and certainly of benefit to the whole community. I would like to emphasise that in particular we fully recognise community concerns about the stack and air quality, not only through the earlier assessment process but continuing up to today. Again, we have endeavoured to carry out an honest, open and transparent dialogue with the community, a dialogue that has not been limited to only consideration of written submissions but which has extended to extensive discussions, meetings and the open exchange of information.

Moreover, at the core of many of the conditions which have been imposed on the project is the fundamental recognition and honest attempt to address those community concerns and perceptions and to fully integrate those concerns into the decision. My assessment report, prepared for the Minister in 1997, concluded that based on evidence from the EPA and the independent consultant, stack emissions should be able to meet current and emerging goals. However, given the concerns about existing background levels, further detailed air quality modelling, including wind tunnel testing

and terrain modelling, was recommended. We have imposed conditions on the RTA that will contribute to improvements to background levels in this regard.

It has also been recommended that a subregional approach to air quality improvements should be equally if not more effective than controlling emissions from the stack in isolation. Whilst the then Minister approved the single stack at Turrella in principle at a minimum height of 25 metres, the final height of the stack was subject to the department's further approval. This is because the position of the exact height of the stack required more detailed air quality modelling, including wind tunnel testing and terrain modelling. Under the requirements of Condition 73 of the Minister's approval, I approved the height of the stack at 35 metres on 22nd August 2000, subject to a number of additional stringent conditions.

The assessment report on the height of the stack considered a number of key issues, particularly a report by the CSIRO, international best practice and, more specifically, community concerns. The key document considered in the department's assessment of the stack was the report by the CSIRO. The CSIRO was directly appointed by the department to provide independent advice. The community had access to the consultants and their report was made publicly available. Based on the review by CSIRO it was concluded that there is a high degree of confidence that the predicted ground level concentration of NO_2 would be below the specified goals if the stack height is 35 metres.

There is less confidence with PM10 goals because the background PM10 levels are occasionally high and thus exceedances may occur irrespective of the stack emissions. This, in principle, could increase the number of potential exceedances. Also, other factors could potentially reduce the potential frequency of exceedances of PM10 during critical winter periods. Overall, the CSIRO report confirms the earlier, that is, the 1997 EPA-Department of Urban Affairs and Planning assessment, that background levels will continue to be a critical factor in determining whether there could be exceedances of the specified goals.

Accordingly, regional strategies to address high background levels of particulate matter, as specifically required under the conditions of approval, are and will always continue to be integral to achieving specified goals in addition to the performance of the ventilation stack. The international workshop that was held provided convincing evidence that electrostatic precipitators have been shown to work effectively in removing particulate matter under certain conditions. However, their use appeared to be very much focused on in-tunnel conditions unique to those countries. A workshop also raised issues regarding maintenance and corresponding downtime and the performance of the ESPs during fires. These issues require more investigation.

In summary, there is no convincing evidence that it is yet international best practice to install treatment systems for external environmental reasons. The international workshop made a number of recommendations which the department has responded to positively and incorporated in the approval of the stack height. The department has separately responded to the recommendations of a previous parliamentary inquiry and adopted a number of them where appropriate. Details of those are contained in the department's full submission to you. One of the key recommendations relates to the interpretation of the air quality goals as specified under condition 72. In recognition of the community's strong desire for certainty about exceedances, the approval of the stack requires a protocol to be developed in consultation with the community and approved by me. EPA advices will also be critical in finalising his protocol.

In conclusion, there appears to be sufficient scientific certainty that a stack constructed at a height of 35 metres would be able to meet the specified air quality goals, particularly taking into account additional measures that have been recommended by the CSIRO, as well as regional strategies to address high background levels of particulate matter. Regional strategies as required under the conditions of approval have always been and will continue to be integral to achieving the specified goals, in addition to the performance of the ventilation stack. Furthermore, the fact that the PM10 levels have met the goals since 1995—bushfires aside—gives some further assurance that the goals will be met. I would add, even if the electrostatic precipitators are installed it is more than likely that a 35-metre stack would still be required for compliance with the NO^2 goals anyway. Electrostatic precipitators do not treat NO^2 and there is no strong evidence of large-scale gas treatment systems operating anywhere in the world.

Approval of the stack is now dependent on additional monitoring stations, including an independent station to be run by the community. Data from the stations will be made available real-time on the Internet. A protocol will be developed with the community to clearly define an exceedance. If the monitoring shows an exceedance as defined under the protocol, electrostatic precipitators shall be installed, and within six months. Mr Chairman, I am very happy to answer any questions, however questions of a detailed technical nature are better addressed to either Mr Haddad or Mr Hather.

CHAIR: Can you tell me whether you have been consulted by the RTA in developing a protocol. They told us earlier they are developing a protocol now.

Ms HOLLIDAY: At this stage we have not been consulted by the RTA in the development of the protocol, but clearly we will have to be consulted as the development of the protocol proceeds.

CHAIR: Can you give any suggestions to the Committee as to what should be in the protocol, regarding exceedances and other things?

Mr HATHER: It is a very complex question. We need to recognise there are external circumstances well beyond the control of the RTA or any of us, such as bushfires. We need to recognise those sorts of factors. Other events will also be there, such as major accidents causing great smoke or an industry on fire. I think the detail still has to be talked through with the community, and I would not want to prejudice any of those sorts of discussions at this stage.

CHAIR: So you do not have any predetermined ideas as to what constitutes an exceedance?

Mr HATHER: Only the principle that it is only the stack alone that should be the cause if it is to be defined as an exceedance.

CHAIR: To go over the top, over 50?

Mr HATHER: Yes.

CHAIR: Are you aware of the article published in the *New England Journal of Medicine*—I am sure you must be—called "The Six Cities Studies" by Dr Ian Cohen, in which he expresses concern about PM2.5 causing much more problem than PM10? There is evidence before our Committee that vehicles create more PM2.5 than PM10 and PM2.5 is far more dangerous. Are you aware of that?

Mr HADDAD: Yes, I am broadly aware of the study. I am also aware of the international discussions that have been going on in relation to PM2.5 and PM10, and their relative effects on health. In undertaking our assessments, however, we do rely on advice from the Department of Health and we rely upon established standards, particularly national standards. It just happens that the national standard in place, both existing and emerging, is PM10. I am also aware there is still an ongoing debate about PM10 and PM2.5 in that regard.

CHAIR: The United States set a standard of 25 micrograms per cubic metre for PM2.5. If we set a standard here of PM2.5 at, say, 25 would this affect the protocol and would it affect the putting in of precipitators in the stack?

Mr HATHER: I understand PM2.5 is a subset of PM10 and therefore PM2.5 will always be less than your PM10 goal. What that proportion is I would have to seek advice from the Environment Planning Authority [EPA] on those sorts of technical issues. But I know it would always be less than PM10.

CHAIR: If there were a standard of 25 and that standard were exceeded regularly by pollution from the stack, would you then consider it appropriate to order the fitting of electrostatic precipitators to remove the 2.5?

Ms HOLLIDAY: I think that is a very difficult question, because assessment of the tunnel and the condition at the present time is specified in terms of the PM10 and the NO^2s. That is the way

in which consent has been constructed. If a new standard emerges, whether it is this year, next year or in 10 years, that fundamentally changes the performance or the perceived performance of the stack in the region and we would obviously have to consider how we integrate those emerging standards into the operation of the stack. But, at this stage, the protocols will have to be determined on the basis of the current standards and the conditions of the consent.

CHAIR: Could you allow in the protocol for an emerging standard of 2.5?

Mr HADDAD: I suppose we can certainly consider it, but just in terms of the expectation, the approval that has been granted is subject to certain conditions. Those conditions are legally binding on the RTA. The Minister does not have an ability to amend those conditions. Modifications of the conditions must be initiated by the proponents or by the regulator in some cases, like the EPA, and this is basically the situation as it exists today. A consent is issued, it is issued subject to conditions and the conditions have to be implemented, and if modifications are to be made they have to be triggered by the proponents.

CHAIR: If it were determined that it is the PM2.5s, which apparently cannot be increased according to the CSIRO and other evidence, and they are far more dangerous than PM10s, there are no means by which DUAP can be forced to put in the electrostatic precipitators even though it might have a serious health effect on the local community.

Mr HADDAD: The only means we will have is to credibly persuade or try to convince and then I suppose we will have to rely on licensing and regulatory agencies to amend compliance with certain standards. But having said that, if whilst we are discussing the protocol there is evidence brought forward by the community in particular or by any health authorities that there is this 2.5, obviously it does not make sense for us to continue to insist on a PM10 fully knowing that there is this credible evidence of something else that is as important. In that context, obviously we will have to also consider it whilst we are looking at the protocol if there is information to that effect.

CHAIR: The RTA told us that it is merely the road operator and all the standards set in force are enacted by the Department of Urban Affairs and Planning. Presumably you would agree with that?

Mr HADDAD: I suppose we agree that we set the conditions and we will do and continue to do our best to make sure the RTA fully complies with those conditions.

The Hon. J. H. JOBLING: In relation to condition 73, clause 4, which is the protocol that we are referring to, in your response on page 7 you suggest that a protocol be developed for deciding how exceedence due to a stack will be determined. You then say the protocol is to be developed in consultation with the air quality community consultation committee and approved by the director-general. The bit that interests me is that it is to be made publicly available at least three months prior to the opening of the tunnel. As I understand it, the tunnel opening is proposed for February. That means the latest date is approximately November this year. So, you have less than six months to get to that. How far advanced are you in relation to this protocol? What are you relying on from the Environment Protection Authority [EPA] for advice in regard to completing the protocol?

Ms HOLLIDAY: I think we addressed that question in part earlier. At this stage the RTA is pursuing the development of the protocol and at this stage we have not been involved in those discussions. We are mindful of the time and the date by which the protocol will have to be secured.

The Hon. J. H. JOBLING: Bearing in mind that you are conscious of the time frame, when will you be approaching the RTA or saying to it, "Hey, it's getting very close? What stage are you up to? What are you doing? When are we going to get it?" What happens if it does not produce it?

Ms HOLLIDAY: I think the condition is very clear: If the protocol is not produced, agreed and approved, then the tunnel cannot commence operations.

The Hon. J. H. JOBLING: DUAP has the authority to do that?

Ms HOLLIDAY: The conditions are very clear, and I believe you put that to the RTA this morning, as to its preparedness to comply with the conditions. We have certainly indicated to the RTA and to the community that we intend to ensure that the RTA does.

The Hon. J. H. JOBLING: On the subsequent page you suggest that the department reiterates that if EPA goals are exceeded that electrostatic precipitators, it is very clear, will be installed and within six months.

Ms HOLLIDAY: That is correct.

The Hon. J. H. JOBLING: Again, I am sorry but I am sufficiently curious to wonder precisely how DUAP would achieve such an outcome if the RTA declines to comply?

Ms HOLLIDAY: We have required the RTA to design the stack in such a way as to be able to retrofit an electrostatic facility.

The Hon. J. H. JOBLING: "We have no money;" they say it is not in the budget. What are you going to do?

Ms HOLLIDAY: Well, the condition requires that if, in accordance with the protocol, continual exceedences take place, it will have to go to the Government. And if it is saying it has no money it will have to go to the Government and arrange for the electrostatic precipitator to be funded.

The Hon. J. H. JOBLING: If it does not do it, will you close the tunnel?

Ms HOLLIDAY: If it does not do it, then the consequences of failure to comply with this will be that either the tunnel cannot operate or we will have to take the RTA to court.

The Hon. R. D. DYER: Is DUAP satisfied that the RTA is doing all that is required for it to do under the conditions of approval?

Ms HOLLIDAY: Absolutely.

The Hon. R. D. DYER: You express no qualifications regarding that?

Ms HOLLIDAY: No.

The Hon. R. D. DYER: What difference in your view, if any, would the installation of electrostatic precipitators make to regional air quality? For example, if I were to be standing at Turrella railway station after the M5 East opens, would I notice any difference in air quality if an ESP were operating in the M5 East tunnel?

Mr HADDAD: I am just trying to answer it to the best of my ability. Probably the answer to that is, no, you will not notice the difference, based on the best available information that we have. Now, that does not mean that the community perception will be what I am saying. Essentially, all the investigations that we have done indicate technically that you will not be able to notice the difference. Now, community may perceive this differently, but that is the best answer I can give.

The Hon. R. D. DYER: Perhaps leaving aside my perception standing on Turrella railway station; using an objective standard, would the air quality be any different?

Mr HADDAD: To the best of the information that we have, probably no.

Mr HATHER: I think I would agree with that statement. No difference.

The Hon. R. D. DYER: In regard to the international tunnel workshop, which you will recall was held in Sydney in June last year, what influence, if any, did that have on DUAP's consideration of the design and approval conditions of the M5 East stack?

Mr HATHER: I think it reiterated a previous awareness that whereas ESPs were operating, that is, if at all, they were all because of in-tunnel conditions. Interestingly, I think the workshop and the presenters identified that most ESPs were not in fact operating because in-tunnel conditions were in fact being met. It was interesting that there was not a perception that because of external environmental reasons these ESPs were operating even though in-tunnel conditions were being met. That did not seem to be a policy position at all.

The Hon. J. F. RYAN: But it would be fair to say that Australian environmental conditions are different?

Mr HATHER: I think far better.

The Hon. J. F. RYAN: Would that not be a reasonable explanation as to why they were not operating, because they were not required to meet the same standards as we have in Sydney?

Mr HATHER: The argument I hear is that any additional pollution is an additional pollution that I do not want. I do not see why that argument is any different in any other country. Why in Norway, even if the background is very high, the same community would not argue the same point.

The Hon. J. F. RYAN: Perhaps you are not getting the purpose of my question. You are making a point that there is no need to have electrostatic precipitators for environmental reasons in Sydney because overseas they are turned off once in-tunnel conditions are met. The point is that they do not have the same conditions to meet and maybe if they did, the reasons for turning the filtration equipment off would not exist and they would have to continue to operate? In Japan, for example, there is a tunnel I believe that is somewhat longer or around the same size but which takes perhaps less traffic than the M5 that does have electrostatic precipitators fitted for environmental purposes. So, it is not that there are no examples of this; it is simply that the standards overseas are different. So, that would be a reasonable explanation as to why they get turned off, would it not?

Mr HATHER: I think though in the case of Turrella the goals are going to be met. In the case of Japan, the issue there is that the particular conditions they have with the very high diesel fleet in Japan, is very different to the Sydney experience as well. So, the level of particular matter is much higher.

Ms HOLLIDAY: We are not saying that electrostatic precipitators may never be required in Sydney. I need to make that absolutely clear. We are looking at the specifics of the region around which this particular stack is identified and is going to sit. So, I would not want that to go on the record that we are in any way saying that at no time in the future ever in any circumstance, any meteorological and topographical circumstance, electrostatic precipitators on a stack may never be required because each one will need to be examined in the context of that regional air quality environment within which the stack sits.

CHAIR: What about local air quality?

Ms HOLLIDAY: I guess when we are talking regional we are meaning the area around which the stack sits. We call it the region as opposed to local, that is, within 100 metres of the stack. We are talking about an area I believe is defined as one kilometre from the stack.

CHAIR: There are a number of tunnels in Europe in which they are proposing to put ESPs, not just for internal quality but also external quality. Things are changing very rapidly on the international scene as far as ESP goes. You would be aware of that information?

Mr HATHER: The issue raised earlier was interesting about the number of tunnels identified for proposals for ESPs, of which we were not aware. We are very much aware of the current reports, such as the Bongiorno report and the results of the international workshop. We would be very interested in seeing that information. In fact, we could acquire that from the RTA June-July 2001 report. The answer to your question is, no, I am not particularly aware of each of those.

CHAIR: I believe what is happening is that the RTA has made it as difficult as possible to put in the ESP. Earlier you heard about the email that went to France, which said, "We need people to

give evidence basically against putting the ESP in." So, to this point the whole thing has been biased against putting in the electrostatic precipitators. I am hoping at some point DUAP and other organisations will see that ESP is happening around the world and it is important, particularly for the local community in a unique condition such as this particular stack.

Ms HOLLIDAY: I think what we are saying for this particular stack in terms of the air quality goals that we require, and the EPA and Health, through all the respective standards to be met that a precipitator is not required on the best available information at the present time.

CHAIR: The CSIRO report, which you seem to have ignored in your approval of the stack, was very concerned the emissions will be much higher than anticipated by the RTA.

Ms HOLLIDAY: Well, we have certainly not ignored the CSIRO report. In fact, it was a key report that we took into account in our assessment of the stack.

Mr HADDAD: Certainly we relied on the CSIRO report as a very open and transparent report. We have asked them to clarify very clearly as to whether the strategy and recommendations we were making were consistent with the findings. To the best of my knowledge the advice was that it is and the report was made available and was adopted on that basis. Certainly there was the recommendation made to me during the CSIRO investigation that there is a need to install the precipitator. At no stage I was made aware very clearly that background levels are significant in solving this locality and in this region. Taking this into account, together with other factors, the best outcome we can advise Government was that essentially the value adding in terms of environmental outcome at this point in time and to the best of our knowledge and ability was to address regional or local background levels. That is where we felt we can get the best return to the community. However, noting, as you have correctly said, that there are rapid developments in terms of electrostatic precipitators, in terms of controls at the source, we have requested the RTA to continue to report on those developments.

We will continually check that what they are saying is credible. If proven that they not complying then we will advise government clearly that they are not complying and action should be taken. That is an open and public process known to everybody so if there is non-compliance then they will have to submit formally to notify the non-compliance and there will be a public debate and assessment process. We cannot do that in closed doors. It is all going to be open and we will go to the director-general and she will also take the appropriate action. That is important to note in that regard. However, there was no evidence presented to me at any time, including subsequent to CSIRO reports, that electrostatic precipitators were necessary at this particular location at this particular time. In making the recommendations we were trying very hard to push the boundaries and incorporate the concerns of the community as much as we could.

The Hon. M. I. JONES: Is the building of this stack as approved by your department in a valley surrounded by homes a high point in town planning?

Ms HOLLIDAY: The M5 East is a very important strategic road. The M5 East is only possible in order to achieve all the goals we have also set for that in terms of open space and amenity, if it has a tunnel. Therefore a tunnel has to be located somewhere. The RTA, as we know, proposes to us the scheme for the road, including that location of the tunnel, and our job is to assess that. If we felt that this stack was not able to be approved then obviously we would have had to have gone back to government and spoken to them about some alternative way to resolve this issue. But we were satisfied on the evidence that the stack could be approved in this location. We also put a lot of work into working with community representatives on the design quality of this stack. Not everybody likes it and it is very difficult to disguise a stack of 35 metres. If the community were being honest they would say that the design that was finally adopted was a significant improvement on the regional design look of the stack that was originally put forward.

The Hon. M. I. JONES: Can I take it then that the answer is no?

Ms HOLLIDAY: The answer is no.

The Hon. M. I. JONES: The question was: Is it a high point in town planning and from your answer I take it the answer is no?

Ms HOLLIDAY: I do not think that is what I said.

The Hon. M. I. JONES: You have not answered the question so I am assuming the answer is no.

Ms HOLLIDAY: But I cannot answer the question, with respect, by a yes or no answer.

The Hon. M. I. JONES: Is it a high point?

Ms HOLLIDAY: I can't answer it with a yes or no answer.

The Hon. M. I. JONES: You mentioned you made an honest attempt to address community concerns. Would you agree that this has failed miserably as there is a distinct lack of happy residents here today?

Ms HOLLIDAY: No, I would not agree that it has failed miserably.

The Hon. M. I. JONES: How would you monitor your success?

Ms HOLLIDAY: The department listens very carefully in circumstances like this to the community. I do not know exactly how many meetings we had with representatives of the community. We had a lot of meetings with representatives of the community to talk about not only the stack, the design of the stack, but to listen to their concerns about the way in which their perception of the stack, and their need to know about the way the stack was operating. The conditions of consent that are added to the approval of the stack height strongly reflects the fact that we have tried our very best to hear what the community has needed. It is important to remember that this is the first time ever in Australia where monitoring of the stack is going to—

The Hon. M. I. JONES: It is the first time ever we have built a stack in a valley?

Ms HOLLIDAY: Can I finish what I was going to say about the first time ever that we are going to have real-time monitoring of the stack on the Internet and we will have a community-owned and managed monitoring station so they can be sure that they are not getting information that they do not trust or believe. We really have tried. As with many town planning issues, to use your words, you can listen to the community, take into account community views but it does not automatically mean that 100 per cent of that community will be happy.

The Hon. M. I. JONES: You mentioned a stack height of 32 metres and that the air quality at ground level will be acceptable in accordance with the standards. May I point out to you that this particular issue is somewhat different because the ground level for many of the residents surrounding this area is higher than the maximum height of the stack. The fear is that it will not be acceptable.

Ms HOLLIDAY: I am aware of the site and I know the area. I appreciate that some residents on the high side of the valley will overlook the valley and therefore overlook the stack. I will ask Mark to comment but my understanding and confidence is that the modelling that has been done in terms of the dispersion as a result of the stack height of 32 metres will lead to a situation which will meet the target the quality objectives set for this particular area. The difficulty in this area is that there is an extremely high background air quality issue already. This stack adds a very tiny proportion to that background level and we have conditioned the stack in such a way that should the background air quality increase—in other words should it get worse and that small additional factor from the stack causes exceedences—then there will need to be, in accordance with the protocol, rectification. I do not know what more I can do.

CHAIR: If the background levels increase to over 50 regularly, regardless of the stack, and the stack adds another five or 10 per cent to that, does that also mean that ESPs need to be fixed? I am saying that if it is not just the stack that takes it up another five or ten per cent but the background levels increase anyway.

Mr HATHER: I suppose that is right. If the backgrounds are going to increase over time then that is true.

CHAIR: If it goes over 50 regularly and you cannot determine whether it is the stack you would then have ESPs fitted automatically?

Ms HOLLIDAY: That is correct.

The Hon. J. F. RYAN: At what point are you able to do that? Presumably at some stage or other this proposal gets signed off and is no longer under your control. I do not think that you propose to be a regulator of the stack forever? There must be some stage at which you can say this is a proposal that has been approved and we cannot do any more to it?

Mr HADDAD: We are in a sense the regulator of this stack for ever because we have the conditions that put a legal obligation on us to regulate the stack. In that context we are the regulator for ever with the exception that the conditions are changed. As long as the condition is there we have to monitor. Mr Chair, your interpretation is correct. The background can increase except for I suppose bushfires et cetera but because, for example, more roads are put in and there is an increase in the background level then we have failed to reduce it. It is the environmental outcomes that we are particularly concerned about. If this outcome continues to deteriorate because the stack happens to be there obviously the importance of retrofitting becomes more significant and more important in that context.

CHAIR: Even if you cannot separate out the stack contribution to the overall level?

Mr HADDAD: Generally one would be able to separate but probably it is the total outcome that we will be looking at. We are saying that there is this level of 50 that experts, or people for some reason have advised us is an appropriate standard to adopt today, and that is the outcome that we will be looking against in terms of making decisions and exceeding the exceedences from that goal or outcome, is the one that will be judging what subsequent action is needed. That is basically conceptually. From what we have been studying and assessing and looking at and from talking with people we are saying that the background level that exists now is relatively high to the extent that controlling any additional contribution is not going to make a difference in terms of an environmental outcome today but if it does happen we are ready to go. We have all the facilities to move and put in, if necessary, irrespective of the total cost, unless of course the condition is varied.

Ms HOLLIDAY: The monitoring stations will be monitoring air quality generally. They are not monitoring just the stack. We are satisfied at this stage that the goals that have been set can be met with or without the stack but if, in accordance with the protocol they cannot, obviously there will need to be retrofitting.

The Hon. J. R. JOHNSON: Does DUAP believe that the design for the M5 East ventilation system being developed by the RTA will meet the air quality goals that are set in the conditions of approval?

Ms HOLLIDAY: Yes.

The Hon. J. R. JOHNSON: Did DUAP take into consideration the possible health impacts of the local community in setting the air quality goals?

Ms HOLLIDAY: DUAP did not set the air quality goals. They are goals set by the EPA and national standards but, yes, we did take into account the health of the community and the views of the community and required the stack to meet those goals.

Mr HATHER: They are actually health-based goals as well so inherent in the goals is the health issue.

The Hon. J. R. JOHNSON: What importance does DUAP place on the RTAs development of the subregional air quality management plan?

Ms HOLLIDAY: We place enormous importance on that because that is the means by which we are going to try to achieve improvements in air quality in this locality. This is also quite innovative on our part to try to tackle the real issue. The real issue for the community—apart from the fact that they obviously would prefer that the stack not to be located in this locality—is the air quality near their homes and in the area in which they live. Through the approach that we have taken we are saying let's try to tackle the overall air quality in this area and not just focus on the additional impact that the stack will make which is small relative to the air quality environment in which they currently live. If we could tackle that throughout the Sydney region and really try to bring down the background air quality throughout the Sydney region, using similar mechanisms that we are proposing through this condition in this subregional area, we would be moving towards a significantly better Sydney region in terms of its air quality objectives. At the moment we have the opportunity through this consent to try to improve the air quality environment in this locality by requiring the RTA to act to improve the sub-regional air quality. This is an innovative approach that we believe is tackling the real issues.

The Hon. J. H. JOBLING: I would like to revisit a quite significant statement that was made today—I think it is the first time that I had ever heard it—to ensure that I understood it correctly. As I understand it, everybody agrees that existing background air quality in the area is not the best and is likely to get worse in the foreseeable future—the second conclusion is mine; you do not necessarily share it. I understood you to say that, if exceedences occurred with or without the stack operating, the RTA would have to retrofit the stack by putting in electrostatic precipitators. Because of its totality and the inability to fractionalise the 5 per cent and if there is no additional issue from the stack, the total will increase and you will insist that the RTA retrofits. Did I understand you correctly?

Ms HOLLIDAY: That is the intention of the condition. With a protocol, we will clearly have to accept that on some days there will be bushfires, factory fires or meteorological circumstances—unusual circumstances. I am talking about the normal background level.

The Hon. J. H. JOBLING: How will you determine which days are extraordinary? Who will do that?

Ms HOLLIDAY: That will be determined in the protocol.

The Hon. J. H. JOBLING: Will that be done by you or the EPA? Who will declare that it is an extraordinary day because of a bushfire or factory fire?

Ms HOLLIDAY: We will have to discuss that with the EPA; it will be determined in the protocol.

The Hon. J. H. JOBLING: We will see it within six months.

Ms HOLLIDAY: In less than six months, as you highlighted this morning.

Mr HADDAD: I wish to clarify one point. In terms of the contribution from the stack, the RTA, EPA and others will also measure emissions from the stack. Whatever comes from the stack will be measured. Returning to the question of how we will know the contribution from the stack, emissions will be measured. Most licences and regulations relate to that. We add value through our assessments. That is part of the community response; we go to the community. We are interested not only in what is coming out of the stack at this point but in what will land somewhere. That is our job: that is how we assess the situation and that is how the contribution will vary.

Ms HOLLIDAY: It is clear how important the sub-regional air quality management plan will be to the RTA. If it is successful, it will clearly reduce background levels and the likely impact of the stack pushing those levels above what is acceptable. In a sense, there will be a double benefit: The general background air quality will improve and, from the RTA's perspective, it will be less likely to have to trigger the electrostatic precipitator.

CHAIR: Who will trigger it: you or the RTA?

Ms HOLLIDAY: We will trigger it in terms of the condition but it will have to trigger it in terms of air quality outcomes. I think it is a different approach to trying to tackle the general air quality in the region around Turrella and the stack.

The Hon. J. F. RYAN: I will raise several peripheral matters before I press you about some material that the Committee has received recently from the CSIRO by way of a submission. What sort of improvements do you expect can be made to air quality in the sub-regional area through the expenditure of $500,000 a year over five years? That is a fairly modest improvement to the environment. If air quality in south-western Sydney could be improved by the expenditure of such a modest amount, any sensible government would have done it already.

Ms HOLLIDAY: I think we will just have to monitor the progress that the RTA makes in using whatever amount of money it sets aside for the implementation of this plan.

The Hon. J. F. RYAN: You have stipulated an amount of money so it will argue that it is not setting aside the money: It will say that you have told it how much to set aside. The amount will not be more than $500,000 a year, will it?

Mr HADDAD: This is obviously only one component of a broader government strategy. You are correct: We cannot solve all problems with the expenditure of this amount. This is basically a recognition that a proponent is contributing something in an environment in which there are issues. We believe that proponents have an obligation also to contribute to the solution. That is only one part of a much broader, complicated strategy. We hope that the EPA and the Government generally will ask for other planning measures to assist in improving air quality in the region and beyond.

The Hon. J. F. RYAN: If an equivalent amount were spent on purchasing carbon trading rights by the EPA, you would not even get dangerously close with half a million dollars and that amount of pollution.

Ms HOLLIDAY: I think we must remember what this money is targeted at: It is a buyback for wood-fired heaters, which are a significant cause of some of the detrimental background air pollution.

CHAIR: I understand that using one wood heater is equivalent to driving a motor car for 15,000 kilometres. Do you have some details about the effect of wood heaters on the environment?

Ms HOLLIDAY: I think you should address those questions to the EPA as it is part of its strategy.

The Hon. J. F. RYAN: I have one other peripheral matter—perhaps Mr Haddad might be able to help us. Did DUAP make an offer to pay for the videotaping of the international convention conducted by the RTA, and was that offer refused?

Mr HADDAD: I cannot recall. I will ask Mark to respond.

Mr HATHER: I am perhaps more familiar with the details. I do not think it was a request, rather an acknowledgement that that was an option for the workshop. I made a few telephone calls and worked out how much it would cost. I said, "This is how much it will cost; sounds like a good idea to me". I could not force the RTA to do it; I simply recognised it as an option.

Ms HOLLIDAY: I do not think we offered to pay.

The Hon. J. F. RYAN: The primary concern expressed to me by the community is the worry about exactly when the trigger will be activated in terms of requiring the RTA to install electrostatic precipitators. I suspect that residents of Turrella would rest a lot more easily with the stack if they knew in what circumstances that would occur. What is the point beyond which the air cannot get any worse? At what point would somebody order the RTA—irrespective of financial or other considerations—to install electrostatic precipitators to improve air quality? At present I see in the condition the requirement to design the stack to achieve specific air quality goals. There then appears to be a further requirement to develop protocols that will set an objective standard in the future.

The problem I think many in the community would have with your evidence today is that you require a demonstration that the stack is causing the exceedences. Nobody, by any stretch of the imagination, has suggested that the stack alone will cause exceedences above the air quality goals: It has always been accepted that it will add a marginal element to a more dangerous level. There will have to be some sort of trade-off when it comes to regarding the stack as the problem. At what point can people be satisfied that DUAP will not go any further and will require some additional measure on the part of the RTA?

Ms HOLLIDAY: That will be determined in the protocol.

The Hon. J. F. RYAN: Why did you not determine it first? Let's face it: It will not be possible to dismantle the stack once it is operating; we will have to deal with what is there. Why was that issue not determined first rather than after the horse has well and truly bolted?

Ms HOLLIDAY: Because we are satisfied, on the basis of the scientific evidence, that an electrostatic precipitator will not be required. We are satisfied that there will be no exceedences of the established air quality goals.

The Hon. J. F. RYAN: Do you appreciate that some people would say that that is a bit of a circular argument: You are going to set a protocol for an event that you expect never to happen; you are gong to make sure that these requirements make sure that it never happens?

Ms HOLLIDAY: That answers an earlier question about the efforts that the department has made to meet concerns expressed by the community. We are confident that it is extremely unlikely that exceedences will trigger that condition. However, we accept that the community perceives that that will happen and requires a mechanism to ensure that, if it does, the RTA must act. I have tried to achieve that through the approval of the height of the stack.

The Hon. J. F. RYAN: Judging from the evidence that the department gave to this Committee previously, a certain amount of your confidence is based on the modelling done by various consultancies into where the plume will go. Is that true?

Ms HOLLIDAY: Yes.

The Hon. J. F. RYAN: Are you aware—you will certainly become aware—that the Committee has received evidence from Dr Peter Manins, CSIRO Chief Research Scientist and Leader, Atmospheric Pollution Program, that throws up phenomenal questions about the modelling that was done and upon which you are relying? There are serious concerns about the dispersion of NO_2 gas, particularly at night.

Ms HOLLIDAY: We obviously have not seen that document.

The Hon. J. F. RYAN: Do you recall that the CSIRO made a recommendation to DUAP that the tunnel should have a virtual stack height of 50 metres, as a means of dispersing NO_2 gas, particularly during the night?

Mr HADDAD: No, we are not aware of that information.

Mr HATHER: Virtual height is effective stack height, and effective stack height equals a few things—that is, the physical stack height plus exit velocities. That means that if you turn up the fan speeds you can get an effective stack height that is greater than the physical state height. Therefore, as to the comment about virtual stack height equalling effective stack height, the report we received from the CSIRO says that the NO_2 goals will be met quite comfortably with a 35-metre stack.

Mr HADDAD: We have not seen the latest advice. The CSIRO was completely free to submit any advice to us at any time. It was appointed completely independently and made available to the residents. We will look with pleasure at any additional information you may have.

The Hon. J. F. RYAN: To put it on the record, one paragraph from the submission we have received states: "Compounding this problem is the fact that the top of the vent is below the level of many of the houses to the north and south. In the night-time light wind conditions mentioned above, the plume height and plume dilution are both low so residences could be struck directly by the plume. To avoid this problem the CSIRO review to DUAP recommended increasing the plume height by boosting the fan speeds in the vent at those times and in these wind conditions". Was that recommendation made to DUAP? Do you recall that recommendation and does DUAP intend to do anything about it?

Mr HATHER: Clearly, it was part of the CSIRO's recommendation in its report to us that there was concern that the fan speeds needed to be increased. That increase in fan speeds will be part of the operation of the vent stack.

The Hon. J. F. RYAN: You have said that it is the RTA's responsibility to develop the protocol. In what way are you able to be sure that it will develop the protocol that has the best outcome, given that, for example, the international workshop convened in June suggested that the RTA should write to Norway, Japan and Korea for updated information about the use of precipitators? From its evidence, it would appear that the RTA has only made contact with Norway and not Japan. It does not appear that the RTA is a willing participant in getting the best possible standards. For quite understandable dynamics, the RTA will try to meet the lowest possible standards that it can get. They are not unusual and it should not be surprising. How do you know you will get the best possible outcome, because I think the community expects at least one government agency to have its hand on this particular project to ensure that what is going on is the best, not the least, that will get it by?

Ms HOLLIDAY: Certainly, the department intends—and it always has done throughout this process—to ensure that we achieve the best possible outcome. We have not said that it is the RTA's responsibility to develop the protocol. We have said that the RTA is commencing that process, but it is my responsibility to approve the protocol so the RTA will do that to our requirements, which will be in consultation with not only the RTA but Health, the EPA and the community.

The Hon. J. F. RYAN: The RTA told us this morning that it has allocated $10 million for the purposes of a property valuation guarantee which it says is an expression of goodwill to the community for worries about perception about the stack. Would you not agree that it would have been more appropriate for the RTA to spend funds of that nature in dealing with the environmental consequences of this stack, rather than what could be almost seen by comparison as cosmetic issues of property values in the surrounding areas which are seen by all objects not to be of major concern? A few people have raised concern about their property values, but the largest concern is health. If the RTA has a spare $10 million to throw around why has some regulatory authority not suggested that it expends those sorts of resources on meeting air quality goals?

Ms HOLLIDAY: The issue of property acquisitions is a matter for the RTA and its Minister. The issue of the health outcomes of this stack and the air quality in this region are obviously a matter for us. As I said earlier, we are satisfied through the analysis we have done and the assessment we have undertaken that the goals that have been set will be achieved. We have put in place the provisions to require the RTA to act should those goals not be achieved.

The Hon. J. F. RYAN: The RTA has advised us that it would take 60 weeks of lead time to install the electrostatic precipitators. Does that seem like a reasonable lead time, given that you have suggested that it must be done within six months? The 60 weeks do not sound like a condition that could be met.

Ms HOLLIDAY: The condition says six months and the RTA will have to achieve that.

The Hon. M. I. JONES: On this 60 weeks—

Ms HOLLIDAY: 60 weeks is how many months?

The Hon. J. F. RYAN: There are 52 weeks in a year.

Mr HADDAD: It is more than one year.

Ms HOLLIDAY: The RTA said to you this morning that it would take a year to fit the electrostatic precipitators.

The Hon. M. I. JONES: The RTA has itemised the number of weeks for each section of what will be required in the installation of the equipment, and it appears to be quite reasonable. It must be realistic. If you are saying that you will hold the RTA to that six months and it cannot do it in six months—

Ms HOLLIDAY: Then it will have to seek a variation to the condition.

CHAIR: I have a fax sent by the Department of Urban Affairs and Planning on 16 May to Peter Manins of the CSIRO. Apparently the question of electrostatic precipitators [ESP] is specifically outside the CSIRO's scope and its brief. Were you aware of that? The CSIRO never considered ESPs because it was never asked to and it was left out of the document.

Mr HATHER: Its brief was to see whether the height reports were adequate. In our submission we clearly indicate what the requirements for the CSIRO study were and whether they would meet the goals was the key one. I think you are aware of the conclusions.

CHAIR: Is there any particular reason why the ESPs were left out of the brief?

Mr HATHER: The question was whether the CSIRO could meet its goal, not to consider whether ESPs were required.

Ms HOLLIDAY: If the CSIRO concluded that no matter what height the stack was constructed the goals for air quality in this particular locality could not be met, obviously we would have asked a supplementary question: if an ESP was installed now could those goals be met? However, we did not get to that point because the CSIRO concluded that a 35-metre stack with the appropriate acceleration would still enable the goals in the locality to be met.

(The witnesses withdrew)

(Luncheon adjournment)

LISA CORBYN, 59-61 Goulburn Street, Sydney, Director-General, Environment Protection Authority,

COLIN JOSEPH WOODWARD, 59 Goulburn Street, Sydney, Assistant Director-General, Environment Protection Authority, and

MICHAEL DANIEL CROWLEY, 79 George Street, Parramatta, Manager, Sydney Planning, all sworn examined:

CHAIR: Did each of you receive a summons issued under my hand in accordance with the provisions of the Parliamentary Evidence Act 1901?

Ms CORBYN: Yes.

Mr WOODWARD: Yes.

Mr CROWLEY: Yes.

CHAIR: Are each of you conversant with the terms of reference of this inquiry?

Ms CORBYN: Yes.

Mr WOODWARD: Yes.

Mr CROWLEY: Yes.

CHAIR: If you should consider at any stage during your evidence that in the public interest certain evidence or documents you may wish to present should be held or seen only by the Committee, the Committee would be willing to exceed to your request. Do you wish to elaborate on your submission or make a short statement?

Ms CORBYN: I would like to make a short statement. The Protection of the Environment Operations Act 1997 gives the EPA responsibility for environmental regulation of the construction of the motorway. The EPA also has responsibility as a determining authority in the environment impact assessment and approval process for this project under part 5 of the Environmental Planning and Assessment Act 1979. The EPA currently licences the construction of the motorway. The EPA's role in the environment impact assessment and approval process for the M5 East ventilation stack was to advise on air quality standards for key emissions from the tunnel ventilation system, both stack and portals; review and assess the air quality modelling and assessment commissioned by the Roads and Traffic Authority; and advise on appropriate approval conditions under the Environmental Planning and Assessment Act to achieve environmental objectives for the project. The EPA has provided additional information on its role to your previous inquiry, so I will not go into that detail.

I would like to say a few words about air quality in Sydney. Air pollution is generally trending downwards, despite pressure from growth in the Sydney region. However, air quality is affected by meteorology, so the results can be difficult to predict each year. The major pressure on air quality is likely to come from emissions from increasing traffic, but we expect emissions to be reduced as a result of the progressively better vehicle emission and cleaner fuels standards. The major sources of emissions into the air shed are petrol vehicles, diesel vehicles, domestic wood heaters and commercial premises. In particular, I would like to touch on fine particles. Fine particle levels in Sydney generally only exceed national standards as a result of natural events, for example bushfires, or programs to deal with them, such as hazard reduction burning. We have national ambient air quality standards that we use in New South Wales. In July 1998 a national environment protection measure for ambient air quality, we call that the air NEPM, was adopted in Australia.

The objective of the air NEPM is to provide equal protection for all Australians regardless of where they live. The air NEPM set a number of ambient air quality standards with a goal that each be met within a 10-year timeframe as monitored and reported at performance monitoring stations in air

sheds around Australia. The air NEPM goals are generally regarded as stringent by world standards. Particle standards are especially stringent, and are lower than in most areas in the United States. The air quality goals in the Minister for Urban Affairs and Planning's conditions of approval for the M5 East were based on the then draft air NEPM.

The environmental assessment process for the M5 East carefully considered the potential for emissions from the exhaust stacks to result in exceedences of air quality standards. The overall conclusion was that the M5 East ventilation stack will not have a significant impact on local air quality when compared with the ambient pollution levels. Gaseous emissions, such as nitrogen dioxide and various air toxics, were not predicted to exceed air quality standards. However, the assessment did note that on days when background levels were already elevated there was potential for fine particle emissions from the stack to result in additional exceedences of the relevant standards under certain conditions.

Between 1995 and 2000 the EPA data shows that there have been only three occasions when the NEPM standard level for particles, 50 micrograms per cubic metre, was exceeded at the Earlwood station, which is the most relevant for this proposal. Exceedences of this standard in previous years have often been associated with bushfire or hazard prevention burns. Research shows as well that wood smoke is dominant on days when pollution is elevated. Wood heaters are responsible for approximately 60 per cent of particulates of concern in eastern Sydney in the winter, when particulate levels are highest, and therefore the major contributor to high background levels.

The CSIRO investigation report on air quality impact of emissions from the M5 East tunnel found that previous reports may have underestimated the possibility of PM10 exceedences, but still concluded that the overall contribution of PM10 from the stack to exceedences would be small. In response to this finding the Department of Urban Affairs and Planning developed additional approval conditions in consultation with the EPA. These conditions require the Roads and Traffic Authority to bring forward the development and implementation of the subregional air quality management plan to bring down the background levels of PM10.

At key feature of this plan is measures to control wood burning, which would reduce the likelihood of the ambient goal being exceeded. This plan addressed recommendation 1 of the inquiry's report. The EPA is aware that the Roads and Traffic Authority has commissioned a contractor to develop the plan, which is expected to be finalised by the end of July 2001. The RTA will then implement the plan's actions well before the opening of the tunnel to traffic in 2002. The plan will identify the major emission sources within the M5 East subregion, and detailed strategies to minimise emissions to ensure that air quality goals are maintained.

The EPA has required that a detailed monitoring program be conducted to check actual performance against air quality standards when the motorway is operational. In relation to the inquiry's recommendations 4 and 10 about air quality goals, the EPA will be considering the relationship between ambient goals and stack emissions through the protocol that is being developed for deciding when exceedences occur. The EPA is to be consulted by the RTA on the protocol for deciding how an exceedence due to the stack will be determined, which must be finished three months prior to the opening. This will recognise the NEPM goal, but will focus on exceedences caused by the stack.

In relation to the tunnel ventilation workshop report, the EPA will continue to analyse the effect of cleaner vehicles and fuels standards, both of which can have an effect on ambient air quality standards. Both are expected to result in reductions in particles from diesel vehicles. Our submission includes further detailed information on those new standards that have been brought forward. Because of the multiple variables involved there is uncertainty about the actual size of the effect that will result from changes in emission in your standards. However, it can be clearly stated that there will be a significant reduction in emissions over time because of these changes. A study prepared specifically to examine the impact of changes to diesel vehicle emissions in the context of preparing a diesel national environment protection measure estimated that by 2015 PM10 emissions could fall by as much as 69 per cent from 1996 levels. Therefore emissions from the tunnel can reliably be predicted to decrease over the next decade.

In relation to the CSIRO report, I would like to comment concerning the balance of the stack height and the flow rates. The EPA's view is that a 35-metre stack coupled with the matrix of emission concentrations and volumetric flow rates that have been developed as part of the DUAP conditions of approval should ensure that the project's specific ambient air quality standards for NO^2 and for PM10 are met. In conclusion, the EPA considers that there is a comprehensive package in place to meet necessary environmental outcomes. There are stringent goals in place. There is a comprehensive monitoring and modelling program in place to see if those goals are being met. There is an air quality management plan being brought forward to reduce background levels, and there are contingencies in place to implement further controls, if necessary. The EPA will continue to work with DUAP, the RTA and the community to make sure that the outcomes are achieved.

CHAIR: The United States has a standard for PM2.5, and I am sure that you would be aware of the dangers of PM2.5s and their increasing role in health risk. Can you tell me whether there is any proposal to have standard PM2.5s in this country, and would that change your attitude towards the stack, bearing in mind that car emissions are largely PM2.5s or under and not PM10s?

Ms CORBYN: There is a proposal under way. When the National Environment Protection Council considered the national ambient air quality standards back in 1998 it considered the issue of PM2.5, and my understanding is that it decided there was not enough information available to actually be able to determine whether they should set a PM2.5 standard and, if so, what that should be. My understanding also is that the National Environment Protection Council has agreed that it will review the particle standard—it agreed to do that in December 2000—so that there is now information being brought forward into that national environment protection standard process to review the particle standard and determine whether it is appropriate to keep the existing standards or to change those standards. But that process has not yet been completed. In fact, it has only just started.

CHAIR: Bearing in mind that the bulk of the emissions from vehicles which will go through the stack will be, surely, PM2.5s and not PM10s in the main, is that not correct?

Ms CORBYN: I cannot really comment on that. I do not know the answer to that.

CHAIR: Can either of you comment on that?

Mr CROWLEY: That is true. There is a tendency for particles to agglomerate as well in the air, and they tend to agglomerate to slightly bigger than 2.5.

Ms CORBYN: One of the issues that is being reviewed, if I could, through that national process is to look at what information really is available and whether the fractions of the particles make a difference and, if so, how do they make a difference. My understanding from the national process so far is that there really needs to be a thorough review of that information before judgments can actually be made. That is why they actually made the decision in 1998 to trigger a review of the particle standards.

CHAIR: If there is a standard set, can the protocol that is being developed between yourself, the RTA and the Department of Urban Affairs and Planning take into account that new standard if it is 25 rather than 50. It may be that the PM2.5 will be exceeded by the emissions from the stack whereas the PM10s would not be.

Ms CORBYN: I have not actually seen the protocol yet because it is in the development stage but I would expect that the protocol would actually deal with the current standards and it is really not appropriate for me to speculate on what future standards might be. That is a matter of government policy that I could not speculate on in terms of future environmental standards.

CHAIR: Do you know if there is any inventory of PM10s and where they come from?

Ms CORBYN: We do actually measure, through our air quality monitoring program, for PM10s in the environment and I believe that in the state-of-the-environment report, although I will have to check that, we have actually broken down contributions. In our submission we have identified that, for example, wood heaters contribute about 25 per cent, I think, of the breakdown of particles,

that is PM10, and I think we have noted in the state-of-the-environment report that about 23 per cent of the particles come from vehicles.

CHAIR: Given the evidence presented regarding vehicle emissions and health impacts at the international tunnel ventilation workshop and the inadequacy of the current standards, why did the EPA not seek to apply more stringent operating conditions to the M5 East project?

Ms CORBYN: The EPA believes that the conditions that have actually been specified are very good conditions. We must remember that the standards that are actually identified through that national process are some of the most stringent standards in the world, particularly for particles, so we believe that the conditions that have been specified not only in terms of modelling, monitoring and bringing forward the air quality management plan at a regional level, as well as the controls and the contingency plan—if in fact it is found that there still remain to be some exceedances caused by the stack—are part of a very comprehensive package that will allow us to achieve the outcomes we are trying to achieve.

The Hon. M. I. JONES: In your opening remarks you said that air quality is tending downwards. I assumed you meant it was getting worse.

Ms CORBYN: It is getting better.

The Hon. R. D. DYER: Can you tell the Committee what influence, if any, the international workshop on tunnel ventilation, which you might recall was held in Sydney in June last year, had on your agency's consideration of the design and approval conditions for the M5 East stack?

Ms CORBYN: The EPA did attend the workshops and as a result of that, the workshops provided useful information, but the EPA's main involvement, particularly in providing advice on the development consent conditions, is to establish the environmental outcome, not to actually concentrate on particular technology types, so from our perspective there was useful information there but we come back to actually providing advice on the outcome and the standards that should be used and achieved.

The Hon. R. D. DYER: Given that there are already, as you will appreciate, ventilation stacks on the Eastern Distributor and also on the Sydney Harbour Tunnel, is there any evidence known to the EPA or anyone else to your knowledge that these stacks have, of themselves, caused air quality problems in Sydney?

Mr WOODWARD: The Sydney Harbour Tunnel has been in operation now since the early 1990s and during that entire period to our knowledge there has only been one exceedance of the goal, and that was for carbon dioxide—

Ms CORBYN: Monoxide.

Mr WOODWARD: And that was internal to the tunnel, within the tunnel itself. The Eastern Distributor has been operating obviously for a shorter period of time and has been complying with the goals. Essentially, our knowledge about tunnels generally is that the design for them has been fairly conservative and that generally the tunnels are meeting the goals that they have been designed to meet, so that gives us some extra confidence with this one as well.

The Hon. R. D. DYER: Do you believe that installing electrostatic precipitators [ESPs] on all of Sydney's motorway tunnels would be a cost-effective way of dealing with air pollution in Sydney?

Mr WOODWARD: At this stage, as Lisa said, the focus for the EPA has been on the actual environmental goals and trying to ensure that they are going to be met. In the case of the M5 East, we know that when the goal is likely to be close to the actual limit, it is other means that are causing the bulk of the problems. For example, wood heaters are contributing about 60 per cent of the fine particulates whereas motor vehicles from the stack account for only in the order of 1 per cent to 10 per cent. Therefore, it is much more cost effective to actually look at what the major source is and to target that. That is why we are confident in this particular case that approaching the wood heater issue

through the development consent and also the broader approach that the Government and the EPA has to dealing with water heaters generally is a much more cost-effective way than putting treatment facilities on stacks.

The Hon. R. D. DYER: Are you saying that wood heaters account for 60 per cent of pollution in the Sydney metropolitan area?

Mr WOODWARD: No, we are saying in relation to the M5 East stack emissions that it is a 60 per cent contribution.

CHAIR: In the winter.

Ms CORBYN: In the winter.

Mr WOODWARD: Which is when the goal is likely to be closer to the limit.

The Hon. J. F. RYAN: The Committee has received a submission from the CSIRO that contradicts one of the things you said, that over time vehicle emissions would increasingly contribute less to air pollution. A submission from the chief research scientist of the atmospheric pollution program, says about expectations for vehicle emissions that essentially, in summary it seems to be that whilst larger particulates will be less of a problem, smaller ones will in fact increase. Previous information the Committee has received is that the smaller ones are a greater problem that the larger ones. I will read the submission so that I do not give the wrong impression. The submission stated:

> Recent emission testing data indicates that in-service emission levels of Japanese vehicles are much higher than European and US vehicles in similar model years … These Japanese vehicles dominate the import market of diesel
>
> Thirdly, the future emission estimates used by the Hyder consultants do not account for the likely trend in petrol vehicle technologies. There is a strong move towards GDI (gasoline direct injection) vehicles to meet required reductions in fuel consumption and Nox emissions. However GDI technology has an inherent problem of much higher particle emissions than multi-pointed injection—particle emissions are four to six times as high …
>
> As diesel emissions are reduced by imposition of Euro 3 and Euro 4 standards over the next five years, particle emissions from petrol vehicles are likely to increase. So much so that any hoped-for reduction in overall vehicle particle emissions may be cancelled out.

Does that information from the CSIRO contradict the evidence you have given, is that something you are aware of and is there some response you can make to that submission?

Ms CORBYN: As I tried to say at the beginning, we know that there are multiple variables involved and there is uncertainty about the actual size of the effect that will result from changes in emission and fuel standards. I have not examined that information in detail from my perspective but from the work that is being done on the diesel national environmental protection measure we do estimate that, in particular, we will be seeing emissions fall by as much as 69 per cent from diesels from 1996. That is particularly an area of concern for us.

It is clearly an area that we will be continuing to look at. You cannot also assume that there will not be cleaner vehicles coming through petrol programs, as well as the cleaner fuels program, so there is quite a significant program being brought in for cleaner fuels and reducing sulfur in fuels at a very stringent rate. That has the potential to also reduce particles. I have not personally reviewed that information, although it would be information that would be fed into the sorts of strategies that need to be brought in place.

The Hon. J. F. RYAN: It would be fair to say that that offers a counterpoint to one of the areas you are relying on for confidence that the standard would be met. If it is proved that the standard would be no better through changing vehicle technology, that would be something you would have to discount, would it not?

Ms CORBYN: We would certainly have to have a look at that, although my understanding is that we expect cleaner fuels to reduce the potential for particle pollution as well as improved new vehicles and standard maintenance programs.

The Hon. J. F. RYAN: The point that the CSIRO was making is that pollutants would be less of the larger particulates but that smaller particulates might increase.

Ms CORBYN: Which is why it is important to have the review of the particles standard, which actually will give us much better information about the implications because I think the jury is still out on large particles, PM10 versus PM2.5. It is important that we get that information. However, it is also important to remember that vehicles are only one part of the contributor to particles. There are other sources and we have opportunities for reducing those. As I said in my opening statement and in our submission to date, we have seen over the last five years three exceedances of particles standard, 50 micrograms per cubic metre.

The Hon. J. F. RYAN: Is that for Sydney or for this site?

Ms CORBYN: For the Earlwood site.

The Hon. J. F. RYAN: The other point made by CSIRO is that this casts some questions on the modelling that was undertaken by the Hyder consultants in that they felt it was based on a mathematical construction that may not be necessarily replicated in real life. What capacity has the EPA to revisit the issue if it proves that the modelling is not as accurate as was hoped?

Mr CROWLEY: As mentioned before, the experience with the numeric model has been that it has proved conservative in practice. The CSIRO raised a number of issues about some of the imports into the modelling. They were discussed and considered in the final conclusions that were made in discussions with DUAP and the EPA, and resulted in a decision to increase the stack up to 35 to ensure improved dispersion. Some of the issues that the CSIRO raised about the modelling influenced that decision-making. The EPA also required additional modelling to be undertaken and we modelled an additional year—1998 as well as 1995 data. We also required physical wind tunnel modelling to be done to get a sense of the robustness of the numeric modelling, and while the CSIRO reports express some concern about the extent to which the two verified each other, the experience gained from the Eastern Distributor where the same process was undertaken has given us some confidence about the modelling. As Lisa indicated, the modelling is about determining whether we have confidence that the system is capable of achieving the outcomes. We still require monitoring to measure that the outcomes have been achieved, and a number of contingency measures will be put in place should it be shown the outcome is not there.

The Hon. J. F. RYAN: Are the standards required for the Eastern Distributor and the Sydney Harbour Tunnel the same as required for the M5 East site?

Mr CROWLEY: The Eastern Distributor has the same standards. The Harbour Tunnel enjoys the benefit of having a 70-metre high stack through to the northern pylon, so this version there is not an issue.

The Hon. J. F. RYAN: Does it have to meet the same standards?

Mr CROWLEY: No, it did not have to meet the same standards. All the modelling indicated there was going to be no issue about meeting standards there.

Ms CORBYN: When the conditions were put on the Sydney Harbour Tunnel the national environmental protection measure was not in existence, even in draft form.

The Hon. J. F. RYAN: That is what I was getting at. To some extent, referring to the example of the Harbour Tunnel may not necessarily be a fair comparison if there is a different set of standards to the M5. Being able to meet weaker standards will hardly build one's confidence.

Mr CROWLEY: The Harbour Tunnel does meet an equivalent in terms of CO standards, and because of the ratio of pollutants you will be pretty confident the same outcome will be achieved.

The Hon. J. F. RYAN: One of the other features of freeways is that they have fairly fast flowing traffic for a while but if a four-kilometre tunnel was suddenly to be blocked on a regular basis in peak hours—which is not inconceivable, the experience of the M4 has demonstrated that. It has

gone to six lanes in some instances and it still has the capacity to be regularly blocked. If that occurs in this tunnel, one would imagine the chances of having exceedances would be very high. Has that been taken into consideration?

Mr CROWLEY: That has been given very careful consideration, primarily because the first thing that would happen is that there would be elevated CO levels within the tunnel, which would be of more concern, and if you can control the CO levels within the tunnel, the external air quality will be similarly protected.

The Hon. J. F. RYAN: Is not the control of the CO level in the tunnel determined by how much you can expel through the stack?

Mr CROWLEY: That is right.

The Hon. J. F. RYAN: How does that give you that certainty?

Mr CROWLEY: Because the people in the tunnel are still being exposed to that air. The situation is that the RTA demonstrated a number of control mechanisms it will use to limit entry into the tunnel should there be a backup of traffic in the tunnel.

The Hon. J. F. RYAN: But I am talking about the normal, standard traffic jams that are likely to happen in Sydney and which do happen regularly.

Mr CROWLEY: That is right. You have two mechanisms. We are getting into a lot of detail which I am not sure helps. There is unlikely to be the sort of situation where you are going to get high levels of particulate, because you are getting very slow movement of traffic. So, you get a different sort of emission coming out of cars.

The Hon. J. F. RYAN: But every bit of that emission is ultimately expelled on Turrella, is it not?

Mr CROWLEY: It is ultimately expelled through the stack, and is then dispersed in the air, at a fairly high level.

The Hon. J. F. RYAN: Is that not going to have an impact on the monitoring that you are doing at Beaman Park, Thompson Street and Jackson Place? Are they not going to experience higher levels? If more traffic in the tunnel is travelling more slowly, is it not a fact that the pollution at Turrella, some five or six kilometres away from the roadway, is going to increase?

Mr CROWLEY: Not necessarily, because you have a number of different controls that you would use. One of the goals of the traffic management system is to keep traffic flowing at a minimum rate of 20 kilometres an hour and to prevent new traffic entering the tunnel if those traffic flows are not being obtained.

The Hon. J. F. RYAN: So you are expecting the RTA to tell cars not to use the tunnel if the speed inside the tunnel falls below 20 kilometres an hour?

Mr CROWLEY: They have a system of traffic control where they can stop traffic entering the tunnel through a series of traffic lights.

The Hon. J. F. RYAN: So there will be a build up and a backup of traffic back along the M5?

Mr CROWLEY: That is right, and if there is a problem, signs to indicate that traffic should take another route.

Ms CORBYN: I think the issue from an EPA perspective is that we have tried to scrutinise the fact that we still have in-tunnel monitoring so we know what is happening from a pollutant perspective and, secondly, we know that the RTA has a traffic management system. It is really up to the RTA to comment on that traffic management system, but it has been brought into place for

contingencies, and the modelling that we have been able to go through from an EPA perspective still provides us with information that says we do not expect there to be exceedances of the standard.

The Hon. J. F. RYAN: The community has provided me with a printout of what appears to be comparative data from the M5 East monitoring stations with the EPA data at Beaman Park. One of the points made to me is that on a number of specific days there can be significant variation between the result at Beaman Park and that achieved by the other two monitoring stations—Thompson Street and Jackson Place, which are the two additional monitoring points the RTA is required to establish under its condition of approval. Given that in a couple of instances there is a reading of 35.3 milligrams per cubic metre of particulates at Thompson Street on one day when Beaman Park will be showing 29.1, and similar differences of around six or seven parts per milligram, given that that is to be a significant difference between the two levels of reading, how will you build that into your protocol to ensure you are determining properly an exceedance has occurred? A difference of six or seven milligrams per cubic metre could make all the difference between whether you determine an exceedance has occurred or not.

Ms CORBYN: That is not information I have seen but certainly there can be different readings at different monitoring stations depending upon the circumstances surrounding those monitoring stations. The protocol will need to be taken into account in defining it. I think the good news is that all of that is under the particular standard so it is not an exceedance, but certainly the protocol will need to take into account a range of different factors as that develops, and that includes monitoring across different ambient stations, not only near the stack but also across the rest of the Sydney area so we can understand what is happening as well as a number of other factors.

CHAIR: If there are exceedances and it cannot be determined whether the stack is causing them, I would ask that ESPs be put into the stack anyway. Is that what you understand the protocol will have in it? If there are so many exceedances a year and you cannot differentiate whether the stack is causing the extra or not, will that trigger the building of the ESPs into the stack?

Ms CORBYN: I cannot comment on what DUAP has commented on, but certainly the EPA role in trying to provide information in the development of the protocol is to try to make a determination about the relationship of the national environment protection measures standard, which is about ambient air and the impact the stack might be having on that. So we would expect a need to be able to understand the interrelationship of both the air quality and what is happening there, and how much the stack is contributing to that. We will need to look at that in the development of the protocol, but I cannot comment on what DUAP is going to do in terms of its consent.

CHAIR: It would be very hard to determine whether the stack is causing the exceedances, presumably? If there are regular exceedances may one attribute that to the stack?

Ms CORBYN: The protocol will need to be able to deal with that. We will be looking at in-stack monitoring. We will be looking at ambient monitoring across the range of different monitors across the Sydney region, which gives us a better indication of what is happening with particles so you can determine, for example, whether there are bushfires or significant hazard reduction burns that raised particle levels across the Sydney region. You can actually determine that. Those sorts of steps, along with other information that we are able to get from the in-tunnel monitoring that is happening as well, will lead to the building of the protocol so there are very clear steps to make a decision as to whether the stack is causing the exceedances or not.

The Hon. J. F. RYAN: But that is going to be a difficult standard of proof, is it not? To some extent the stack becomes something like an accused party: it has to be proven guilty before any action is taken. Some might argue that if the air quality standards in that area are poor and one presumes they are poor because of the nearby Kingsford Smith airport and the fact that it is low, it is a reasonably irresponsible action to put something extra into that air space that constitutes a risk or, if you did, you would at least take precautions, because this stack does not have the advantage of the Harbour Tunnel, which has a 70-metre chimney. It is in a valley, it is next to an airport and it is near residences. One would have thought you would need to be more cautious than simply determining whether or not the stack is causing the problem; it is obviously going to be a part.

Ms CORBYN: Let me be quite clear. This is not just about determining whether there is an exceedance. A comprehensive package is being brought forward to try to reduce background levels. That is a significant step in terms of requirements on the RTA as well as the design of the stack in terms of the height of the stack and the velocity flow through the stack as well as some good modelling.

The Hon. J. F. RYAN: The comprehensive package to date consists of half a million dollars by the RTA for planning purposes over five years. I do not think anyone would call that a comprehensive package.

Ms CORBYN: From our perspective there is a good monitoring program. There is good modelling that shows us from the modelling information we have that the goals can be achieved. A regional air quality management plan is been brought forward. That is quite a significant step, as well as the design of the stack and the way it is run, and a contingency plan in case there are exceedances, which is not what we believe will occur, but a contingency plan is in place to deal with that as well. So, you cannot assume that nothing is happening. I would have to say as well there is a broader air quality management plan that we are continuing to work on to make sure we get improvements in air quality.

The Hon. J. F. RYAN: I do not think anybody would argue that simply planning for something to happen means it is going to happen. The most concrete suggestion that has been made to this Committee is that the plan is going to result in a buyback of wood fire heaters. That appears to be the only thing that will physically change.

Ms CORBYN: It certainly would reduce particles from wood heaters as well as the broader package we have. I think the interesting issue for us is to refocus on the environmental outcomes, and that is very important. When you are dealing with ambient standards, you must look at all the emission sources so we are not saying that things are not being tackled across the board. They are. We have comprehensive education programs as well as other things to try to deal with that.

The Hon. J. F. RYAN: My last question would be that what concerns the people who live at Turrella is that you might well be able to produce a reduction in air pollution in south-western Sydney generally, but that does not change the position you are in if you are living on the ridge at Turrella with a stack next to you. That does appear to be the critical issue. They will not be too worried—to some extent that only adds to their agony—that somebody else in Sydney is breathing better air when they have the difficulty of all the combined fumes of one stream of traffic of four kilometres emptied into their part of the world.

Ms CORBYN: From the EPA perspective we still come back to the environmental outcome. Our predictions are showing that it will be not causing exceedances, and that is the most important step from our perspective.

The Hon. J. F. RYAN: But the tunnel will never produce on its own an amount of 50 milligrams per cubic metre of particulate matter, for example. Until it does that how would you know the tunnel is causing the excess or others? It seems to me that anything less than that you can blame something else.

Ms CORBYN: We are not in this to blame per se. We are in it to try to get preventative action, so programs have been brought forward to try to tackle all the sources of air pollution that might contribute to an exceedance.

The Hon. M. I. JONES: Ms Corbyn, you said if all else fails there is a contingency plan. Would you like to tell us what the contingency plan is, please?

Ms CORBYN: My understanding is there is a development consent condition that actually says if exceedances are caused by the stack the director-general of DUAP will make a decision about the implementation of electrostatic precipitators.

The Hon. M. I. JONES: So that is the contingency plan? That is what we have been discussing all morning.

Ms CORBYN: Yes.

The Hon. J. F. RYAN: You would agree that is entirely a decision for DUAP?

Ms CORBYN: It is DUAP's development consent condition. So, yes. The EPA will be providing technical advice on air quality as well as the implementation of the protocol, but it is a decision as written in the development consent condition as I understand it for the director-general of DUAP.

The Hon. J. R. JOHNSON: On what basis have the emission goals for the M5 East project been set? How do these conditions compare to those in other jurisdictions or to air quality goals applicable when, say, the M2 motorway was opened?

Ms CORBYN: The goals within the development consent have been framed using information from the national environment protection measure on air quality, in particular, I believe for NO_2 and particulates. At the time that the development consent was being framed it was a draft national environment protection measure, but it has since been finalised. In terms of other jurisdictions, my understanding on the ambient air quality, in particular for particles, is that these are very stringent standards by world standards, so to speak. They are much more stringent than those, for example, that are in place in the United States of America. I am sorry, what was the third part of your question?

The Hon. J. R. JOHNSON: How do the conditions compare to the air quality goals applicable when, say, the M2 motorway was opened?

Mr WOODWARD: Essentially the M2 motorway does not have any significant tunnels. So, it does not have goals in relation to stacks on tunnels. So, there is no direct comparison.

The Hon. J. R. JOHNSON: What consideration was given to the health of the local community? Was it a significant factor in setting those goals?

Ms CORBYN: I can comment really only on the national environment protection measure standards. I would really need to have the Department of Health advise in terms of actual health of local community. But there was quite a significant amount of work done in framing the national environment protection measure for air quality on a health basis. So, we view those as having important information on the health basis from which the goals were derived. There was quite a significant amount of work done on health when the national environment protection measure was brought forward.

The Hon. J. R. JOHNSON: What other forms of air pollution affect the Turrella valley? How significant does the EPA view that?

Mr WOODWARD: As Lisa Corbyn mentioned in the opening submission, the main sources of air pollution in the Turrella valley are motor vehicles, diesel vehicles, domestic wood heaters and also commercial premises. Each of those sources generates certain sorts of emissions. Petrol vehicles generate hydrocarbons and oxides of nitrogens as well as carbon monoxide. Diesel vehicles predominantly have emissions of particulates and also oxides of nitrogen. Domestic wood heaters emit primarily particulates, and the main emissions from commercial premises are hydrocarbons. So, each of those has been assessed during this process and in relation to the emissions at Earlwood monitoring station, fine particulates generally meet the NEPM goals and oxides of nitrogen have exceeded that on two occasions between 1997 and 1999 inclusive. So, generally the goals are being met in that particular area.

The Hon. J. R. JOHNSON: Does it matter what type of wood is burned?

Ms CORBYN: Yes.

The Hon. J. R. JOHNSON: Whether it is dry, contains sap, is hardwood, softwood, treated wood, is coal, coke, paper, cardboard or chipboard—has that been assessed?

Ms CORBYN: Yes it does. In fact, the EPA has put out an education package for people trying to encourage them to use dry wood, for example; to actually upgrade the way they use their wood heaters for example because it has the significant potential to reduce particles—not allowing a wood heater to smoulder overnight et cetera.

Mr WOODWARD: There have been changes to regulations in 1996 and again in 1998, which actually put more stringent requirements on the design and operation of wood heaters. So, the EPA has been addressing this both through regulation and education in the design and also through operation. We have found through our research that the education programs have been quite effective, particularly the program that says "Don't light tonight." That part of it is voluntary but it is being picked up by the community. So, when you have that voluntary program together with some of the regulatory programs, we have found overall that has been partly responsible for the reduction in particulates that we have observed through monitoring over the last five years.

The Hon. M. I. JONES: Can you assure this Committee that provided the NEPM goals and all the other goals are not exceeded, wood heaters notwithstanding, there will be no effects on anyone?

Ms CORBYN: That is a health-based question. I would really have to refer to the Department of Health to actually comment. We certainly believe that the air quality standards that have been set are appropriate for the information that we have now. There has been quite a rigorous scrutiny of both the health information as well as other environmental information. So, we feel they are appropriate.

The Hon. M. I. JONES: Surely you integrate sufficiently with the Department of Health to be able to answer that question?

Ms CORBYN: Which is why I have answered that we think that the goals are appropriate and there has been quite a significant scrutiny of the health information. But in terms of providing health advice, that needs to come from the Department of Health, not the EPA.

CHAIR: I have here the M5 East motorway air quality report, an EPA document signed by Nick Agopedies and Mike Dean. At the end it says, "There may be some difficulty in meeting DUAP condition of approval 70 during the tested operation." Condition 70 says, "The proponent must implement any reasonable requirement of the EPA which aims to improve internal air quality as requested by the RTA." Given the likelihood of congested traffic and a minuscule margin of safety, is it reasonable for the EPA to require the RTA to put ESPs in the stack? Why have you not done so?

Mr CROWLEY: The two issues are quite separate. The issue Nick was referring to, I think I have it right, is the in-tunnel air quality, which was related to CO levels and relates to a discussion that was had earlier about how do you manage the congestion in the tunnel. The actual concentrations experienced in the ambient level were influenced by the flow rate through the tunnel. It can be influenced by different processes.

CHAIR: But if there is internal congestion obviously there will be a lot more pollution coming out of a stack.

Mr CROWLEY: The actual monitoring shows that the times you get the highest levels of pollution coming out of the stack do not correlate with the highest traffic flows because you have different types of traffic flowing at different types of the day. The highest level of commercial traffic, which is through the middle of the day, is when you have the highest particulate flows. You have the highest potential for NO_2 levels that actually occurs in the middle of the night and has not really anything to do with the amount of traffic flows. It is about dispersion conditions at those times. There are different sorts of conditions that result in high and low levels of pollution.

The Hon. J. F. RYAN: Are you aware with regard to the issue of dispersion at night that the CSIRO recommended to DUAP that there be the use of fans to assist the dispersion overnight because there was some concern that NO_2 levels would be fairly concentrated at night-time?

Mr CROWLEY: Well, there is that potential and that was addressed through one of the additional conditions of DUAP to set up a matrix of concentration of flow rates to ensure the ventilation rate was sufficient to avoid that problem.

The Hon. J. F. RYAN: I am not exactly sure I know what that means.

Mr CROWLEY: I can try to explain it a bit further, if you wish. What has been set up is a matrix. The actual impact of external air quality to the tunnel is a concentration of emissions put into the tunnel and the amount of air that goes through with it so that you can get better dispersion. If you ensure that the fans are operating at a sufficient rate to get enough flow rate through the tunnel, then you can keep the concentration of emissions below the goals. So, what the community has been concerned about is to ensure that the fan rates are not cut back to save on other costs; that they are maintained to provide that appropriate level of dispersion. What the condition does is set minimum flow rates to ensure that you get the appropriate level of dispersion.

The Hon. R. D. DYER: Supposing there is exceedence of air quality goals on a given day, to what extent scientifically can you sever or separately identify the source of that exceedence between different causes?

Mr CROWLEY: That is an issue that has been discussed previously about the protocol and the fact it has to address a number of issues. One of the key inputs is in stack monitoring so that you know what is coming out of the stack. Therefore, you have a fairly clear idea what contribution is likely to be on the ground. You then link that with analysis of meteorology plus analysis of what has been recorded at various air monitoring stations and develop a correlation over time about the possible contribution between the stack and what has been actually measured at ground level. It is one of the reasons why the RTA was required to put in its monitoring stations ahead of the operation of the stack, to get the good feeling of what the background levels are and what the correlations are at Turrella to other air monitoring stations prior to the stack operating.

The Hon. J. R. JOHNSON: When the Sydney Harbour Tunnel was being built there were dire predictions about emissions. Can you inform the Committee whether the emissions go up through the pylons of the Sydney Harbour Bridge or whether it is in close proximity to St Aloysius school? Is monitoring done because there were concerns raised at the time about the emissions near St Aloysius? Did any of those dire predictions in relation to tunnel emissions come to fruition? You can take the question on notice if you wish.

Mr CROWLEY: We could provide you with more detailed information on notice, but my limited understanding is that the levels have been significantly lower than anticipated. To try to give you some understanding of this, quite a different ventilation system operates in the tunnel, but there is a series of, I think, four to eight fan banks to provide ventilation in the tunnel. Generally the amount of ventilation required has decreased over time as emission performance of cars has improved. Generally it is operating at a small percentage of its capacity in terms of ventilation. So, my expectation from that would be that the levels are quite low. We can provide you with additional information.

CHAIR: Can you explain the role of the EPA when protocols are in place and there are exceedences? What role do you have in the decision about whether ESPs go in the stack?

Ms CORBYN: The EPA will be providing technical advice to the Department of Urban Affairs and Planning. The decisions are made under the development consents. It is my understanding that it is the director-general of the Department of Urban Affairs and Planning that actually makes the decision about whether to activate the condition that we call a contingency condition to bring in filtration.

CHAIR: DUAP says that the ESP will be put in within six months, is that how fast you can act?

Ms CORBYN: I really can't comment on that.

CHAIR: What is your advice?

Ms CORBYN: From our perspective we look at the environmental outcomes. We have not assessed the implication of the actual timing of putting in electrostatic precipitators. We really need to get advice from DUAP and the RTA on that in terms of how much time they anticipate.

CHAIR: Does six months seem reasonable to you, given the advice they would need?

Ms CORBYN: I really can't comment.

The Hon. J. F. RYAN: What role will the EPA have in regulating the stack at all? Can the RTA be guilty of any air quality infringement for which the EPA might take to court in time?

Ms CORBYN: The control conditions are in the development consent so the actions would be brought through the development consent process. The EPAs role would be to provide technical advice to the Department of Urban Affairs and Planning but the controls are actually in the consent conditions.

The Hon. J. F. RYAN: The EPA would in no circumstance prosecute the RTA for emissions?

Ms CORBYN: The EPA is not licensing the stack. The controls actually come through the development consent conditions so legal action in terms of enforcement of the development consent conditions would need to be dealt with by the Department of Urban Affairs and Planning, but we would be providing technical advice.

The Hon. J. F. RYAN: How would that compare to, say, a commercial stack which the EPA would normally licence?

Ms CORBYN: It very much depends on what is in what we call the schedule to the Protection of the Environment Operations Act and that actually specifies what we licence and what we do not licence. It varies.

The Hon. J. F. RYAN: Why does the stack miss out on being licenced by the EPA?

Ms CORBYN: The way our legislation is currently framed, as I said at the beginning, the EPA licences the construction of the motorways. The schedule to the Protection of the Environment Operations Act actually specifies what we licence and what we do not licence. It specifies quite clearly in that schedule that the EPA licenses the construction of the motorways.

The Hon. J. F. RYAN: Once the M5 is under construction, which it obviously is, there is no way that the EPA will ever get involved in the licensing of anything—tunnel or stack—constructed on the motorway because it is already a constructed entity?

Ms CORBYN: We have actually provided advice through the development consent conditions so the State controls actually come through the development consent conditions.

The Hon. J. F. RYAN: Would it be fair to say that people might regard the EPA as a regulator, and unlike Sydney Water that can have licences on its pollution, the RTA is not subject to any EPA licences in regard to the operation of motorways?

Ms CORBYN: That is the way the legislation is currently framed.

The Hon. J. F. RYAN: I have in front of me a set of notes which were prepared by the Department of Urban Affairs and Planning which were obviously meant to be considered by the people, including representatives of the EPA, in August 1997 when first discussions were made as to what conditions might be imposed on the stack. Interestingly enough those notes indicate that one of the choices that needed to be made at that time was whether to impose occupational health and safety standards on the stack as opposed to what is called a 24-hour period condition. One imagines that what has emerged has been a condition which has air pollution averaged over a 24-hour period rather than being considered at any one moment. What was the reason for using the average over a 24-hour period as opposed to exceedence at any one point in time?

Ms CORBYN: The NEPM is actually framed as a 24-hour goal. That is the reason that numbers are in there as they are because it is a 24-hour goal.

The Hon. J. F. RYAN: Are you saying really it was not an option to use an occupational health and safety standard?

Ms CORBYN: I can't comment from my perspective. I do not know the advice from DUAP and it is not appropriate for us to advise on occupational health and safety but from an environmental perspective we used the appropriate goal which was at the time the draft national environment protection measure which was about particulates in particular, and it is a 24-hour goal.

CHAIR: What action is the EPA taking on the question of fitting filters which exist on diesel vehicles? They have been written up in the *New Scientist* and so on. I asked a question many years ago about the role of the EPA in managing and fitting filtration on vehicles. What has happened in relation to that?

Ms CORBYN: I am sorry I cannot comment off the top of my head on that. Most of the new vehicle standards are actually brought through the Commonwealth system because the legislation is that way. The new vehicle standards are actually dealt with in Commonwealth legislation, not State legislation. That has changed from previous times.

CHAIR: What about retrofitting filtration on older vehicles?

Ms CORBYN: I am sorry I cannot comment off the top of my head. I will have to take that question on notice. At the Commonwealth level there are a range of standards being brought forward.

CHAIR: I am talking about retrofitting old vehicles? I am sure you are aware that most old diesel vehicles badly pollute. Why can not the EPA mandate filtration on those old vehicles?

Ms CORBYN: I cannot comment off the top of my head.

CHAIR: Would you find out?

Ms CORBYN: Yes.

Mr WOODWARD: I add that the research shows that most vehicle kilometres travelled by commercial vehicles are by newer vehicles rather than older ones. In other words newer vehicles operate in commercial enterprises generally. Newer vehicles do more kilometres per vehicle and therefore the introduction of the newer goals which provide for much tighter emission controls on the newer diesel vehicles leads to a quicker improvement than trying to retrofit old ones. In terms of cost effectiveness you get a quicker and bigger improvement.

CHAIR: Surely it would be much more cost effective and quicker if the old vehicles, say older than five years, were forced to fit filtration? Could the EPA do that?

Mr WOODWARD: No, the most cost-effective way is to take all the newer vehicles and get those into the fleet because they are ones that do the most kilometres. If you do retrofit older ones that would give you an additional reduction but not as much reduction. You have to weigh up, of course, all the costs that would flow onto the entire community.

Ms CORBYN: We really need to come back to you, I am sorry, and take that one on notice. I really cannot answer off the top of my head because of the complicated nature of both the Commonwealth and the State legislation that deals with vehicle standards, both new and in-service. It is actually very complex. It would be remiss if I actually tried to answer without getting the right advice—

CHAIR: It is a State issue, not a Commonwealth issue?

Ms CORBYN: I am saying the legislation dealing with vehicle standards is quite complex so I would not feel comfortable answering it off the top of my head without actually getting some advice.

CHAIR: Would the EPA have power to do something about old vehicles?

Ms CORBYN: I will have to get some advice on that.

CHAIR: Does the EPA consider the contributions from other industries in the area, and the expansion of the Sydney airport that would affect local air quality?

Mr CROWLEY: One of the outcomes of the air quality management plan is to provide a detailed inventory of the various sources of particulates and nitrous oxides within the subregion around the stack to give us a clearer understanding. We have a reasonable understanding of the various sources from the metropolitan air quality study that was conducted in the early 1990s. The sources of emissions varied between each type of pollutant. Industrial emissions are more important for hydrocarbon emissions. Within the Sydney region they are less important for No_2 emissions and similarly for particulates.

CHAIR: Do you consider this stack to be a significant source of natural oxide for local and regional ozone impacts?

Mr CROWLEY: No, it would not have a significant change to regional impacts.

The Hon. J. F. RYAN: Is there any concern at local levels?

Mr CROWLEY: The expectation is that the NEPM goal be met.

Ms CORBYN: That is right.

The Hon. J. F. RYAN: One of the outcomes of the international tunnel ventilation workshop on which quite a number of people who came from overseas commented, is the enormous amount of energy that would be required to operate this tunnel ventilation shaft as compared to ventilating in a conventional way of more closely along the line of the road with some filtering en route. The level of power required to operate the tunnel is something comparable to the amount of power used by a small rural town. Does the EPA have any concern regarding the extremely large costs associated with this stack in terms of energy? What environmental audit of the energy costs have been done for the M5 stack? Is there a concern that you are creating pollution somewhere else, particularly with regard to greenhouse gas emissions, by the enormous amount of power required to operate the tunnel?

Ms CORBYN: My understanding is that the issue was looked at in the environmental impact statement but it really is an issue in terms of costs that needs to be addressed by the RTA.

The Hon. J. F. RYAN: Do you have any concerns at all that the greenhouse gases being produced to operate this stack which is a reasonably unconventional way to ventilate a tunnel, that is, to take the gases five kilometres away and ventilate somewhere else—it appears that is a political decision rather than one based on environmental or engineering necessity. Does the EPA have any concerns about that kind of decision which involves an enormous use of power just for one road?

Ms CORBYN: We would wish that it would be looked at through the environmental impact assessment process to make sure that people understood the consequences of that.

The Hon. J. F. RYAN: The history is that because the environmental impacts of this road had been determined at an earlier stage when the change was made from three stacks to one which meant transferring the emissions from one place five kilometres through the tunnel elsewhere, that issue has never been the subject of any environmental audit or assessment because of the decision of the Land and Environment Court. Is it a concern to you that a decision that obviously contributes significantly to greenhouse gas emissions has escaped any attention or reporting at all?

Ms CORBYN: I don't have information before me that actually says that it is producing significant greenhouse gas emissions but from an EPA perspective we would wish that people would

look at those sorts of issues. It really is up to the decision-makers in terms of costs and the trade-offs across a range of environmental issues. We have tried to provide some information but only briefly in our submission because generally the EPA does not regulate greenhouse gas emissions.

The Hon. J. F. RYAN: As I understand it, it was stated by numerous people at the international workshop and one commentator said that we would not be allowed to waste that level of power in our country because of stringent requirements with regard to greenhouse gas emissions. Should an agency like the RTA be able to make the same decision when apparently people from overseas say they would not be allowed to do it by their environmental regulators, but it seems that the EPA has not been able to even comment or have any impact on that decision at all?

Ms CORBYN: From our perspective the advice that we have been providing really deals with the environmental issues in particular from an air quality standard that we would normally deal with.

The Hon. J. F. RYAN: Is it fair to say that you have never been asked to comment?

Ms CORBYN: As far as I am aware we have not been asked to comment on greenhouse—

CHAIR: What cost benefit analysis did you undertake before recommending a buyout of solid fuel heaters? How are emissions from them so different from fuel emissions?

Mr CROWLEY: From cars? The air quality management plan, as part of this brief, is to do a cost benefit analysis of various emission controls. We look at the cost benefit of a buyback scheme. The emissions from solid fuel home heaters have much high level particulates than cars which are burning basically a cleaner fuel where you have hydrocarbons as distinct from carbon often in wood.

CHAIR: Has an estimate been made of the cost of buying solid fuel heaters? Has any amount been set aside for that purpose? Will that come out of the $500,000 a year?

Mr CROWLEY: It is coming from the $500,000 a year. The air quality management plan will provide an indication of what sort of scheme will work, based on the experience in other jurisdictions.

CHAIR: If all solid fuel heaters within a 1-kilometre radius of the stack were removed, by how much would that reduce average yearly emissions of PM10 in the air?

Mr CROWLEY: That should be one of the outcomes from the air quality management plan. My expectation is that it would be quite significant.

CHAIR: Does the EPA have any idea whether it should ban the use of solid fuel heaters throughout the Sydney region?

Ms CORBYN: We have brought forward a comprehensive program in terms of the regulation of new heaters, as well as an education package designed to manage, in a broad sense, emissions that might come from solid fuel home heaters. We have been conducting an education campaign, particularly with local councils, to try to reduce emissions from solid fuel home heaters. As Joe said, we also have a program called "Don't light tonight unless your heater is right", which allows us to link meteorological conditions on a particular day that we might be able to foreshadow—particularly during winter—with people's actions on the ground. That has so far been quite a significant process. We do not see the need to make further recommendations until we have gauged how that program has been implemented. We have good regulations, good education programs and public announcements about meteorology.

CHAIR: The time for questions has expired. I suspect that we will have quite a few questions on notice for you to answer.

(The witnesses withdrew)

DONALD ANDREW JOHN WILSON, Chief Health Officer, New South Wales Health, 73 Miller Street, North Sydney, sworn and examined; and

VICKY SHEPPEARD, Acting Senior Policy Analyst in Air Quality, New South Wales Health, Admin Building, Gladesville Hospital, Victoria Road, affirmed and examined:

CHAIR: Did you each receive a summons issued under my hand in accordance with the Parliamentary Evidence Act 1901 and are you conversant with the terms of reference of this inquiry?

Dr WILSON: Yes.

Dr SHEPPEARD: Yes.

CHAIR: If you consider at any stage during your evidence that in the public interest certain evidence or documents that you may wish to present should be seen or heard only by the Committee, the Committee will be willing to accede to your request. Do you wish to elaborate on your submission or make a short statement?

Dr WILSON: No, not at this stage.

CHAIR: What involvement did the Department of Health have in assessing the air quality impacts of the M5 East stack before the roadway's approval, and how can that lack of involvement be explained? I am sorry, I am pre-empting your answer to the first part of that question.

Dr WILSON: I will pretend that I did not hear it. I will ask Dr Sheppeard, who was most intimately involved in that process, to give you an outline.

Dr SHEPPEARD: Representatives of the environmental health branch reviewed the impact statements for the M5 East and provided advice to the RTA and to DUAP about the implications of the roadway. This included advice as to the emerging NEPM—it occurred in 1996 or 1997 before the new goals had been set. We also advised that a higher stack would provide better dispersion and lower ground level concentrations of pollutants.

CHAIR: Did you give any advice about the health impacts of PM2.5s and what proportion of those would be in the air after the stack was built?

Dr SHEPPEARD: In 1996 or 1997?

CHAIR: When you gave advice, did you advise about PM2.5s?

Dr SHEPPEARD: Not specifically. PM2.5s are such an emerging issue that there were no, or very few, health studies on them at that stage.

CHAIR: The report on sick cities was published in 1993, was it not?

Dr SHEPPEARD: That is correct.

CHAIR: And there have been many other reports since then.

Dr SHEPPEARD: Yes, but they were mainly PM10 studies.

CHAIR: The report was on PM2.5s.

Dr SHEPPEARD: No, I do not believe so.

CHAIR: There has been a considerable amount of evidence—I searched for it yesterday—on the health effects of PM2.5s and there is now a United States [US] standard. Is that correct?

Dr SHEPPEARD: I am not sure whether that standard has been approved; there has been considerable debate in the United States about PM2.5s.

CHAIR: Are you aware that the bulk of PMs coming from the stack will be PM2.5s or less and not PM10s?

Dr SHEPPEARD: That is what the EPA is measuring and assessing. The point about the issue of PM10s versus PM2.5s—I think this was illustrated very well by the Kunzli study in Europe last year—is that we do not put people into chambers and expose them to specific air pollutants when we assess the effects of air pollution; we assess a cocktail of air pollutants. When an eminent group such as Kunzli uses PM10 as an indicator pollutant for the pollutant mix across Europe, it is not ignoring the fact that there might be effects due to sulphur dioxide, PM2.5 or PM1—all these pollutants occur in proportion across the spectrum of urban development because the main pollutant is motor vehicle pollution. Therefore, one does not need to pay too much attention to a particular fraction. The health effects are assessed across a city. If you measure an indicator pollutant across a city—in this case, it is quite easy to measure the indicator pollutant PM10—the effects of PM2.5 will be incorporated in those health effects.

CHAIR: I am referring to the stack in the valley. It is a very localised community and I am talking about the effect on that community. I understand from evidence that the Committee has received that the bulk of PMs that will come through the stack will be PM2.5s not PM10s. So an exceedence of the US standard might occur on many occasions although there is not yet an Australian standard for PM2.5s.

Dr WILSON: Our point is that the indicator that is used for most health studies around the world on the impact of air pollution is the larger particle size. We believe that incorporates the effect of the smaller particles. The published information on PM2.5s suggests that, when you concentrate on measuring the small particles alone, the increased risk that you find from moving from particle size 10 to 2.5 is very small—less than 10 per cent. We are more than happy to consider any additional information that might have been made available to the Committee and is not available to us. However, we doubt that it will alter the estimated health effects that we have talked about so far in our submission.

CHAIR: I am worried that there has been no assessment at all of PM 2.5s and that there is no relevant standard in this country.

Dr WILSON: I am sorry, but I do not think you understand what we are saying. The issue of 2.5s is considered in the context of considering PM10s. A separate study is unlikely to make any substantive difference in terms of the overall health effects. The type of interactions or effects that you find as a result of health pollution are unlikely to be different whether you use 10 or 2.5.

CHAIR: I understand that, but my point is that perhaps 70 per cent of the PMs coming from the stack will be 2.5s and the US standard for 2.5s is half that for PM10s. If there is a quantum of ten coming from the stack, that equals 20 for mostly 2.5s. Therefore, we are underestimating health effects because we are not taking account of the fact that most of the stuff coming from the stack will be smaller material that causes more damage.

Dr SHEPPEARD: I have not heard the estimate of 70 per cent; that is a very high proportion.

CHAIR: We have received evidence to that effect, which we will hear about on Thursday.

Dr WILSON: We will be more than happy to consider that information. If additional information has been presented to the Committee, as always, we will be more than happy to look at it and provide advice about what it means from our perspective.

CHAIR: What evidence does the Department of Health have that there will be no acute, long-term health impacts as a result of vehicle emissions from the M5 East stack?

Dr WILSON: We have provided in the documents you have been provided as part of this an assessment of what we believe the likely health impacts of the model discharges from the stacks would be. We believe that those health impacts are very, very small on the basis of the information that is available to us. If the Committee has other information that it wishes us to consider, as I said, we are more than happy to consider that information.

CHAIR: There was an assessment by the Department of Health some years ago that there were something like 400 deaths per year from particulate matter in the Sydney basin. Are you aware of that?

Dr SHEPPEARD: Not directly. We have done studies of the effects of air pollution on health in Sydney. We found that, due to particles, there was about a 1 per cent increase on annual mortality due to air pollution. That is on an underlying rate of mortality in Sydney, which I think is about 600 per million.

Dr WILSON: Per 100,000, something like that.

Dr SHEPPEARD: I would have to check the figures again. As a rule of thumb, we attributed about half of that air pollution in Sydney to motor vehicle pollution, so about half the impact that we calculated would have been due to motor vehicle emissions.

CHAIR: About 0.5 per cent increase on the—

Dr SHEPPEARD: Underlying mortality rate for each 10 microgram increase in PM10.

The Hon. R. D. DYER: Dr Wilson, you will be aware that this Committee held an earlier inquiry into this very subject matter in 1999. As part of its report flowing from that earlier consideration of the matter, the Committee saw fit to make a recommendation relating to an epidemiological study of the health and community in the area of the tunnel emissions. The Government made a response to that particular recommendation, which stated:

> The Department of Health has advised that it is questionable whether a study as contemplated by the inquiry would contribute meaningful data to current knowledge of the health impacts of vehicle emissions.

Can you comment briefly as to why that would be the Department's attitude?

Dr WILSON: There are significant limitations to what you can and cannot do with epidemiological studies. Basically, the smaller area you are trying to look at and the smaller number of people you are trying to look at, the less reliable it is as a method of looking at health effects. Based on the estimated number of people that were likely to be exposed to an increased level of pollutants as a result of the stack, it is our belief that you will not get out of that results which would be in any way interpretable. It is not that we want to play down the role of epidemiological studies in this regard. They have an important role in trying to determine cause and effect and in monitoring overall effects but as soon as you start to look at smaller and smaller populations it becomes extremely difficult to monitor that.

I should also like to distinguish between the role of health surveys and epidemiological studies as a way of studying health effects versus attempts to monitor the health of particular groups in the population. The reply that has been given is whether we would be able to set up a study in some way or another that helped us to understand better what the health effects of the stacks would or would not be, as that case may be. Our view is that given the number of people that according to the modelling would be exposed, that is highly unlikely. However, there may be a role in this regard in terms of reassurance to the community of what I would call health monitoring, which is systematically looking at people's health over a period of time and providing them with some reassurance about what is actually happening in the community. That is something that is certainly possible, given the sorts of numbers that I am informed are likely to be within the area, according to the modelling.

The Hon. R. D. DYER: Arising out of that Government response to the Committee, RAPS, or Residents Against Polluting Stacks, stated in the form of a letter to this Committee:

> What is recommended is a study which would quickly identify the appearance of such effects as and when they appear around the stack. It should always be remembered that effects documented and relevant studies were first noticed and quantified as a result of the observation of clusters of specific illnesses close to the ends of unfiltered tunnels. The question is not one of causation but occurrence, which can best be determined by a properly constructed study.

Would you like to make any comment to the Committee about those observations?

Dr WILSON: The same problem emerges in terms of trying to conduct a study. It does not get around from our comment. It is not that we are unhappy to conduct a study. We just want people to be aware that the limitations of this method are unlikely to reduce the result that they want and is likely to be as confusing as much as any. It is not an issue that we are not prepared to be involved in health monitoring; we are certainly more than prepared to be involved in that and to work with the community to develop an appropriate way of doing that. If it is an ongoing issue for the Committee that it believes it is something that should be done to reassure the community, we are more than happy to relook at it but we want to flag that our experience in doing this sort of the study in New South Wales and international experience has been that they do not necessarily add very much to what is actually happening.

The Hon. J. H. JOBLING: The RTA suggested that it was in fact simply the builder of the tunnel and not expert in extraction. With that in mind, could you tell the Committee whether the RTA consulted you in relation to the plume dispersal expected from the stack and the question of how it would deal with the proposition of drawing a line on buyback?

Dr WILSON: If you do not mind, I will ask Dr Sheppeard to answer that.

Dr SHEPPEARD: I guess that was in two parts. Did the RTA consult us about the plume dispersal? Not specifically but we have reviewed the plume dispersal predicted by the different modelling which was in the review of environmental impacts and also mainly at the tunnel workshop. No, the RTA did not consult us about the property buyback boundaries.

The Hon. J. H. JOBLING: As the RTA did not specifically consult you, did you undertake an investigation as the Health Department in its own right? What prompted you to look at this proposition? What specific advice did you give back to the RTA in relation to both the plume dispersal and the buyback?

Dr SHEPPEARD: We have not given any advice to the RTA about the buyback.

The Hon. J. H. JOBLING: And the plume dispersal?

Dr SHEPPEARD: As with any environmental impact statement or review of environmental factor statement that we receive to review and look at the health impacts, we look at their projected emissions, what the associated health effects might be and what population might be affected. That is our role.

The Hon. J. H. JOBLING: If the RTA was then to say to either yourself or to Dr Wilson that it relied on the advice of the Health Department, having not asked you questions, where do you think the RTA's security stands?

Dr WILSON: As I said, we are not aware that the RTA has asked us about the buyback. We have certainly provided comment in relation to the plume. The RTA may well have got advice from elsewhere but if it seeks advice from us we will provide that advice.

The Hon. J. H. JOBLING: In view of what I understood you to say to the Committee, would it be reasonable that health monitoring is something that takes time? I understand that it is a long-term project that could take up to 20 years to determine problems that arise. Would this be a fair assumption in generalities?

Dr WILSON: I am not quite sure I understand your question. Certainly in terms of some of the health effects that people are talking about, the latent period—the period before some of those illnesses may develop—could be quite an extended period of time. Most of those ones are things that

we could pick up, for instance, cancers could be picked up through existing monitoring systems. It is more the areas of respiratory disease which will be difficult for us because that is not routinely notified.

The Hon. J. H. JOBLING: I understand that you are talking about cancers, some of which, depending on the causal effect, might take five, 10, 15 or 20 years to show up. If you play with mesothelioma, you will not see this for many years. I would expect a more cautious answer from the Health Department.

Dr WILSON: I think you are confusing two issues here. One is the issue of the health assessment in the first instance, which is based on longitudinal studies that have been done elsewhere and give us a sense of the relationship between various types of exposures and disease or illness outcomes. That information is used to make some assessment of the exposure risks in the first instance. It will always be the case that you are trying to make a decision in a prospective way and you are trying obviously to look at what the risks and benefits might be in that situation. The secondary consideration is what happens subsequently. In some situations it may be appropriate to continue health monitoring past that time. All I am saying to you is that for some diseases in the community we have systems for recording those illnesses in an accurate way. Cancer is one of those things for which we have mandatory notification in New South Wales. That means that we have very good time data on cancer and we can monitor it without special studies. Other diseases require us to do special studies or special monitoring activities if we want to look at them.

The Hon. J. H. JOBLING: I find it amazing that the answer you have given me has no scientific rigour whatever attached behind it, and you well know it. If you were to undertake such a study, could you perhaps tell the Committee what you would consider a reasonable number to undertake such a study on which scientific rigour could be accepted and the results might reasonably be able to be evaluated?

Dr WILSON: Just before you came in I was explaining that one of the difficulties in this situation is that the size of the population which the models project would be exposed is relatively small. It will be very difficult to detect changes in the health of that population just because of the number of people who are in it. That is one of the reasons why, in our response to the earlier Committee, we said that extremely limited benefits might come from these studies. In my earlier comments I distinguished between epidemiological studies, which were looking at cause and effect, and studies which were monitoring health in a community, which were as much about reassurance for the people in the community as they were about investigating health effects.

The Hon. J. H. JOBLING: I come back to the same question. If you were running such a study, will you tell the Committee what number of people you would expect to be a reasonably acceptable number for the scientific study to have rigour—100, 200,500?

Dr WILSON: The situation is not quite as simplistic as you put it. It depends on the frequency of the disease in the community that you are talking about. If it is a common disease then the number of people you need to study is relatively small. If it is a rare disease, such as cancer, then the numbers you will need to study will be very large.

The Hon. J. H. JOBLING: Do you know what you are studying and looking for at that stage?

Dr WILSON: If the Committee would like some estimates of the numbers of people that would need to be studied to measure the precise effects, I am more than happy to provide those. It is not a particularly difficult, complicated calculation to do once you are clear on the issues you want to measure and what the exposure is likely to be.

The Hon. J. H. JOBLING: We know the number of residents that are likely to be within the region by kilometre or plume fall out of the stack. Are they the sort of numbers we are talking about?

Dr WILSON: We think that those numbers within the exposure distance from the stack are such that it is unlikely that we would be able to detect health effects in that group.

The Hon. J. H. JOBLING: How many numbers are you talking about?

Dr WILSON: You are talking about many thousands rather than a couple of thousand.

The Hon. J. H. JOBLING: Many thousands are not a sufficient area to pick an individual effect if there is something extraordinary happening there?

Dr WILSON: If there is something extraordinary happening, if it is so extraordinary to be of that magnitude it is likely to be evident even in the data we collect now.

The Hon. J. H. JOBLING: I am sorry, Mr Chairman, I am stunned that a person of science would give me that answer when nobody else has ever come up with that as an answer to scientific rigour.

The Hon. M. I. JONES: You mentioned reassurance for the people. Can you guarantee with the NEPM goals and the other goals that we talked about today, set by the EPA and DUAP, that the public that is likely to be affected by the stack, who live around the stack, are not going to be used as guinea pigs?

Dr WILSON: Based on the best information that is available to us we have tried to make some estimate of what the health risks, the health impact of the discharge from the stack is likely to be. Our estimates, based on the best information that is available from around the world, is that those impacts are likely to be extremely small. That is as much of a guarantee as we can give in any situation based on the best scientific information that is available to us. The estimates of what the exposures are likely to be, we are saying based on that information the likely health effects from this are very small.

The Hon. M. I. JONES: Are they to be further minimised if electrostatic precipitators were to be fitted to the stack?

Dr WILSON: We think that the reduction that would result from that would be pretty minimal.

The Hon. M. I. JONES: It would enhance your ability to guarantee their health?

Dr WILSON: The effect would be very small.

The Hon. J. H. JOBLING: How do you know? You have not done a study. How do know? You have complained about a series of situations and now you are making statements that are unscientific and with nothing to back them.

Dr WILSON: I do not actually recall making any complaints, but the issue is that based on the scientific information that is available we have made the best estimates of the health impacts available. We have to do that in effect because once the tunnel is there we need to provide some advice to government in advance about what the health impacts are likely to be. We have done that based on the best scientific information that is available.

CHAIR: I wonder whether the Department Health could be under a good deal of pressure. I have a file note of the New South Wales Health Department signed by Stephen Corbett, dated 19 February 1997, which says, "My only concern is that this is a hot political issue at the moment and that by saying we are weighing in against the RTA. It would not be a good look for us to be arguing with them in public." Is it a fact that the RTA is a heavy-duty body that stands on the New South Wales Health Department, and you cannot be independent in your advice to them because it is a hot political potato?

Dr WILSON: I personally have been brought under no pressure by the Government, by the RTA, by the EPA, to provide anything but the most considered advice I can based on information that is available on what the health effects are likely to be for this.

CHAIR: So you think this comment here by Stephen Corbett is probably not accurate?

Dr WILSON: All I can say is that that is the area of the department that I manage, and I have not been brought under pressure by any of those bodies to provide anything but accurate advice on what the health impacts are likely to be.

CHAIR: What evidence does the Department of Health have that ambient air quality standards are appropriate for a point source of emissions? How does this differ from the approach taken in occupational health and safety?

Dr SHEPPEARD: Ambient air standards are based on health impacts, they are not necessarily set at the level that a health impact occurs. Sometimes there is a margin of safety area where a health impact is observed, for example with NO_2 and when the standard is set. Sometimes with particles, as you knowthere is a range of effects so that there is no actual threshold dose. An air quality standard is basically a consensus of health impact and what is achievable. The Australian NEPM has undergone rigorous evaluation, and it is one of the most stringent in the world. It is a reasonable standard applied to ambient air quality in Australia. So far as point sources go, they are not designed to be applied to point sources, but they are often applied to point sources. If a point source complies with the ambient goal for the whole city that means that the point source will not be contributing to excesses to the ambient levels. That is the one point on that. The other point is that as the NEPM goals are based on health effects, then they are reasonable to be applied to a point source as to whether the community will interact with emissions from that point source.

CHAIR: What comes after this particular point source is not necessarily the same as what is in the ambient air. You are aware of that? Components that are coming out of the stack can be very much different to what is in the ambient air. Have you done a study on what is actually coming out of the stack?

Dr SHEPPEARD: That is what is has been predicted, the increments of what comes out of the stack.

CHAIR: You mean what components are coming out, like nitrogen oxide, nitrogen dioxide and carbon monoxide?

Dr SHEPPEARD: Yes, that is what all the modelling has looked at as to what emissions are from the stack.

CHAIR: How different in composition is that from the ambient air?

Dr SHEPPEARD: It is not only what comes out of it, it is what gets dispersed and what is detected at ground level, so it is not exactly what comes out of it; it is what people receive at ground level where the stack contributions come down. They are the same basic components because most of our ambient pollution in Sydney is from motor vehicles.

CHAIR: About 30 per cent?

Dr SHEPPEARD: Probably higher, depending on the season. But the assessments that we have made on the impact have come from the stack emission levels, so that we have assessed what has come out of the stack and what impact that would have on health.

CHAIR: Do you have that written down somewhere in a document?

Dr SHEPPEARD: It has been summarised in our submission and it is based on the modelling of Holmes and the CSIRO.

The Hon. J. F. RYAN: I do not think we have a submission from the Department of Health.

Dr WILSON: Not for this particular inquiry, but certainly for the previous ones.

The Hon. J. F. RYAN: No, we do not have that, either. The difficulty is that the Department of Health has not provided submissions for this inquiry at all.

Dr SHEPPEARD: I am sorry, as far as I now it has gone through our system and I would have believed that it would have—

The Hon. J. F. RYAN: It would not be the first time that you have prepared some advice on this issue that has not reached the public, would it? Do you recall once writing with regard to the use of technology that electrostatic spectators could be used to remove particular pollutants from stack emissions? You said that the use of such technology would reduce levels of particulates but would principally impact on regional particulate levels? Are you aware that that draft of letter that was prepared in response to a letter from WRAPS, never reached WRAPS?

Dr SHEPPEARD: No.

Dr WILSON: I am sorry. The department has prepared advice in relation to this for the Committee. All I can offer the Committee is to find out where it is. I can assure you that I have signed off on such submissions.

CHAIR: We do not appear to have received them.

Dr WILSON: I apologise if it has not arrived. All I can do is find out for you where it is.

CHAIR: We did not get one the last time, either, in 1999

The Hon. M. I. JONES: Are either of you really concerned about the outcomes of the building of this stack and is detrimental effect on health? Are you really concerned about what might happen as a result of this damn thing being built?

Dr WILSON: I think there are two components to what you are asking. The first is, based on the information we have at hand we do not believe that there is going to be a significant health impact on the local community. From that perspective we have given what we believe is honest advice about what the effects of the predicted modelling is from that. The second component of it is whether I am concerned for the community surrounding the stack in relation to their concerns about the health. Of course I am. I am the Chief Health Officer in New South Wales. It causes me concern when people are worried about their health. We want to give them some reassurance about that. Our modelling of that and our interpretation of data suggests that there are minimal health effects to them, but as I have said earlier in the information, if there are other ways that we can help reassure the community then we would try to do so.

The Hon. J. F. RYAN: As I understand it you have not been asked to provide the Government or the Department of Urban Affairs and Planning with any written advice specifically with regard to the health effects of the M5 ventilation tunnel. You may have prepared submissions to this Committee and other places, but to the best of my knowledge we have yet to cite any written advice from the Department of Health on the potential health impacts of this tunnel from the Department of Health at all. As I understand it, the explanation for that is that you have not been asked to provide it and it is not normal as I understand it, and if I might quote another note from Dr Sheppheard, she said that there is no legislative or regulatory requirement to participate in the assessment or approval of major developments, such as the M5 East tunnel, and provide advice to other departments or members of the public when requested in relation to such developments.

Dr WILSON: That is the current legal situation in New South Wales, but where we see issues that we believe are important, like the M5, we have prepared advice by reviewing it. The legal situation is exactly as you have just described it.

The Hon. J. F. RYAN: Precisely. But you would only provide advice if you were asked, would you not?

Dr WILSON: No, we provide advice in some situations where we believe there is an issue of enough concern or there are specifics of the situation that would raise concern, and that is exactly what we have done in this situation.

The Hon. J. F. RYAN: In regard to the development approval procedures conducted by the Department of Urban Affairs and Planning did the Department of Health provide any advice on the potential health impacts of the emissions from the tunnel? If so, could you supply it to this Committee, because to the best of my knowledge we do not have one.

Dr SHEPPEARD: This is back in 1997, 1998, we provided a letter to DUAP and one of the recommendations that the emerging NEPM goals and the stack height should be 35 metres to increase dispersal.

The Hon. J. F. RYAN: Another issue I would appreciate your commenting on is the cumulative impact. The NEPM goals are satisfactory in terms of determining the level of pollution over an average period of time, but one of the things they do not necessarily take into consideration is the cumulative impacts of being exposed to that level of pollution day after day. What comment does the Department of Health have with regard to the potential cumulative impact of living in an environment that is close to the mark of the NEPM goals, which is what is going to happen at Turrella?

Dr SHEPPEARD: The modelling predicted an average increase of about an annual increase of 0.3 micrograms per cubic meter on the annual average PM10 level in that area, and using the estimates from the six city study or from the recent European assessment of the effects of air pollution, they look at long-term impacts, so we can relate that 0.3 microgram increase to the long-term estimates that were done in the United States and Europe, so those are the cumulative impacts; that addresses cumulative impact.

The Hon. J. F. RYAN: Another group of people it is important to consider are vulnerable people who might live in that environment, not necessarily the average healthy individual, but kids with asthma or people suffering chronic illnesses. The NEPM for nitrogen dioxide is apparently 256 micrograms per cubic metre. Modelling suggests that the stack may cause exposure close to or around that level. Are you aware of any evidence to the effect that asthma events can occur at levels below that because I understand there is potentially some evidence that suggests asthma can occur in certain sensitive individuals by a mere half hour exposure to a level of 180 or 200 micrograms per cubic metre, which would suggest that the NEPM goal may not be strong enough for vulnerable people, although it may be fine for people who are not vulnerable?

Dr SHEPPEARD: That is covered in our submission and I have a copy of that, if you would like it now.

Dr WILSON: We will also give you a copy of the submission.

CHAIR: It would have been good to have that before today. Why did we not get the submission?

Dr WILSON: As I indicated to you, I will find out and ensure that the submission arrives.

The Hon. J. H. JOBLING: That leaves us in a difficult situation, you would admit.

Dr WILSON: Yes, and it would have helped with a number of discussions we have had today if you are that had the advice set out. I apologise. I do not know where it is but we will attempt to find it for you.

CHAIR: Is it stuck in the Minister's office?

Dr WILSON: I could not comment on that.

Dr SHEPPEARD: As regards to nitrogen dioxide, we tried to point out that the evidence on that is very mixed. We are very concerned about it. Some studies have pointed to effects on asthma and on children's health at low levels, whereas other chamber studies show no effects at levels many times above the goal, even on susceptible populations, so it is much less clear-cut than the effects of PM10s on health.

The Hon. J. F. RYAN: I draw your attention to a media report in 1997 which was headed "Eastern tollway damned as a health risk", and suggests that there was a confidential memo within the Department of Health that expressed alarm that air pollution in eastern Sydney would be pushed above World Health Organization standards if—and I think it is with regard to the Eastern Distributor—it went ahead. Is it at all possible you could find for the Committee the advice the Department of Health might have given with regards to the Eastern Distributor because that appears to have been given roughly around the same time as a request for advice about the M5 East stack and as one person suggested to me that might well indicate why Mr Corbett was reluctant to have an open slanging match with the RTA in public?

Dr WILSON: I am happy to try and find that out. I do not remember that particular headline but whenever something gets leaked from the Health Department that is a discussion of what may or may not be the case, it usually results in those sorts of headlines.

The Hon. J. R. JOHNSON: Are there any attributes you can give to that document?

The Hon. J. F. RYAN: I can table it. I confess that I have not read the entire document and I said that it is an unattributed source. It just says that it is Health Department advice, which was then received by the newspaper.

The Hon. J. R. JOHNSON: Perhaps the Gulargambone Gazette?

The Hon. J. F. RYAN: No, it is that wonderful journal, the *Sydney Morning Herald*.

The Hon. M. I. JONES: You made mention of reports you received which expressed detrimental health effects with regard to asthma.

Dr SHEPPEARD: Yes.

The Hon. M. I. JONES: Although there were other contributors.

Dr SHEPPEARD: With regard to nitrogen dioxide, there is contradictory scientific evidence.

The Hon. M. I. JONES: Given that we are really dealing with the health of a large number of people, would it not be prudent to take a worst-case scenario and make available such reports?

Dr SHEPPEARD: Certainly I believe that I have included them in the references of the Health Department's submission.

Dr WILSON: The impact assessments we have done have not been based on the minimum level of exposure but on the worst predictions of the models that come out of it. Is that what you mean?

The Hon. M. I. JONES: Not exactly, no. I am not asking for your findings on these reports that you have received. How about tabling the reports themselves?

Dr WILSON: You mean the studies themselves?

The Hon. M. I. JONES: Yes.

Dr WILSON: I am more than happy to do so. They are in published journals. It is not material which is commissioned by the department and which is not necessarily automatically in the public arena. These are all papers which are in published journals.

The Hon. M. I. JONES: So this is not specific to Turrella?

Dr WILSON: This is not specific to Turrella. We have to interpret the best scientific evidence that is available and try to interpret what that means for the people of Turrella, but there is no

reason to suppose that the people of Turrella will react differently to the air pollutants than people in neighbouring suburbs or anywhere else in Sydney.

The Hon. M. I. JONES: From the comments made by Dr Sheppeard I was under the impression that it was specific to this likely increment of pollutants into this region.

Dr SHEPPEARD: The pollutants in this region are the pollutants that are encountered elsewhere in urban areas throughout the world.

The Hon. M. I. JONES: But there is the specific concentration, though. You have 4½ kilometres in a tunnel coming out at one specific point. That would create an increase in the incidence of pollution fall for those people.

Dr SHEPPEARD: Yes, but the modelling has shown that by the time what comes out of the stack reaches the ground, which is where the people encounter it, it is diluted to the extent that it is almost indiscernible from the normal air in Sydney.

The Hon. M. I. JONES: An awful lot of people, myself included, are not prepared to accept that argument. Coming back to what you said—and I am sorry to harp on about this, Mr Chair—you inferred that there were specific reports regarding increase in asthmatic conditions. I assumed that that was based upon an increase in pollutants but you say that it is not, so I do not see why there would be an increase in asthmatic conditions.

Dr SHEPPEARD: There are a number of studies, for example, Dr Pilotto's study of schoolchildren, which found that with rather low levels of nitrogen dioxide they had an increase in coughs and more days off school. That is one of the few studies that have shown effects at that kind of level. When people have been put in chambers they might receive up to about 15 times that level and not have any increase in their asthma conditions and the kind of levels that are found in chambers that affect people are two or three times higher than the goal. A couple of studies have shown effects at low levels but it is not right across the spectrum of scientific literature at the moment, so there is quite a lot of doubt as to whether effects do occur at those levels.

The Hon. M. I. JONES: Do you think enough work has been done apropos this specific stack?

Dr WILSON: My understanding is that the proposal includes fairly extensive local monitoring around the stack, once it is commissioned, of the emissions that come from that, so we will know fairly rapidly because my understanding is that the M5 is predicted to reach maximum traffic capacity fairly quickly. Therefore, we will know fairly quickly what the levels are likely to be in the surrounding community and whether or not the predicted levels are below or above what has been predicted.

The Hon. M. I. JONES: But the answer you gave to my colleague the Hon. J. H. Jobling a short while ago was that your response to the numbers that will be required to monitor this would be too confusing.

Dr WILSON: That is exactly my point. The issue here is it would be very difficult to base the impacts on the basis of the health change in that community. The best way of doing it is to look at the exposures that they get. The best way of doing it is to follow up and make sure that the predicted levels of pollutants in that community are least the same as, if not less than that predicted from the lower levels in the models.

The Hon. M. I. JONES: But would it not be worthwhile doing more work in advance of this happening rather than using these people as guinea pigs?

Dr WILSON: There is a volume of work going on around the world all the time looking at this sort of stuff.

The Hon. M. I. JONES: But it is not case specific to Turrella.

Dr WILSON: I am not quite sure what it is you think could be done at Turrella to test the people of Turrella in relation to air pollution. I am more than happy to consider it, but I am just not quite sure what you think we could do.

The Hon. M. I. JONES: My suggestion would be that you take a different position against this wholesale government department approval of the stack. In coming to that consideration I think too little work has been done on the likely effects from a stack that will be below ground height for many people. Too often during the course of today we have heard about the effects at ground level. The effects at ground level for many people are above the level of the stack. I have been dissatisfied all day with many answers given to these questions. There seems to be a towing of the line, as it were?

Dr WILSON: That is not my understanding of what the predicted models show for the on-ground exposure to people. I do not believe that the modelling, as it has been done, agrees with the statement you just made, that is, that people at ground level will be exposed to higher levels of pollutants than the Australian standard recommends. My understanding is that what you just stated is incorrect.

The Hon. M. I. JONES: What if I am right and their health deteriorates?

Dr WILSON: My understanding is that based on the best information we have at the moment, that is incorrect.

CHAIR: Would it not make sense, with the obvious controversy surrounding this stack, to do a health survey or prestudy of individuals living within a one-kilometre radius of the stack, and then a follow-up study of these people?

Dr WILSON: There is no doubt that that study can be done. Nobody is questioning the fact that that study can be done. The caution that I am urging here is that it may not give you the answers you are talking about. It may just confuse the issue. It will not necessarily show any changes of the type that we are talking about. The level of change that is predicted from the best that we know about the way that people respond to air pollutants suggests that there will be a very, very small increase, if any, in any illness in that community and trying to measure that will be very difficult with the sorts of numbers that are there. That does not mean we cannot do that study. We are just saying that the results will be so difficult to interpret once we got there. We are saying that the most important thing, based on what we have at the moment, is the monitoring of the exposure because that can be reliably measured and we know what the impact of those levels would be.

CHAIR: But you have no data to go from. Things do deteriorate and the PMs do increase. You have no base data to work from. If you did a health survey of 500 to 1,000 homes in the area, a detailed study of how many people had asthma, how often they had asthmatic attacks or what other ailments they had, that could be monitored year by year and would give some criteria on whether it may have been caused by pollutants.

Dr WILSON: All I am saying is that it is possible to do that study, but I am being cautious about how that would be interpreted and what the results might show in relation to that study. I am just saying, from a scientific perspective, that what that means or what reassurance it may or may not give to the community will be limited.

CHAIR: It might be of use to the community.

Dr WILSON: That is what I said earlier. There are two elements to what you might be doing in terms of monitoring the health of that community. One is a scientific study about the health effects associated with the stack. The other is about a monitoring exercise, which is about the health of the local community and reassurance for that community. I am not dismissing those as important components of what we should consider in relation to this but I am just urging some caution, as Mr Jobling was pushing me about before, about what the scientific merits of that would be as opposed to its reassurance value to the community. They are different things. That is all I am saying.

CHAIR: There might be startling changes.

Dr WILSON: I think that is very unlikely based on everything we know about air pollution, based on the experience elsewhere—we are not unique in this regard—and based on a large amount of work that has been done. I think that is very unlikely.

The Hon. J. H. JOBLING: Dr Wilson, I found your last comment interesting. If I were to say to you as a department, and an important department in New South Wales, Public Health, would you reasonably understand why in most of these cases of involvement in developments people would perceive you as reactive rather than proactive?

Dr WILSON: The nature of the legal requirements which are placed on a department more often than not place us in that situation that you are describing, yes. I would reply in that way.

The Hon. J. H. JOBLING: Therefore, irrespective of what happens in a development, the department sees its critical role as waiting for something to happen and after a period of time then reacting to whatever is there?

Dr WILSON: If I could answer that slightly differently to what you have asked me.

The Hon. J. H. JOBLING: I may come back to you. You can.

Dr WILSON: I am more than happy to come back to it, but let me just put it this way. It is something I have been trying to change, that is to get us involved in the assessment of these processes at the earliest possible time, because the earlier we are involved the more we can better understand community concerns around what the issues are, the more we can contribute information about what the health impacts may or may not be and the limitations of the information or what the scientific knowledge is at an early time. Therefore I believe that Health should be involved at the earliest possible time in the assessment. I think that probably answers your question.

The Hon. J. H. JOBLING: So if we agree with the statement you have just made, why is the statutory process not an obligatory requirement that you become involved?

Dr WILSON: I do not think you are asking the right person.

The Hon. J. H. JOBLING: Yes, I am. I want to know from the Department of Health why it should not be so.

Dr WILSON: That is the way the legislation in this State is written. That is the way it has been for the past 15 years.

The Hon. J. H. JOBLING: Fair enough. If that is so, then what in 15 years have you or your department done to change it?

Dr WILSON: The issue here is one for government, not for the department. Governments make decisions about what is—

The Hon. J. H. JOBLING: No, departments make submissions. With respect, Dr Wilson, you well know that as the chief medical officer you can make these submissions. Have you made a submission or any such submission to change this?

Dr WILSON: I do not think that it is appropriate for me to comment in the context of this inquiry. Governments make decisions about what they legislate and what they do not.

The Hon. J. H. JOBLING: Mr Chairman, surely that is a question that requires a yes or no answer. I repeat the question.

Dr WILSON: Governments make decisions about what they require departments to legislate on, and that is their business.

The Hon. J. H. JOBLING: Therefore, I can simply assume from what you have said, because you have not told me otherwise, that the answer is no. When would you advise DUAP, and

perhaps EPA, of your discovery of a problem arising in the Turrella area as a result of emissions? How long would you take to react when you found such a problem, and how would you test that your views that there was a problem were correct?

Dr WILSON: This comes back to the issue raised before about numbers. The size of the population in Turrella and the number of people likely to be exposed will make it very difficult for us to detect the health effects in that area—

The Hon. J. H. JOBLING: No, what I said to you is you have just detected one.

Dr WILSON: —because the size of that effect is likely to be so small it is going to be very difficult for us to detect.

The Hon. J. H. JOBLING: There are 2,000-plus people, and what I am putting to you is you have now detected one. I would like to understand process—

CHAIR: Hypothetical?

The Hon. J. H. JOBLING: No, I would like to understand the process the Health Department would go through to advise DUAP and the EPA, because I think the residents would be interested in knowing this.

Dr WILSON: I think we would not hesitate to advise DUAP, RTA and the Government if we believed a health impact was occurring in an area, and we would see it as important that the community knew about that health impact if that was occurring.

The Hon. J. H. JOBLING: Where else in the past 100 years has this happened?

Dr WILSON: I am sorry, I do not really understand your question?

The Hon. J. H. JOBLING: Oh, yes you do. Where else have you detected a problem and advised the community in New South Wales?

Dr WILSON: I believe we had a small problem in Sydney no more than two and a bit years ago where we had some cryptosporidium in the water in Sydney, and we did notify the community about it. I think that is an indicator of the degree of sensitivity I have about these issues. When we became aware of it we informed the community about it, and that was obviously important in terms of its concerns. There are other situations where if we become aware of it we would inform the community and the appropriate authorities, if we were not the ones responsible for acting on it.

The Hon. J. H. JOBLING: If I understood you, you indicate that the department relies on monitoring and modelling that had been put to you in relation to the M5 East stack and the outcome of them. Has the department fully accepted that modelling or have you tested as a department any of the modelling that has been put to you?

Dr WILSON: We have not, to the best of my knowledge—Dr Sheppeard might correct me—I do not think we have done any modelling of our own on what the likely output is from it. It is not an area in which we have expertise. We have expertise on the health effects of the omissions but not on what are the predicted outcomes from that.

Dr SHEPPEARD: That is right.

The Hon. J. F. RYAN: Is it worthwhile doing some work to detect some baseline data, like getting information from local general practitioners about the number of asthma cases they have an other lung function issues, to make sure you have some baseline data so that if you were to do some subsequent study after the tunnel comes into operation you would have some baseline data to work on?

Dr WILSON: Yes. I think we have been negligent in one area, if you like, and that is in the earlier inquiry you asked us in relation to this and I think we could have come back to you with some

available data and some better data. I have today spoken with some people in my department and asked them to put together some of the material to let you know what we can and cannot collect in relation to the population in that area.

CHAIR: At the workshop the following quote was made by Dr Stephen Corbett:

> There is a vast inequity of who is exposed to air pollution and who is not and that is a fact. We live in a very large city and there are hundreds of thousands of people who live on main roads, there are people who live in the South-West of Sydney, the whole of the south west get a disproportionate, so let's look at equity in some sort of reasonable context here. Are we proposing to isolate a small group of people and relieve them of that inequity? I mean, if you are going to talk about equity, then let's talk about equity, because I don't think you are in that proposition.

What he is saying essentially is a group of people who live near the stack should not be treated differently from other people in Sydney merely because they have the point source of pollution placed right next to them. Does that reflect department of policy, do you think?

Dr WILSON: The position I voiced before is that the concerns of the people of Turrella are as much of a concern to me as the people of any other part of Sydney. We would want to work with them and try to address their concerns. Having said that, our estimates are that this will have minimal if any health impact on the people of Turrella.

CHAIR: But that would not be colouring the attitude of the Department of Health, that these people should not be treated differently?

Dr WILSON: That is not the Department of Health position, no.

CHAIR: This is an extraordinarily controversial project, as you will have gathered by now. It has been in the media for a long time and will continue to be from now on, and other stacks are being built. It seems to me in order to assist people to determine whether or not there are serious health outcomes from the stack you should be doing some background work, not only here but in other areas where there are stacks as well. I thought it would be better for the Department of Health to urge the RTA to put in ESPs so the local community can be satisfied that at least that stack will not create higher PM levels.

Dr WILSON: I am sorry, ESP?

CHAIR: Electrostatic precipitators.

Dr WILSON: Sorry, I thought it was something you were passing to me that I was not picking up. The caution I have already urged in relation to the studies around this is that it will be very difficult, based on the size of the population and the amount of exposure likely, to detect any health impact as a result of the stack. I think we need to separate the issues of the reassurance to the community and what that might contribute in some sort of scientific way. I think it will have little contribution to scientific knowledge. It may contribute to community reassurance, and I am more than happy to meet with and discuss it with the community if that is a concern they have.

CHAIR: Why then have you not done a health risk analysis prior to the stack being in operation?

Dr WILSON: We have done a health impact assessment.

CHAIR: A health risk analysis?

Dr WILSON: We have done an assessment of what the likely health impact would be of the emissions from the discharges from the stack. That has been done on several occasions to make some sort of estimates of what the health impact would mean..

CHAIR: According to Dr Stephen Corbett there was no current need to conduct a health risk analysis in the area.

Dr WILSON: I think there are two different issues. One is the issue of what is our best estimate of what the health impact would be based on the emissions from the stack. The second is, and this is the area I am cautioning, some post-commissioning assessment of what the impact would be. I am saying we can do that but it will be very difficult to interpret the information we get from that.

CHAIR: It is worth doing, nonetheless, do you think?

Dr WILSON: I think we need to separate the two reasons we are doing it. As I say, one is around reassurance to the community, and if that is something that would help the community we should look further at it. The scientific merits of what we could or could not do in this situation—I think would be very difficult to interpret the information.

The Hon. J. H. JOBLING: As I understood Dr Wilson, he indicated two or three health impact studies were done by the department. Could I ask why they were commissioned?

Dr WILSON: Health impact assessments.

The Hon. J. H. JOBLING: Health impact assessment, yes. Why were they done, who commissioned the studies and where are the documents available to be perused? If they are available, may we have them? I would be interested to know why they were done and who commissioned them?

Dr WILSON: These were done by the department within the branch, our assessment of what it was, and we are prepared to say, based on looking at the issue—we did not have to be formally notified about it to know that these were occurring—that we have made some assessment of what those risks are. That is in a submission that has been prepared here and in the previous one.

The Hon. J. H. JOBLING: With respect, I do not appear to have seen them. Could you tell me who issued the instruction for the studies to be undertaken and why they did it?

Dr WILSON: If we have a concern around a health issue, we would initiate studies of our own. We do it all the time.

The Hon. J. H. JOBLING: Who?

Dr WILSON: This may well have been initiated within the range itself. It may have been initiated in a discussion we had within the department.

The Hon. J. H. JOBLING: I am sorry, that is very vague.

Dr WILSON: I am sorry, Mr Jobling, I cannot give you an answer.

The Hon. J. H. JOBLING: Can you come back to us on that?

Dr WILSON: We can try to find it.

Dr SHEPPEARD: We have been involved in this issue for the past several years. We get inquiries from the public. We have been to the tunnel ventilation workshop and have seen the report from the first inquiry. So, of course, what we then do is use the model emissions data and apply known health effects and look to see what the health impact could be. It is not that we have actually gone in and studied health in the community. We have data on what the underlying health problems are in the community. That is routinely collected. We know what health impacts of certain levels of air pollution are. We just apply those figures to the underlying health of the community to look at what the impact of the stack could be.

The Hon. J. H. JOBLING: With respect, I understand that and that is very fine. As you appear to know about this, I again put to you, who was the officer that instructed that such investigations and health impact studies be undertaken? When were they undertaken? To whom did they report? I apologise if it does exist but I have not seen them and I am not aware of them.

Dr WILSON: I am more than happy to try to answer the question and give you an answer on how these were initiated and what was the initiating factor. I am more than happy to try to do it, but to say that although we are not necessarily actively consulted does not mean we do not necessarily proactively look at issues when we become aware of them.

The Hon. J. H. JOBLING: Equally it is a major study of an issue that is sensitive to many people in the area. You understand my concern as to how such a study was initiated because you would not just do it without a reason.

Dr SHEPPEARD: Because people ask us if there are health effects. How can we give an answer if you do not—

Dr WILSON: That is just not correct.

The Hon. J. H. JOBLING: Who asked for it?

Dr WILSON: The health department does initiate and look at health issues in a proactive way. There are a range of issues we look at all the time when there are issues that you raise.

The Hon. J. H. JOBLING: Then there will be a memo to go with it that explains it?

Dr WILSON: Maybe.

CHAIR: Have you conducted any health analysis on the Eastern Distributor and Harbour Tunnel in regard to emissions?

Dr WILSON: Not that I am aware of.

Dr SHEPPEARD: No. We have recently requested to look at what the measured levels are from those stacks compared to what the model levels were.

CHAIR: That will be available publicly?

Dr SHEPPEARD: We have not received that information yet.

CHAIR: Can it be made available to us?

Dr WILSON: Presumably the information is potentially available to you anyway straight from the RTA in the same way we have requested it, but we are happy to do so.

CHAIR: During the 1999 parliamentary inquiry we do not appear to have received a submission. Dr Stephen Corbett in a note of a telephone conversation said it was to be a political decision whether Health made a submission to the inquiry and that he had raised that matter with the Minister. Did you have to go to the Minister to make a submission to our inquiry or can you make it off your own bat?

Dr WILSON: I am sorry, I am not aware of the telephone call that is being discussed. So, I do not know what that means. We would of course inform our Minister if we were making a submission to a major inquiry like this.

CHAIR: But you would not get permission?

Dr WILSON: No. We would obviously inform our Minister what was going on. But if you have requested information from us, as I have done on several previous occasions when I have appeared before you, we provide it to you. As legislators you are entitled to that.

(The witnesses withdrew)

PETER CHARLES MANINS, Chief Research Scientist, CSIRO, 121 Station Street, Aspendale, Victoria, sworn and examined:

CHAIR: In what capacity do you appear before this Committee?

Dr MANINS: A scientist in the CSIRO.

CHAIR: Did you receive a summons issued under my hand in accordance with the provisions of the Parliamentary Evidence Act 1901?

Dr MANINS: I did.

CHAIR: Are you conversant with the terms of reference of this inquiry?

Dr MANINS: I am.

CHAIR: If you should consider at any stage during your evidence that in the public interest certain evidence or documents you may wish to present should be heard or seen only by the Committee, the Committee would be willing to accede to your request. Would you like to make a submission?

Dr MANINS: I would like to make a short statement. I hope the Committee has seen my written submission. I suggest that the submission covers briefly issues such as the location of the M5 vent, vehicle emissions determinations, the CSIRO review that was undertaken for DUAP and I was a member of the team who wrote that report, the CSIRO recommendations on vent heights and impacts and perhaps something on monitoring for performance assessment, something that the resident committee has to deal with. I have addressed each of those issues in the written submission. I hope to briefly go through a few slides. I have for this Committee made three videos, each one just a minute or two long, that hopefully will be informative and will illustrate the sort of air pollution that we are talking about and how it changes through the region of the M5 stack. I will not go to a full PowerPoint presentation here but I want to switch between a few different things and I will do things in perhaps a half baked way.

The first slide shows that the stack is in a valley. Scientifically that is a poor choice and that has been mentioned to this Committee numerous times in the past, I understand, so the Committee is well aware of those sorts of issues. Here is a map of the Turrella region, courtesy of RAPS, in their submission apparently, and a 400 metre radius circle just to give an idea of the location we are talking about here. I believe the stack is located here. I saw it earlier this morning. I want to show some videos using some numerical modelling that CSIRO has developed, modelling that is world leading in its capabilities. I hope it will illustrate some of the issues that perhaps the Committee has not seen the same way before. I am showing, instead of a 400 metre circle which is about this diameter, an area 5 kilometres by 5 kilometres centred on the stack. These lines are the terrain. You can see a rigid line rising to around 40-something metres. Cooks Creek runs through here and Wolli Creek runs through here.

This is a three-dimensional highly complex numerical model simulation of this area and of the winds in this area. We had to predict all of the winds in this area and we predict the pollutant of the pollutants from the stack. Using the profile information, the matrix information that is in the Hyder reports that CS IRO was asked to look at for DUAP. You can see half hour time steps, hour by hour, how this plume moves around in the valley in the region. This is for illustration: I am not trying to suggest that this is precisely correct but it is as near as we can manage in the time we had available. This is actually three days in early March 2000 without the stack, of course—the stack was not operating. Into the night time we find quite strong impacts on the northern terrain right out to large distances, out to 5 kilometres. As we go into the early morning on the second day we find down this Wolli Creek valley the plume quite frequently impacts on this high terrain here in the night time coming into the early morning of the third day it is escaping quite a bit. Now into the afternoon of the next day we have this consistent flow towards the south.

This is what we expected to happen, not frequently, but on occasions in this region. I show you a closer view, not a 5 kilometre square , but a 2 kilometre square. This is 2 kilometres across so our 400 metre circle is around here. I did not have time to draw in houses. This is the southern terrain. You know where all the houses are. This is a general model that is not specific to this region. This is a general air pollution model that we have developed. In the morning of the first day we have got this plume swinging around. One of the things it shows is how much it moves around during the day. This is very common. It is not a simple plume going in one direction all the time. The impacts are here relative to everything everywhere else down Wolli Creek. On this exposed one here it has quite strong impacts on occasions.

The Hon. J. F. RYAN: The diagram shows the plume expanding and contracting and going into different colours. Do the colours and the expansion and contraction have any significance?

Dr MANINS: Yes. It is stationary now. This is a footprint, a map of the ground level pollution concentrations. The particles are the centre line of the pollution and the change of width of the ground level footprint is because of the change of the mixing in the atmosphere and the impact of the plume on the terrain depends on how close the plume is to the ground and how much mixing there is in the atmosphere. It changes the width of the footprint of the area affected.

The Hon. R. D. DYER: What might the red, as distinct from the purple or green, colour denote?

Dr MANINS: This simulation is actually for nitrogen oxide, not nitrogen dioxide. As you might be aware some nitrogen dioxide is emitted, about 10 per cent of the nitrogen oxide is nitrogen dioxide emitted and some is also formed in the atmosphere by conversion with ozone. It is not immediately obvious what the ground level concentration is in terms of nitrogen dioxide. I prefer just to say that the pink colours are higher concentrations, the yellow to blue colours are lower concentrations. Those concentrations are of interest. They are not small. One last slide is a three-dimensional view. It is a little difficult for some to see perhaps but we have here the stack, nowhere near as wide as it looks in reality, and we are looking to the north and we see this ridge line. Here is Cooks Creek and Wolli Creek and these particles are showing the plume centre line.

I want you to see that during the day the particles are quite high in the air, well above the stack. During the night they are frequently in the simulation. This simulation has been chosen because it is of interest: It is not an ordinary occurrence. During the night the particles can be quite low in height, so that is another message. These colours are the footprint. At 20 to midnight on the first day, there are deep concentrations very close to the stack. The concentrations are elevated at different distances from the stack. Into the evening on the second night, they go down to Wolli Creek and are sweeping around. There is a big impact at the stack; it is very local, but there are also substantial concentrations elsewhere. I hope that gives you more of a feeling for the impact than perhaps you have gained from looking at simple plan maps. That is what we are talking about when we refer to "air pollution modelling": the modelling of isolated stacks. It is quite complex to do in three dimensions, taking account of the terrain in great detail, as we have done here.

We have seen three videos. I have a slide on the air NEPM, but you have had plenty of discussion about that. I also have a slide on the different kinds of vehicle technology into the future, and we can talk about that if the Committee wishes. I have something about hazardous air pollutants—not just fine particles by themselves but constituents of fine particles and some of the gases that are related to motor vehicle emissions, such as benzene, formaldehyde and others. I have a slide about a risk assessment from vehicle pollution done in Melbourne about seven years ago, which shows that exhaust particles are by far the greatest cause of cancer incidence compared with benzene, formaldehyde or some of the weirder compounds from motor vehicles.

The Hon. J. F. RYAN: What about the risk caused by particulates from wood fires compared with motor vehicles? Is there a similar risk?

Dr MANINS: We believe so—more or less. It is not simple; nothing is simple in this sort of area. We are dealing with human beings and different kinds of emissions. In Melbourne, and to some extent in Sydney, in winter most of the particles in the air come from wood smoke—about 60 per cent or so. That is in the general area; it might be different in specific locations. The percentage depends on

the meteorology and how cold it is—how many people are lighting up. The kinds of pollutants emitted by wood smoke are rather different from those emitted by motor vehicles: The mix of particles and volatile organic compounds is quite different. However, the assessment for particles is generally regarded as being the same. According to health standards, it is the mass of particles that matters regardless of whether they come from motor vehicles or wood smoke.

CHAIR: Do you have any opinion as to the output from motor vehicles of PM2.5s versus PM10s? Do you know whether 2.5s are much more dangerous than PM10s? As I understand it, up to 70 per cent of PMs from motor vehicles are PM2.5s, not PM10s. I put it to EPA and others that the majority of PMs that will come from the stack will be very small, and therefore more dangerous.

Dr MANINS: That is slightly beyond my area of expertise, but I understand that practically all particles from motor vehicles are PM2.5s. There is not much mass between PM2.5 and PM10 from motor vehicles. I thought it was more than 70 per cent.

CHAIR: Really?

Dr MANINS: Yes, much more than that.

CHAIR: Do you have any view or any knowledge of the danger of small particles versus larger particles?

Dr MANINS: My view comes only from what I read in the literature. The health people who appeared before the Committee earlier this afternoon would be far better qualified to speak about this.

CHAIR: They did not seem very well qualified to speak about anything.

Dr MANINS: No comment.

CHAIR: What is your view of the way in which your submission to DUAP was treated by the department? Do you think it received adequate consideration?

Dr MANINS: I believed at the time that it did. We got very positive feedback from DUAP. However, I have read some statements attributed to DUAP or the RTA representing various views that seem to indicate that the reception was less than positive. They eventually seemed to conclude that our report was rather academic and highly technical—I thought it was meant to be technical. So DUAP seemed to shift a little over time.

CHAIR: Do you think it made a difference to the decision?

Dr MANINS: When the decision was announced I thought it was a reasonable one given all the reports and given what I understood about the other information that DUAP was acting upon.

CHAIR: What is your view about inserting electrostatic precipitators in the tunnel or the stack?

Dr MANINS: Two issues have caught attention in air pollution terms: particles and nitrogen dioxide. The particles have a 24-hour average compared with nitrogen dioxide, which has a one-hour average. So the way that the chimney contributes to a PM reading at any place is quite different. You saw how much the plume moved around on particular days—those days were chosen because they were rather severe; on an average day, there would probably be more movement by the plume around the region. So the contribution from the plume to PMs at any particular point—as was shown by the modelling done for Hyder—is quite small most of the time. It was rarely above about 15 micrograms per cubic metre compared with the standard of 50 micrograms per cubic metre from the stack.

CHAIR: Do you believe it will be higher and has been underestimated?

Dr MANINS: We draw attention in our submission to the possibility that it will be higher by up to a factor of two than the model that the Hyder consultants used in their emissions estimates. So instead of 15 it could be 30, 10 or five micrograms—something in that range.

CHAIR: That is presumably within the plume fall-out area, which varies throughout the day. Therefore, the average throughout the day might not be 15 or 30 micrograms.

Dr MANINS: No, that is the average throughout the day.

CHAIR: Is that the average within the vicinity of the stack regardless of where the plume goes?

Dr MANINS: I am simply referring to the modelling that was done by these people and my own understanding of the matter. We are talking about the average particles over a whole day.

The Hon. J. F. RYAN: Was that figure around 50 micrograms per cubic metre?

Dr MANINS: The committee probably knows better than I do about the maximum contribution. I do not have the numbers in front of me.

The Hon. J. F. RYAN: We have information that the overall ambient air quality is meant to achieve a certain standard. However, I do not think we know what contribution will be made by the stack; what will actually come from it.

Dr MANINS: That information was in the Hyder consultants' report that DUAP asked us to look at and that we commented upon. I believe there are tables that show the concentration on the ground with the stack in isolation and the concentration on the ground with the stack and background levels for the rest of Sydney.

The Hon. J. F. RYAN: If the background level around the stack was about 30 to 35 micrograms per cubic metre, 15 micrograms per cubic metre would take it close to the required standard, would it not? Do you simply add the two figures together or is the process more complex than that?

Dr MANINS: On any particular day you would simply add the two together. The background levels in this region of Sydney could be anywhere between very low or rather higher than 50 micrograms per cubic metre. Any contribution from the stack, no matter how small or large, could cause an exceedence of the air quality standard.

The Hon. J. F. RYAN: The monitoring being done now by the RTA and EPA indicates that background levels have reached 35 micrograms or greater, which means that, if the stack had been operating on that day, it is likely that there would have been an exceedence. Is that correct?

Dr MANINS: It is more complex than that because the plume has to contribute a substantial amount on that day. That means that the dispersion conditions and vehicle emissions must be conducive to that high contribution. However, it is conceivable that those two figures could simply be added together.

The Hon. J. F. RYAN: If that is the case, monitoring already indicates that there would have been three or four exceedences in January.

The Hon. M. I. JONES: You have already touched on the Hyder modelling. You have also been critical of the wind speeds that the consultants assumed and of their assumptions. Can you expand on that point?

Dr MANINS: I am not sure that we were critical of the wind speeds.

The Hon. J. F. RYAN: My colleague is almost right. I think you commented about numerical modelling as opposed to some other form of modelling.

Dr MANINS: Wind tunnel modelling was done as well as numerical modelling.

The Hon. J. F. RYAN: You commented about one being preferred over the other and the fact that the Hyder consultants had used the one that you did not prefer. Is that correct?

Dr MANINS: I am sorry, that question is too vague.

The Hon. J. F. RYAN: Page 4 of your submission to the Committee says that CSIRO was asked by DUAP to review both the physical wind tunnel and the numerical modelling undertaken by Hyder consultants for the RTA. CSIRO found that the physical modelling was not very relevant since it could not be done at necessarily low wind speeds when high ground levels were expected. It also found that the numerical modelling, while in principle adequate to the task, made several assumptions that led to overpredictions of air pollution effects, which combined highly uncertain background concentrations in such a way as to likely underpredict the cumulative air pollution effects.

Dr MANINS: The issue was between wind tunnel modelling and the numerical modelling. We observed that the wind tunnel could not be run at sufficiently low speed to simulate the conditions when the numerical modelling said that high pollution events would occur. There was not evidence there to support the contention that the numerical modelling was conservative by a substantial margin because there simply was not enough overlap.

The Hon. J. F. RYAN: Today the EPA said that the numerical modelling tended to produce conservative predictions with regard to pollution. I think its position was that if the numerical modelling showed that there would not be a problem, you were able to have confidence in that because it was likely to overpredict rather than underpredict. You seem to be saying the opposite.

Dr MANINS: I am saying exactly the same thing but not in quite the same words. I said that the numerical modelling was said by the Hyder consultants to be substantially conservative by comparison with the wind tunnel, but the wind tunnel modelling was not done at the right speeds to demonstrate that. That is not saying that the numerical modelling was not conservative. It is not saying that the numerical modelling was underestimating the pollution levels of itself. Where the underestimations could well have occurred is in the estimate of emissions, rather than in the modelling itself.

The Hon. J. F. RYAN: What impact would that have with regard to the ambient air quality with the operation of the ventilation shaft?

Dr MANINS: The issue that we drew attention to was for particles. We indicated that there is new evidence that has been generated as part of the manufacture of a diesel NEPM or national environment protection measure for diesel vehicles. New evidence suggests that diesel vehicles under heavy load emit a lot more particles than the PIARC methodology would suggest. After all, the PIARC methodology is appropriate for Europe, not for this country. So if the emissions are twice as high as those used by Hyder then the concentrations for particles would be twice as high. It is quite simple for particles; it is not simple for nitrogen dioxide.

The Hon. J. F. RYAN: Will monitoring afterwards disclose whether that is an issue?

Dr MANINS: Monitoring has the potential to indicate the contribution from the stack, from the vent, by using a combination of carbon monoxide and nitrogen dioxide particles, wind speed and wind direction information altogether to separate out the impact from the airport which is probably quite substantial for some polluters.

The Hon. M. I. JONES: I was probing as to whether you are happy with the modelling that DUAP has undertaken.

Dr MANINS: I am not happy with the modelling. We said that it was probably adequate to the task. It is not the best possible modelling but it was adequate to the task, given the right inputs.

The Hon. M. I. JONES: Would you say that this issue demands the best modelling possible?

Dr MANINS: No, I would not say that.

The Hon. M. I. JONES: So the people's health in this area does not demand the best possible modelling?

Dr MANINS: It demands the best possible estimate of the emissions and the conditions that are driving the model.

The Hon. M. I. JONES: The issue here is that we are trying to make the best of a very bad job. Does it not require the best modelling possible to come up with the best result? We started from behind the eight ball with this damn thing stuck in a valley. Surely we should demand the best modelling.

Dr MANINS: The modelling that has been done, the kind of modelling which is straight line gauze and plume model, is adequate to this task, given the appropriate meteorology and the appropriate emissions data. I do not think that we could really say that it was given either of those things, but the modelling itself was reasonably adequate.

The Hon. R. D. DYER: In your opinion what impact will the subregional air quality management plan being undertaken by the RTA have on local air quality?

Dr MANINS: I am afraid that I do not have anywhere near enough information to make a sensible comment about that.

The Hon. R. D. DYER: You are unable to say.

Dr MANINS: I have some information about the location of monitoring stations. Is that your question?

The Hon. R. D. DYER: No, not really.

Dr MANINS: Then I will not answer it.

The Hon. R. D. DYER: I know that you discussed monitoring stations and their location in your submission. From the data to which you have had access, do you consider that it is possible that there may be exceedances of air quality goals even without the construction of the M5 East project?

Dr MANINS: Yes.

The Hon. R. D. DYER: You concede that readily?

Dr MANINS: Yes, readily. The data is there to show that in the past there have been exceedances without anything there.

CHAIR: What would be the main cause of that?

Dr MANINS: Some of the data indicates to me that it is due to local wood fire, wood heating in combination with a general regional contribution from wood heating, motor vehicles and industry.

The Hon. J. F. RYAN: Would you come to the conclusion that the operation of the tunnel will cause exceedances to be more likely than they are now?

Dr MANINS: You would have to say yes. You are adding more vehicles into that region. They are emitting more than they would be if it was a road rather than a tunnel. The tunnel has to go down 5 degrees and come back up 5 degrees. Trucks are on full load. They would not be on a road. They are emitting more. You have to increase the emissions; therefore you have to increase the concentrations.

The Hon. R. D. DYER: A short time ago I think you made a reference to 60 as the percentage you attributed to emissions from wood fires. Is that correct?

Dr MANINS: I think that is the data I recollect from Victoria in the winter time in the eastern suburbs where there are most wood fires.

CHAIR: For roughly how many weeks a year?

Dr MANINS: Throughout the winter.

The Hon. M. I. JONES: But the climate in Sydney and the climate in Melbourne are hardly comparable.

Dr MANINS: Yes but there are a lot of wood fires in Brisbane, too, but you would not credit it.

The Hon. M. I. JONES: We either discard wood fires in the winter and, for the sake of comparison, look at summertime recordings.

Dr MANINS: Yes, right.

The Hon. M. I. JONES: And then return to the question of whether it is likely that these exceedances will occur more frequently with the building of the stack.

Dr MANINS: The answer again must be yes. There are more emissions in the local region, quite clearly.

The Hon. R. D. DYER: Are you in a position to assign any notional percentage to emissions from the stack?

Dr MANINS: I can only go back to the Hyder modelling for some answers. I feel that you are fully conversant with the conclusions they drew.

The Hon. R. D. DYER: I refer to a short passage in your submission in which you discuss vehicle emission determinations and the review that the CSIRO did for DUAP. You said:

> Preliminary analysis of some of the data suggests that emissions from vehicles operating at full load may be two or more times higher than given by the PIARC methodology employed by Hyder Consultants. This is particularly important because of the expected high usage by diesel trucks of the tunnel and because the tunnel grades near exit are around 6 per cent which will require these trucks to operate at full load there. It should be emphasised that this conclusion awaits confirmation from more detailed data analysis.

I take it that that confirmation is not presently available and the views you have expressed are made on some preliminary basis only at this stage.

Dr MANINS: That is correct.

CHAIR: The wood fire buyout will have an impact evidently in the winter and it will obviously have very little impact in the summer. Do you have any other details about, for example, barbecues and their impact, or anything like that?

Dr MANINS: They are a favourite target of councils. No, I do not think so.

CHAIR: It seems to be the answer of DUAP that to solve this problem, instead of putting filtration in the stack, it will buy out all the wood stoves in the area.

Dr MANINS: That would address some contribution to the particles in the Turrella region. The particles are very widely spread of very uniform concentration across the whole region, only added by individual fires or wood fires or smoky diesels or smoky vehicles or something like that. But once you get away from that immediate source, the concentration varies very little across the whole air shed of Sydney. Therefore it requires air shed wide effort to reduce the particle emissions.

CHAIR: What about in the summertime?

Dr MANINS: In summertime especially, and stop the sea breeze. The sea breeze brings in quite a lot of salt particles.

CHAIR: Are they dangerous to one's health?

Dr MANINS: The medical people do not know because it becomes part of the particle mass. The medical people are not sure whether it is particle mass, particle number, particle size or particle composition that is responsible for the relationship between particles and morbidity and mortality.

CHAIR: A number of studies show that there is higher mortality in cities than in the country.

Dr MANINS: That is true, yes. The concentrations are higher, on average, in cities.

CHAIR: Do you have any details of how many deaths may occur from particulate matter in Sydney on the average year?

Dr MANINS: Did the Health Department not say in a famous study about 400 a year?

CHAIR: Yes. Do you have anything that would contradict that?

Dr MANINS: No. The Health Department used the same relationships that I am aware of.

CHAIR: Has anyone done an estimate of how many people may die from the pollution from the stack—one every five years, one every year?

Dr MANINS: You can work it out. The relationship is something like 1 per cent extra deaths per 10 micrograms per cubic metre increase in PM10 concentration. That is per day.

CHAIR: So that could be worked out for the people who live around the stack, could it not?

Dr MANINS: Yes. If there are 400 people around the stack, if there are 400 deaths over a year around the stack due to natural causes, then with a 10 microgram increase you might expect an extra four deaths due to fine particles. That is the relationship that the health people told me.

CHAIR: I wonder whether the Department of Health, DUAP or the EPA has done that calculation.

The Hon. J. R. JOHNSON: How long have you spent investigating the air quality issues relating to the M5 East project?

Dr MANINS: We were commissioned by DUAP in approximately June 2000. The only work we have done on the M5 is that commissioned by DUAP. We had a set terms of reference to which we responded.

The Hon. J. R. JOHNSON: How long did you spend on it?

Dr MANINS: This work, this assessment, took approximately three man months.

The Hon. J. R. JOHNSON: Have you received all the data that has been gathered by the RTA?

Dr MANINS: I do not imagine so. I did not know what to ask for. That was one problem we were facing in looking at the Hyder report. It was not clear what other information was available or existing.

The Hon. R. D. DYER: Have you reviewed all the data you received from the RTA?

Dr MANINS: I believe we have reviewed all the data that the RTA has provided to us at our request and has volunteered to us, yes.

The Hon. J. R. JOHNSON: The RTA supplied all the data you requested?

Dr MANINS: I believe that is true. I cannot think of any instance where something was not supplied that we asked for. Some of it took quite a long time but it came.

CHAIR: In your report you talked about the three key issues regarding the emissions data. You talk about the question of diesel trucks, which you have already covered, and then the question of PIARC. You state that PIARC does not account for Japanese vehicle types. How much difference does the fact that PIARC does not take into account Japanese vehicle types, when most of our vehicles are Japanese and not many conform to European and American standards?

Dr MANINS: I believe I am correct in saying that Japanese vehicles have no emission controls when it comes to particle emissions.

Dr MANINS: European vehicles have to meet particle emission standards.

CHAIR: It would make a very large difference then?

Dr MANINS: I believe it would make a substantial difference.

CHAIR: I do not suppose you can quantify that?

Dr MANINS: Unfortunately, no. I have a slide here that might be vaguely interesting. It shows what Euro 3 standards will be in Australia in 2004. New Australian diesels will have to meet Euro 3 standards and eventually they will have to meet Euro 4 standards. This is a slide from Japan, but I suspect that Japanese vehicles currently emit something higher than either of these standards.

The Hon. R. D. DYER: Why are using such conditional and tentative language as, "I suspect", and you understand the position regarding Japanese light vehicles powered by diesel might be such and such?

Dr MANINS: I am a scientist with some caution about straying into an area that is not exactly my specialty. I am an air pollution modeller; I am an air pollution expert rather than an expert on motor vehicle emissions as such, though in some of the submissions that we made to DUAP we had responses back from the RTA indicating that it really was not on top of motor vehicle emissions either. In particular, this slide is here for the reason that a current hobbyhorse of my own is that petrol vehicles are moving to gasoline direct injection [GDI]. The RTA knew nothing about it. When ringing me up and quizzing me it said that Hyder consultants also knew nothing about it. It is an emerging technology that is quite likely to become the norm. Unless GDI vehicles have extra emission controls added to them they will emit, as you can see comparing this one with this one, four to six times as much mass of particles as petrol vehicles.

CHAIR: These would be very tiny particles, 2.5s?

Dr MANINS: Yes, microscopic, PM2.5 for sure. PM2.5 means particles 2½ micrometres or smaller.

The Hon. J. R. JOHNSON: Do you know what the advantage is for their going into this new project?

Dr MANINS: Yes, something like a 20 per cent fuel saving so that we meet fuel reduction targets, lower greenhouse gas emissions and, to some extent, lower NO^2 emissions and other pollutant emissions. Associated with it is a very low sulfur fuel, so there is also considerably lower sulfur dioxide emissions, not that that is a problem with petrol vehicles.

The Hon. J. R. JOHNSON: Is that being imposed by any of our authorities on the Japanese?

Dr MANINS: On the Japanese? This is a Japanese slide, but this data is not peculiar to Japan. The data is actually from Europe.

The Hon. J. R. JOHNSON: Is the new project, GDI, being imposed on them or is it as a result of advance in technology?

Dr MANINS: Motor vehicles have to meet more and more stringent emission conditions, and how do they meet them? One way it is called lean burn, very lean mixtures, and one way to achieve that is to use gasoline direct injection. It is not so much that technology is being imposed, but rather emissional performance standards are being imposed and the manufacturers try different ways to meet those performance requirements.

CHAIR: Yet you say that the emissions will in fact increase four to six times so far as PMs are concerned?

Dr MANINS: That is right. That is a chronic problem with GDI.

CHAIR: Surely, this would be a really serious health matter. You would think that the Department of Health, the RTA and DUAP would be most concerned about this?

Dr MANINS: Petrol vehicles at the moment do not emit the majority of particles on major roads, it is diesel vehicles that emit the majority by far. Figures that I am aware of, I think from Sydney and Melbourne, indicate that on most major highways about 80 per cent of the fine particles are due to diesel vehicles, even though diesel vehicles represent only a small percentage of the fleet on those roads. In the M5 tunnel the percentage of diesel vehicles will be higher, so as petrol vehicles change their technology their contribution to particle emissions will not be quite so dramatic as in the general ambient air of Sydney or Melbourne.

The Hon. J. R. JOHNSON: Do you know if any advances are being made to correct the difficulties with diesel engines?

Dr MANINS: You were talking about it earlier this afternoon with the EPA. A member of the Committee was mentioning articles in *New Scientist*. The Minister for the Environment in the United Kingdom put her handkerchief over the exhaust of a diesel vehicle for five minutes to find that it was still clean because of the technology that has been developed, which is becoming widely available in the UK and, possibly, the rest of Europe. There have been enormous advances in the past few years. The European standards have encouraged those developments to take place, as well as having an eye on reality, and that is possible.

The Hon. J. R. JOHNSON: You would think that would ultimately flow through to us?

Dr MANINS: Not ultimately, but rather soon. Euro 3 comes in in 2004-05, Euro 4 in 2006-07 for new vehicles only. But it is coming in rather rapidly. Euro 4 has not been completely agreed to yet in Europe. We have committed to implement what is the final commitment in Europe. We have actually caught up enormously compared to, say, the mid 1970s to 80s.

CHAIR: But as you have heard, it does not cover the older vehicles.

Dr MANINS: Quite so.

CHAIR: That seems to be a serious problem. A lot of these older vehicles—some are 10, 20 or 30 years old—are still spewing out vast amounts of diesel pollution.

Dr MANINS: Yes. There is a nice picture here. I understand the EPA New South Wales or the RTA has an inspection and maintenance program to be implemented. Whenever it was or will be, at least it is being done. In Victoria we do not have anything of the sort being considered. At least something is being tackled here.

CHAIR: I put to the EPA that it could enforce filtration onto the vehicles, but it did not seem to consider that.

Dr MANINS: You could also monitor the emissions per vehicle as they went through the tunnel and take the appropriate course of action.

CHAIR: And ban them from the tunnel.

Dr MANINS: You have a captive fleet of vehicles going past.

The Hon. R. D. DYER: On page 4 of your submission you say, "CSIRO noted in the review", I assume that is the review done for DUAP?

Dr MANINS: That is correct.

The Hon. R. D. DYER: That particle concentrations in the vicinity of the M5 vent were occasionally high due to sources unrelated to the vent. Can you tell me what that means or what you are referring to?

Dr MANINS: It is curious, because the vent did not exist. It is unrelated to motor vehicles.

The Hon. R. D. DYER: I am quoting something you said.

Dr MANINS: Yes, I am curious about what I meant. I meant unrelated to motor vehicles. The use of wood fires, in particular, in the wintertime.

The Hon. R. D. DYER: You go on to say, "all the modelling results from the Hyder consultant showed that the highest cumulative concentrations would occur when the vent contribution was small, less than 5 per cent contribution. Even after doubling or trebling this contribution the vent emissions are not the major expected sources on high pollution days and in any event vent height is not greatly important since the particle concentrations involve a 24-hour period and the plume from a vent moves around a great deal over the course of a day." Would you like to add anything by way of explanation or expansion to the Committee?

Dr MANINS: What I am trying to draw attention to is that the contribution from the vent itself to particle concentrations is not large, that most of the particle concentration in the Turrella region is already there and is due to the existing motor vehicle fleet and to the forms of heating that people choose to use, and due to the local industry. There is also the issue that standards to be met by the fine particles are a 24-our average, so the vent height is not a great determinant on the ground level concentration therefore, because of the longer average and the larger contribution from non-vent sources. It is quite different from nitrogen dioxide because it is only a one-hour standard. There the relative heights of the receptor or the residence and the vent are quite important, and also the direction.

CHAIR: Could you tell me whether the air that comes out of the vent is of similar composition to the ambient air? Is it a similar percentage of nitrogen dioxide, nitrogen oxide, carbon monoxide and so on? How does it differ from the ambient air?

Dr MANINS: It has lower concentrations of ozone, or it has no concentration of ozone. The ambient air has a concentration of ozone, but the vent air has none, that is one thing.

CHAIR: What about oxygen, for example?

Dr MANINS: The oxygen is a little bit depleted, probably 1 per cent or less depleted because of the combustion of motor vehicles in the tunnel.

CHAIR: Benzine?

Dr MANINS: The ratios would be similar because ambient air in the region is greatly affected by motor vehicles, and it is the same benzine coming out of motor vehicles whether they are in the tunnel or not. That is not much different.

CHAIR: The composition is just about the same?

Dr MANINS: For the toxic air pollutants and for the criteria pollutants, such as particles and nitrogen dioxide, the ratios are about the same, yes.

CHAIR: There is no sort of fingerprint for the air coming out of the vent?

Dr MANINS: There is not an obvious fingerprint, except speed and wind direction, that is why I mentioned that earlier on in using those factors to help identify whether the stack is causing the contribution or whether it is, say, the airport or something.

CHAIR: How difficult would it be to prove exceedences from the stack from the monitoring stations?

Dr MANINS: It should be an interesting exercise. It should employ some people for quite sometime.

CHAIR: What do you think would be the best location for the third monitoring station? What criteria should be used in selecting it?

Dr MANINS: I have addressed that towards the end of this report in our submission to you. I understand that there are already two stations in position, one to the north and want to the east, and that there is some discussion about where a third one should be, whether it should be off to the north-west. Perhaps I could illustrate that by looking at some of these pictures. What if we had a look at this one, which is two kilometres, so we have two kilometres across. At some stage we have the plume going off. It did not go far enough that time. It will do it later. Here it comes. Up in this north-western region from the stack is an interesting place to have a monitoring station.

[*Interruption from the gallery*]

Yes, there is a primary school there. Down here is a direction I favour because the plume is more frequently travelling towards the south than it will be towards the north in high pollution conditions. Here we have another example. I say that somewhere down here, and there is quite some high terrain nearby that would appear to be rather ideal for a monitoring station. The frequency or impact is more important, I think, than trying to catch the extreme single event, one hour in 8,760 hours in a year.

CHAIR: Yes, that is what the community is interested in.

The Hon. M. I. JONES: At this stage the whole report is revolving around whether we should or should not introduce electrostatic precipitators into the stack. In your opinion should we introduce this equipment into the stack?

Dr MANINS: Let me direct you to the last slide that I have not shown you yet. I feel that treatment of the emissions, the particle emissions, is feasible, but that it is rather poor value scientifically because of the local contribution to ambient levels from the stack, but it is feasible. I understand that a chap in the back of the room is willing to sell us a system today that will do it. It is certainly feasible, and technology is changing all the time. It will be more feasible in another six or 12 months.

The Hon. R. D. DYER: Why do you say it is poor value scientifically?

Dr MANINS: Because of the low contribution of the stack for the vast majority of the time to the ambient PM concentrations, you have this precipitator running all the time, absorbing an enormous amount of electricity, along with the humungously large electricity demand for the fans to get the pollutants up the stack, all of the time. It has a diurnal cycle and I need to mention that diurnal cycle. There is a matrix of operating conditions. The DUAP condition on the stack is supposed to be designed to reduce the air pollution. Our interpretation of the Hyder work and our own work for this inquiry indicates that really the fan speeds are not high enough in the evening times. The RTA did not seem to take on board the proposal that we put forward through DUAP and that DUAP actually put in its licence conditions should be explored. The fan speeds are not high enough at night-time when the traffic is reducing but is still high, so you get your highest concentrations in night-time.

CHAIR: Of nitrogen dioxide and PMs?

Dr MANINS: Of nitrogen dioxide principally. I really cannot say about PM because of the 24-hour average. It is too hard from the work I have done to be able to address that. I am saying that the treatment of PM emissions is feasible but poor value and that the treatment of nitrogen dioxide emissions is not really feasible. It is done on some very special systems in special conditions, like horizontal tunnels, low traffic loads, reasonably clean vehicles compared with Australian vehicles, all manner of exceptions abroad compared with Australian. What I suggest is the most feasible is that you need a higher plume height, something we suggested through DUAP that the RTA should be seriously considering. I have not seen, although I do not know that I have seen all of the information, any evidence that the RTA has really looked at that very seriously. You need higher plume height to get above the height of the residents. The stack is below the height of the residents at the moment and during night-time the stack has very little plume rise.

CHAIR: Could the particulate matter be covered by filtration of the nitrogen dioxide?

Dr MANINS: Yes, it could be. I am just saying that in my opinion, from what I understand of the issue—and I am not entirely across the whole gamut of the problem—it is poor value scientifically.

CHAIR: Maybe in a regional sense it is, but in a local sense it would be good value, a few hundred homes?

Dr MANINS: One or two days a year perhaps, yes; a small number of days. You are getting exceedances now due to conditions that have nothing to do with the stack and the stack contribution is convolved with those conditions. It is a very difficult thing to address exactly. The Hyder report had a go at that and indicated maybe five to 10 events a year might be candidates for highest ground level concentrations exceeding the standard. They said there were none but there were candidates there.

CHAIR: DUAP said that if there were exceedances, presumably more than five a year which cannot be attributed to bushfires, even though they would not be able to necessarily attribute the exceedances to the stack, they would insist that the precipitators are put in. Does that make sense to you?

Dr MANINS: Who insisted?

CHAIR: DUAP.

Dr MANINS: Did they insist.

CHAIR: They said earlier that even if they could not work out whether the exceedances were due specifically to the stack but if there were exceedances which were not due to bushfires and obvious causes, they would insist on the ESP being put in under Condition 72.

Dr MANINS: I have no comment. If that is what they say, they say it. I have indicated my position.

CHAIR: Apart from having a higher stack, in order of priority what other things would you do to reduce particulate matter in the region?

Dr MANINS: A higher stack is a possibility but higher plume rise is more than a possibility. It is quite a straightforward thing to do. It requires more electrical energy and faster fans but you could be smart about it and use the fans only when they were really necessary because the concentrations, ambient and operating conditions were such that there is an expectation of exceedance or near exceedance. You could be smart about how you used the fans. You could also increase the dispersion and reduce an enormous energy load by having extra vents near the portals, something that has been ruled out on occasion but seems to come back again every now and again. The vents near the portals do not have to have a significant impact at all but they would make an enormous difference to the power requirements of the operation of the whole central stack.

CHAIR: Apparently they can put ESPs and a vent at the portals, which would reduce the emissions from the stack by 50 per cent.

Dr MANINS: That would be highly desirable if it could be done economically.

CHAIR: At a cost of some $13 million.

Dr MANINS: And what energy saving would you have over the lifetime?

CHAIR: I do not know, but apparently there would be an energy saving. They would actually save energy by doing that.

Dr MANINS: I would imagine you could recoup that $13 million rather rapidly. I have not done the sums.

CHAIR: That might be a way out.

Dr MANINS: It might be. What would changes do to the regional air quality, I think was your question.

CHAIR: What other things would you do to improve regional air quality? I know it is a broad question. Wood burners, for example?

Dr MANINS: First off is diesel vehicles, and we are tackling that very slowly but we are tackling it; their particle emissions, wood burning fires, more assessment of industry and what emissions are occurring there. About one-third of PM10s is from industry. Industry needs to be tackled as well as motor vehicles and wood burners. It is not just one thing or the other. A whole suite of activities have to be put in place. It is not just one magic bullet for particles. It is a very difficult problem to make much headway with.

CHAIR: There are some least-cost solutions?

Dr MANINS: These have been worked out in other cities and countries time and again. I understand the EPA has done the same sort of thing in Sydney as part of the Max study in the early to mid-90s. They came to conclusions on how to reduce fine particles in the Sydney Basin.

CHAIR: I have been asked to put these questions to you. If you were to advise on strategies to design a ventilation system for the M5 what would you recommend? If your scope was not limited and the stack was not built, what would you recommend other than a 35-metre stack?

Dr MANINS: Are you saying if we did not have a lateral tunnel of 800 metres and a stack in the bottom of the valley?

CHAIR: Yes, and $30 million in your pocket.

Dr MANINS: I think I would put the stacks where they were first designed to be put, that is, along the headland.

CHAIR: It would have had a better outcome.

Dr MANINS: I think it would have had a slightly deleterious impact on the people in the vicinity of those three chimneys but it would have had a much less deleterious effect on the people who are currently going to be impacted.

CHAIR: Three times the impact of each one of those other communities; in fact, more so?

Dr MANINS: Yes. That is a good way of looking at it.

CHAIR: Greater than that because the actual vent is below the homes in many cases, so it will be greater than three times because the other three proposed stacks were higher.

Dr MANINS: The Committee in years past has already looked at the impact of the three-stack proposal. Has a comparison been done between the three stack and the one stack?

CHAIR: We have not done one. It was a political decision.

Dr MANINS: This is the house of politics.

The Hon. J. F. RYAN: I presume that the slides and videotapes are available electronically. Are you in a position to email some of the material to the Committee so that we can have access to that after you have gone?

Dr MANINS: I can give you a copy of the three videos right now on CD but I will email you the slides.

The Hon. J. F. RYAN: Hansard takes down the details but they cannot take down slides.

Dr MANINS: The videos are about 200 megabytes so it is a bit hard to take that down.

CHAIR: During the last inquiry, after the evidence that focused on particulate matter and NO^2 the RTA raised questions about carbon monoxide, which has not been discussed today. Do you have any comments about CO emissions and the ability to treat them?

Dr MANINS: I have nothing to add about CO in the ambient air but CO in the tunnel is what the design of the fans is all about. I might add, that one need only look at Citylink to see what Sydney users of the M5 tunnel might be in for. The Burnley tunnel is quite murky on occasion because of high emissions from diesels that put a lot of particles into the air. The CO is being coped with by the fans but that still allows the particle levels in the tunnel to be quite high.

CHAIR: It would not have much impact on the ambient air quality, then?

Dr MANINS: In general, carbon monoxide is not an issue in ambient air anywhere in Australia. Indoors and in car parks are pretty well the only places where CO is a problem.

The Hon. J. F. RYAN: Do you have literature that you can make available to the Committee that advances your position on cars? You seem to have a different view to that of the local EPA in terms of future vehicle technology.

Dr MANINS: I have quoted some of the EPA.

The Hon. J. F. RYAN: Is that the Federal EPA?

Dr MANINS: No, the New South Wales EPA on page 2. Secondly, there are questions about light-duty diesel trucks. That paragraph is based on EPA submissions to DUAP. I am not sure we are different. Perhaps it is just a different emphasis.

The Hon. J. F. RYAN: I meant future vehicle technology producing possibly an adverse outcome. Our local EPA seems to be of the view that future vehicle technology will result in an overall decline in vehicle pollution. You seem to be of a different view.

Dr MANINS: We expect in the near term, in the next five to 10 years that vehicle technology would improve air quality but then the sheer number of vehicles if not GDI and other things will overwhelm that improvement and there will be a new round required of regulations and controls.

The Hon. J. F. RYAN: Did the modelling take into consideration, as you saw it, the situation that might occur with regular traffic jams in the tunnel as it becomes more common to use it?

Dr MANINS: I certainly did not take that into account, although I did read in the Hyder consulting reports that there is a congestion emissions scenario that was tested and was part of their consideration for the ground level concentrations. I do not know whether that means traffic jams. The RTA responded to our question about that, that this tunnel, unlike many others, will be actively managed in terms of diverting traffic away from the tunnel if the tunnel itself becomes too congested or jammed. For a four-kilometre long tunnel that is obviously essential.

The Hon. J. F. RYAN: I am sure that drivers will be excited by the knowledge that they might regularly find themselves diverted from their normal route.

Dr MANINS: All I can say is that a congestion scenario was part of the Hyder considerations.

CHAIR: Do you wish to make any final comments?

Dr MANINS: No, thank you. Thank you for your questions.

(The witness withdrew)

(The Committee adjourned at 5.00 p.m.)