EVIDENCE TAKEN BEFORE

GENERAL PURPOSE STANDING COMMITTEE NO. 5

INQUIRY INTO THE M5 EAST VENTILATION STACK

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At Sydney on Monday, 29 November 1999

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The Committee met at 10.00 a.m.

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PRESENT

The Hon. R. D. Dyer (Chairman)

The Hon. Jan Burnswoods	The Hon. Ms Lee Rhiannon
The Hon. J. R. Johnson	The Hon. J. F. Ryan
The Hon. M. I. Jones	The Hon. J. M. Samios

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

JOHN RAYMOND ANDERSON, Senior Project Manager, M5 East Motorway, Roads and Traffic Authority, 260 Elizabeth Street, Surry Hills,

GARRY RAYMOND HUMPHREY, Professional Engineer, Roads and Traffic Authority, 83 Flushcombe Road, Blacktown, and

KERRY TERESA HOLMES, Air Quality Scientist, Holmes Air Sciences, and Air Quality Consultant to the Roads and Traffic Authority, Suite 2B, 14 Glen Street, Eastwood, affirmed and examined:

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

ALL WITNESSES: Yes, I have.

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

ALL WITNESSES: Yes, 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 and resolve into confidential session, but I should warn you that Parliament may override that decision at any time and make your evidence public.

The Committee has decided, given the pressure of witnesses today, and has decided on a prior occasion, to limit each segment to 45 minutes. That is not per witness but per group of witnesses. Within that segment, the Committee will allow 15 minutes in total for an oral presentation and the residue of the time will be devoted to questioning. I realise that may place considerable pressure on some groups of witnesses. However, we really have no alternative in the interests of fairness to balance out the day by imposing those guidelines.

Could I also indicate that everyone will be given a fair hearing. I would ask for order to be preserved. When you are asked a question you should respond as succinctly and directly to the question as you can. Do not talk about something that is not raised in the question. Direct your mind to what is being asked. Now, could I ask for a witness on behalf of the Roads and Traffic Authority to address us as I have indicated?

Ms STRICKER: Mr Chairman and members of the Committee, I will present a brief summary of the RTA's submission and the other people here beside me will be presenting a very brief statement within their own areas of expertise or experience.

The RTA has many obligations in developing and managing roads, including having due regard to our heritage, both natural and cultural, our environment and, equally importantly, to the health and lifestyle of people they most directly affect. The M5 East development has been undertaken with respect to these principles.

The M5 East has been planned for many years, and a road reservation was set aside in the late 1940s for this road. This was through Wolli Creek and includes the site of the ventilation stack. Local government and the community have known for 50 years that a road reserve existed here. Rightly, the local community wanted to preserve this precious remnant bushland and rejected a surface road through Wolli Creek as part of the community consultation for the 1994 environmental impact statement. Subsequently, new tunnelling technologies meant that keeping the bush and building the motorway became feasible.

As the authority charged with building the motorway, it is not appropriate for the RTA to set the air quality goals that need to be met in order to safeguard the health of the local community. This was done by those agencies charged with this role - the Environment Protection Authority and the Department of Urban Affairs and Planning - which were, in turn, guided by the standards set by the World Health Organisation.

The air quality goals set for the RTA to meet on the M5 East are among the most stringent in the world and are the most stringent ever applied on an Australian road project. These goals are similar to those adopted by the European Union.

The Minister for Urban Affairs and Planning in his final approval of the project placed 150 conditions on both the construction of the motorway and the impact it would have on the local environment. Aside from the very stringent air quality goals, these included independent verification of the ventilation system design, the installation of a comprehensive independently operated monitoring system, the provision for the installation of further treatment systems if the air quality goals are not met, the development of a subregional air quality plan and establishment of community consultative committees.

Furthermore, the final height of the ventilation system will not be determined by the RTA, nor is the final decision to install emission treatment systems the RTA's. These decisions are in the hands of the Director-General of the Department of Urban Affairs and Planning in consultation with the EPA. These tough targets and conditions have been imposed for only one purpose - to protect the health and the environment of the local community.

The local community has expressed concern that the single stack may act as a means of concentrating the exhaust emissions. Our studies have found this not to be the case. 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 a specially built air intake. This will mean the air in the tunnel is breathable for motorists and workers alike and diluted when it is released to aid in its dispersion. This dilution is essential to reduce the carbon monoxide to a safe level throughout the tunnel.

Without doubt, the most effective way to improve the air quality for the people of this area and the greater metropolitan area is to control the emissions of all motor vehicles. To this end, the Federal Government is committed to the accelerated introduction of European vehicle emission standards for all vehicles. At the same time, the State Government has already introduced the first stage of the vehicle emission inspection and maintenance program for current vehicles.

One of the key conditions imposed on the RTA included the development of

strategies to manage and improve the air quality of the whole subregion. This will include an identification of air pollutant sources in the area and the means to control them.

A significant immediate improvement to the subregional air quality is expected on the opening of the motorway by the simple act of reducing the present stop-start traffic through local streets, especially in relation to heavy vehicles, which are the largest source of particulates.

The goals that the RTA must meet on this project have been set by Federal and State experts based on the best information the world has to offer.

During the course of this inquiry you will, no doubt, be told about other ways of managing tunnel exhaust systems. The RTA has investigated the systems and technologies used overseas and is continuing to do so.

I refer the Committee to pages 14 and 15 of the RTA submission, which outlines recent advice from Professor Karl Pucher, and I ask the Committee to note an amendment to Professor Pucher's title. He is Head of the Division of Pollutant Dispersion and Tunnel Ventilation within the Institute for Internal Combustion Engines and Thermodynamics at the Technical University at Graz, Austria.

I refer also to the additional paper supplied to the Committee by Professor Pucher as an addendum to our submission. Professor Pucher has confirmed to me that no electrostatic precipitators or gaseous cleaning systems are in use in any European tunnels. Trials of these systems in Austria and Germany have been concluded and decisions taken not to use these systems operationally, and some have been removed.

The European view, as expressed by Professor Pucher, is that it is far more effective and beneficial to the entire community to reduce the emission at the source, that is, the motor vehicle, rather than use end-of-pipe treatments.

The introduction of the new vehicle emission standards in Europe has already resulted in significant reductions of particulates and oxides of nitrogen, as illustrated in Professor Pucher's graph of the emission reductions from the Austria heavy vehicle fleet.

The precipitators use large quantities of electricity and produce a waste sludge which must be either burnt in a high temperature incinerator or disposed of at specially designated sites. The use of electrostatic precipitators on the M5 East will not significantly improve local or regional air quality, because 94 per cent of the particulate matter is not from the tunnel.

With regard to gaseous emissions, at present there is no proven system in operation anywhere in the world that will deliver a significant reduction in waste gases, and particularly nitric oxide. This is why the M5 East stack is necessary for dilution and dispersal of these gases.

In conclusion, during the course of this inquiry, you will hear many allegations about the M5 East project. We would ask only that you look at the facts, and the facts are that this project has the most stringent air quality targets ever imposed on an Australian road project; that DUAP and the EPA, the agencies directly charged with protecting the community's health and environment, have placed these world standard conditions on the project to

protect the community from adverse impacts on the local air quality; that the project has been reviewed by DUAP and the EPA and independently assessed as able to meet the stringent targets; that the design for the ventilation system will be independently verified; that the environmental concerns raised by the residents have been addressed through consultative committees and will be addressed through the development of a subregional air plan; that a comprehensive and independently run air quality monitoring system is being developed, again in consultation with the community so that they can see for themselves whether the air quality targets are met; and at present available operational emission treatment systems in the world are either unproven or would make little difference to the local air quality.

CHAIR: Is there anyone else who would like to make an initial oral submission?

Mr HUMPHREY: Mr Chairman and Committee, I will be addressing world's best practice in tunnel ventilation and developments in tunnel air cleaning around the world, in particular, the work done in Norway and Germany.

Tunnels provide considerable environmental benefits to communities but they also must be ventilated to maintain air quality in the tunnel and to extract smoke in the event of a fire. The systems utilised have either some combination of ducted fresh and exhaust air or longitudinal air flow that relies on air coming in the entry portal and either flowing out of the exit portal or a ventilation stack.

The trend in Sydney is towards longitudinal ventilation systems which dilute and disperse air from the tunnel at the portal or stack. This approach is in keeping with international practice.

As Jay mentioned, an alternative approach of partially cleaning the air before dispersion has been utilised in a few countries across the world - Japan and Norway. The installed systems incorporate electrostatic precipitators to remove particulate matter because of high concentrations of this material derived from either a high number of diesel vehicles in their tunnels or high dust levels from spiked tyres. Sydney's conditions are different from these two countries.

No air cleaning system is in operation in the major tunnelling countries of France, Italy, Switzerland and Germany, amongst others. Gaseous emission treatment plants have been trialed in Norway, Austria, Germany and Japan. There are currently no operational plants of this type anywhere in the world. The first is planned to be installed in the very long and deep Laerdal Tunnel in Norway next year.

Despite extensive research in Hamburg, a city that I visited, there is no intention of installing an air cleaning system in that city. Sydney's practice has been widely quoted as being out of step with that of Norway.

In June this year I attended the World Tunnel Congress in Oslo. I was able to visit some tunnels whilst there and talked to representatives of the Norwegian Public Roads Administration. My observation is that New South Wales practice is not inconsistent with Norway for the following reasons.

Norway has longitudinal ventilation, or has moved towards longitudinal ventilation systems, as has New South Wales. The basis of design is that operational air quality goals

must be met. New South Wales air quality goals are among the most stringent in the world. The 24-hour goal for particulates is actually 30 per cent lower than Norway's.

There are approximately 700 tunnels in Norway. The vast majority have low standard electrical-mechanical systems, particularly lighting and fire systems, with no ventilation or air filtration at all. Electrostatic precipitator systems are installed in several tunnels and operated only to maintain visibility or to meet air quality goals, as I mentioned. This has meant that the system, for example, in the Granfoss Tunnel is currently not utilised at all because operational conditions do not require it. It is installed but it is not used.

The system in the Ekeberg Tunnel is switched on only during peak hours, and the operational requirement is to meet visibility. Electrostatic precipitation equipment is not routinely used in Oslo's tunnels. The latest tunnel under construction in Oslo is the Svartdal Tunnel, which is just at the end of the Ekeberg Tunnel. Air quality goals could not be achieved at one portal and, accordingly, rather than install ventilation stacks or an air filtration system, they chose to seal and ventilate two buildings.

The M5 East project includes provision for future installation and use of electrostatic precipitation equipment in the event that particular goals cannot be achieved, in much the same way as is done in Norway. It is a fallacy that air emitted from tunnels in Norway fitted with electrostatic precipitation equipment is clean. The rule of thumb is that about half the volume of air is clean so that the air which is emitted is within air quality goals. A pilot gas cleaning plant has been installed in the ventilation shaft of the Oslo tunnel. Do you mind if I use the overhead projector?

CHAIR: Could I ask how much longer you intend to address the Committee? We have nearly run out of time for the preliminary addresses.

Mr HUMPHREY: Several more minutes. I will move quickly if you like. I think it is worthwhile looking at these.

CHAIR: Well, I have to adhere to what I have said. I will cut you off in two minutes. We will have to go to the questions.

Mr JOHNSON: But you can incorporate.

CHAIR: You are at liberty to table anything you wish to so long as the Committee has access to what you want to present.

Mr HUMPHREY: I was going to talk about the Laerdal Tunnel, which is the only tunnel in the world that has gas cleaning equipment installed. It is a very unusual tunnel. It is 24 kilometres long and it is almost 1.5 kilometres below the ground, so it is a particular location.

It is probably worthwhile mentioning that from a paper presented at the Permanent International Association of Congress meeting in Kuala Lumpur in October, Mr Jan Erik Henning of the Norwegian Public Roads Administration said:

> A ventilation shaft with tower has been used, and will be used in the future, to disperse and dilute polluted tunnel air instead of emitting it through the tunnel mouth. In many cases this will prove to be

> an acceptable method.

He went on to say:

> In some cases, instead of using a ventilation tower, the air may go through a cleaning process within the tunnel. There are no straight answers as to what will be the correct ventilation solution. The system must be planned for and adjusted to each tunnel according to local conditions.

The RTA is very conscious of the need to use world-class technology in its tunnels. It has done so in the past and will be monitoring developments in the future to ensure that it is continued.

CHAIR: Thank you very much. Now, I invite the Committee to ask questions of any of the witnesses. Could I indicate in that regard that the fact that a question is directed to one witness does not mean that another cannot also respond.

Mr RYAN: First of all, it seems to be common ground with everybody concerned that the air quality conditions at the place where the stack will be located are reasonably close already to the requirements set by the EPA of 50 micrograms per cubic metre. The Committee has had access to material from yourselves, in which you concede it will be 47 micrograms per cubic metre with a potential additional amount of close to six micrograms per cubic metre, which clearly will exceed the air quality goal if that occurs at various times.

The Committee has other material which suggests that if you average air quality between the monitoring station at Beaman Park and Sydney (Kingsford-Smith) Airport, the results may even be worse than that. Do you not concede that the air quality of the area where the stack is going is already pretty tight and it is more likely than not that you will, on a number of days, exceed the air quality target of 50 micrograms per cubic metre?

Dr HOLMES: Certainly on occasions at the Beaman Park monitor there are levels which are close to the air quality goal, and this was recognised throughout the assessment process. When we did our representation report we referred to that and felt that there had to be some regional or subregional plan which would address this issue.

I think it should be noted also that the EPA has in its submission noted that this project should not result in any additional exceedences of the air quality goal because, on occasions, there will be exceedences of the goal regardless of whether this project goes ahead or not but if I may put up an overhead to show what contribution the stack makes to the background air quality, I think that is an important issue.

CHAIR: Could you bear in mind in putting up an overhead that Hansard can only record what you verbalise?

Dr HOLMES: Yes, I understand that. I should note also that although I have been the air quality consultant for all the project throughout the EIS process, I am no longer doing the modelling. That is being done by an independent consultant. So these are the results which they have provided.

The pink is the background level and the blue on the ground stack, and this is throughout the year, data that was modelled from April 1995 through to March 1996. This is

actual monitored data at Beaman Park and modelled predictions, using the meteorological data that was collected at Beaman Park. It presents maximum daily ground level concentrations of PM10, which is particulate matter, which has a goal of 50 micrograms per cubic metre on a 24-hour basis.

Mr RYAN: Can you just indicate where PM10 is on that graph so we can see it?

Dr HOLMES: The goal?

Mr RYAN: Yes. That is that heavy line, is it?

Dr HOLMES: That's right. Now, you can see from this that the maximum concentration of PM10 occurred generally during the winter months. This is because throughout the year the emissions into the air shed will be relatively constant, although in winter there may be some additional emissions on PM10 due to home heating of one sort or another, but, generally speaking, certainly from the transport sector, one expects that the emissions will stay the same more or less throughout the year but what will change in winter is the meteorology.

In winter there is a high incidence of inversion conditions which will lead to poor dispersion of the ground-based sources. From the transport, from the road, from the traffic using the roads there will be poor dispersion, so you get your highest concentration.

In the summer months, although the traffic will be much the same, you will get lower concentrations because the air dispersion is better. With a stack you see the reverse picture, almost, that the stack contributions, which are the blue bars, are generally low in the winter months, whereas the stack contributions in the summer months are generally higher, and this is because of the way the meteorology affects the dispersion from the stack.

Generally speaking, in stable conditions, with the inversion conditions that you get in winter you get this narrow plume coming from the stack, which generally remains aloft. It may interact with a tall building, it may interact to some extent with the terrain, but largely it remains aloft, whereas in summer when you have windier conditions, when you have thermal mixing, the plume generally comes to ground more easily, and it is under those conditions that emissions from the stack generally give you the highest concentration.

Now, under these conditions in winter you get the maximum concentration from the ground-based sources but you do not get the maximum concentration from the stack, and the reverse happens in summer. So that explains that pattern that you see. While it will vary a little from year to year, you will see the same general pattern, and it is a well-established phenomenon with dispersion from the stacks. So in answer to your question, you generally do not get the highest with the highest and the lowest with the lowest.

Mr RYAN: We have to move on, and that is a point well made. But your monitoring so far has taken place at Beaman Park. Beaman Park is about one and a half kilometres away from the site where the stack is going to be constructed and it would be roughly three kilometres away from the Kingsford-Smith airport, which is, in fact, only two kilometres away from the site of the stack.

Do you not think, given the significant contribution to air quality that Kingsford-

Smith might make to the area where the stack is going, that it would have been appropriate to carry out some air quality monitoring at the site to decide base levels?

Dr HOLMES: I believe air quality monitoring is about to start at the site, but in answer to your question, if I may elaborate on the FAC data and the airport data, some comments have been made that that would have been a better dataset to use or that perhaps, in the case presented by Mr Child, an averaging should be done between the Beaman Park data and the airport data. That is obviously not a scientifically rigorous procedure, but I do not have any particular problem with that. It is obviously an attempt to get an estimate, which is not unreasonable. However, I have actually used in a report to the EPA the data that were collected at the airport to look at nitrogen dioxide concentrations and incorporated that into the model.

Mr RYAN: I am more focusing on particulate matter.

Dr HOLMES: I understand you are, but the reality is that the nitrogen dioxide concentrations, from memory, were not very different at the Beaman Park site and at the airport site. However, the particulates were. If you look at the airport site, you will see that there is actually a local source of particulate matter quite close to that monitor.

There are large exposed areas, or there were at the time that the data was collected. If you have a look at the way the wind carries that dust, or at least if you look at the coincidence of the high concentrations of PM10 with the way the wind is blowing at that site, you will see that it is generally coming from a large exposed area where dust is likely to be blown off. This will be contributing to that data. When you have a local source of dust emissions like that I do not consider that it is appropriate to consider that that will be representative of the general area.

Mr RYAN: I would not at all, but what I would say is that there is no way in which the measurements you are taking at Beaman Park take into consideration anything that might be blowing across from KSA at all. Beaman Park is a quiet suburban park located close to the Cooks River. This other area is in a valley and within visual distance of Kingsford-Smith airport.

Dr HOLMES: The point I am making is that I do not think the monitoring data, certainly in terms of nitrogen dioxide, is very different at the airport than it is at Beaman Park.

Mr RYAN: I am talking about particulate matter.

Dr HOLMES: And the point I have made is that there is a difference in particulate, but it is because there is a local source, in my opinion.

Mr RYAN: If you are about to start monitoring now at the site it is likely that you are not exactly going to have an extensive and lengthy dataset by the time the stack is constructed. The stack is actually under construction now, is it not?

Dr HOLMES: That is my understanding.

Mr ANDERSON: The stack itself is not physically under construction.

Mr RYAN: Well, there is construction on the site close to where the stack is, and I presume if the stack was not going ahead that construction would not be undertaken either, would it?

Mr ANDERSON: The project is under construction but the physical construction of the stack itself has not commenced.

Mr RYAN: Indeed, and one of the most expensive parts is in fact the tunnel that leads to the stack, is it not?

Mr ANDERSON: That's correct.

Mr RYAN: That is under construction now, is it not?

Mr ANDERSON: Yes.

Mr RYAN: So what if your monitoring at the site demonstrates what has been feared by the Child study, which is available to Canterbury Council, that the air quality at the site is close to or exceeding the air quality goal for particulate matter already? Then what are you going to do?

Dr HOLMES: Well, I think it is very likely that the air quality at the site will show, just as nearly every other air monitor in Sydney shows, that on occasions the PM10 level is close to the goal, on occasions, not very often, maybe a few times a year, but on occasions it will be, and I do not think --

Mr RYAN: Everything you have got so far is a guess, is it not?

Dr HOLMES: No, it is not a guess. It is the --

Mr RYAN: You do not have any monitoring on the site. How many months of monitoring will be done prior to making the decision to construct the stack?

Dr HOLMES: I cannot answer that question, but monitoring will start, I believe, in the beginning of the year.

Mr RYAN: Months, weeks, days.

Ms RHIANNON: Can somebody else answer it?

Mr ANDERSON: The purpose of the monitoring that is going to commence shortly is to do with demonstrating once operation commences that the project is meeting the air quality goals. That is the purpose that is set out in the conditions, and that was to commence six months prior to operation of the tunnel, but as part of our community consultation the issue was raised that perhaps it would be appropriate to bring that forward, and as a result of that discussion with the community we agreed to start that early next year, but I do emphasise that that work is largely to confirm that the project is operating in accordance with the goals, not as part of the design process.

Mr RYAN: So there will be in fact no data that tells you predictively what impact you are going to have on the local air quality or whether the local air quality is already close to the EPA goal?

Dr HOLMES: In answer to your first question, there is data to show predictively what will happen, and that is what I showed you.

Mr RYAN: You have a site at Beaman Park which is more elevated than the site where you propose to have the stack, much, much further away from Kingsford-Smith Airport. Both of those things, I imagine, will have some impact on the local air quality and yet you are going to build the stack anyway.

Dr HOLMES: The predictions will not change. The predictions are based on the traffic that will be in the tunnel, not on any of the background. The predicted contributions --

Mr RYAN: I have got to move on.

CHAIR: Mr Ryan, can I just interpose at this point? Can you make it clear when the stack is expected to be operational, because the monitoring and when it commences would clearly have some relevance to that, I should think?

Mr ANDERSON: The project is expected to start operating in mid-2002.

Mr RYAN: And monitoring?

Mr ANDERSON: Well, as I said, we are proposing to start that early next year but, in accordance with the conditions, it was only required to start six months prior to commencement, so it would have been at the beginning of 2002, so we have brought that forward.

Mr RYAN: What is the cost of building a single stack? I understand there is a significant cost involved in the tunnelling and the stack itself. None of the submissions to the Committee has indicated what the cost of that is and it would be useful to the Committee.

Mr ANDERSON: The cost of the stack itself, the structure --

Mr RYAN: The stack itself is irrelevant unless you have the tunnel so we need both.

Mr ANDERSON: The overall cost of the project is $750 million. Of that, approximately half is the tunnel, and that includes the excavation of the tunnel, which is driven by the ventilation.

Mr RYAN: We need to be quick. I am talking about the ventilation stack, including the tunnelling that leads from the roadway to the stack and the stack itself.

Mr ANDERSON: The cost from the traffic tunnels to the stack is of the order of $30 million.

Mr RYAN: And that includes all of the electrical gear, for example, the fans and so

on?

Mr ANDERSON: That includes infrastructure from where it leaves the traffic tunnels to where you get to the stack.

Mr RYAN: As I understand it, there is also an annual operating cost to the stack. Has that been estimated by the RTA, and how much is that?

Mr ANDERSON: There is a cost of operating the motorway itself.

Mr RYAN: No, the stack?

Mr ANDERSON: I do not know.

Mr RYAN: The electricity cost and so on?

Mr ANDERSON: I cannot quote that figure off the top of my head.

Mr RYAN: I have noticed that an EIS had been conducted fully for the three-stack option. There has, as I understand it, been no EIS for the single-stack option. Is that correct?

Ms STRICKER: That is correct that there has not been an EIS devoted to the single-stack option. The single-stack option was developed in response to community representations on the EIS, which included the proposal for the three stacks.

Mr RYAN: Would you agree that the single-stack option appears to be a significantly different project to the three-stack option? For example, the other three stacks, it could be reasonably presumed, would disperse different concentrations of air quality at different places. With the single-stack option, we have established that we have precious little air quality monitoring for the site now on which decision-makers can decide whether this is a fair risk or not; we have different operating conditions, for example, at Kingsford-Smith Airport, and so on, yet we have no EIS for the single-stack option, even though it seems that it is going to operate very significantly differently from the three stacks.

Ms STRICKER: The contribution of emissions from the tunnel goes into that subregional air shed, whether it is from one stack or three stacks. That loading of emissions from the tunnel is within that and, with regard to your earlier question, the validity of the EIS and the modifications under the Environmental Planning and Assessment Act have been through the courts twice and been found to be valid.

Mr RYAN: Finally I need to ask you, with regard to this air quality plan that was supposed to address other exceedences, what can the RTA seriously do about air quality from other sources?

Ms STRICKER: The subregional air quality plan will be developed at the RTA's cost in consultation with the Environment Protection Authority, the Department of Transport, the Department of Urban Affairs and Planning and the Department of Health. Now, part of that will be to look at what other sources of pollution there are that are affecting the subregional air quality and to develop whole-of-government strategies to address them. And that will sit under - in fact, it is Action 2.13 out of the Government's Action for Air plan.

Mr RYAN: But what can you reasonably do to improve air quality? What will the RTA be able to do?

Ms STRICKER: What I am suggesting to you is that it is not the RTA's total responsibility to implement those strategies. We will be putting up funding to implement the strategies but all of the other regulatory authorities will have a role to play. There may be source controls that are more appropriate for the EPA to implement. I do not know that until we have looked at the problem.

Mr RYAN: That, too, then, is a bit of a guess?

Ms STRICKER: No, it is not a guess. There are very clear strategies outlined in Action for Air. I would expect that the subregional air quality plan will be along the same lines as those.

Mr RYAN: If any other industry were going to build a stack in that area, for instance, a float glass plant, or something like that that might have similar air quality issues, could they not really and reasonably have had to answer all those questions first, have a full EIS on the project and done things which, it would appear, are exceptions for government?

Governments can get away with these things by saying, "We have these other things that we are bringing to bear." Truly, is it not reasonable that the RTA should justify its specific projects under current terms operating now like you would expect any other commercial enterprise?

Ms STRICKER: That is rather speculative. I would suggest that other industries do not have to provide that level of detail necessarily. Environmental regulation is, to an extent, a staged process. You do not necessarily have the full design for absolutely everything you are going to do before you go to approval. You need to have that approval before you can proceed down that path.

Mr RYAN: The final question I need to ask you is that the additional submission you gave us from Professor Pucher and your submission made reference to the fact that the current air quality goals are significantly higher than anywhere else and over time there has been a continuing improvement in air quality emissions for cars.

It would be fair to say, though, that whilst air quality has improved over time so has our knowledge of the needs for air quality, and the standard for air quality has been significantly going downwards. For example, only a couple of years ago meeting a standard of 150 micrograms per cubic metre in any 24-hour period was considered an acceptable standard. The standard that you are having to meet is 50 micrograms per cubic metre, nearly a third of that amount, and also you are having to measure particulate matter at PM10.

The EPA, as we understand from its submission, is looking at particulate matter of 2.5. It would be fair to say that you are already close to the current guidelines. If future guidelines do what current trends suggest they will do and go down further, your stack has not got a ghost of a chance of meeting any sort of future improvements to air quality guidelines at all, has it?

Ms STRICKER: I reject that entirely, because if you look at the material that Professor Pucher has sent, particularly the graphs which show very, very significant reductions in particulates and also in NOx, there is no reason in the world to expect that Australia will not follow the same reductions as have been seen in Europe. We are slightly behind in the timing of introducing those standards but they will be the same standards and we are predicting the same reductions.

Mr RYAN: I suppose one other more general question I could ask is, given that there is an opportunity to improve air quality, an area which has clearly got tight air conditions already, why should the RTA not be making some improvement to air quality in any event, quite apart from whether it marginally meets existing guidelines or not?

It seems a kind of a waste really to gather together the aggregate exhausts of 60,000 cars a year and not make some improvement on the local air quality. Given that we have the lucky happenstance of them having been aggregated, why not make some effort to improve them since there is at least electrostatic equipment which might at least make some marginal improvement on air quality? Is that not a worthwhile project?

Ms STRICKER: I think it would in fact be a very marginal improvement at a high cost and also a big environmental cost if one considers the waste sludge that is produced.

Mr RYAN: The stack is a pretty high cost, though, is it not?

Ms STRICKER: I beg your pardon?

Mr RYAN: The stack is a pretty high cost itself, is it not?

Ms STRICKER: But the electrostatic precipitators would be in addition to the stack. We cannot take the risk of not having a stack, putting all our eggs in one basket and using electrostatic precipitators, because you still need to dilute and disperse the gases.

Mr RYAN: But why not fans at the portals and have that as a dispersion mechanism and an electrostatic dispersion within the tunnel. That is suggested by Mr Child.

Ms STRICKER: I would suggest that that may be a question for the EPA about the ground level concentrations from the portals but it would be difficult to meet the gaseous limits for oxides of nitrogen.

Mr RYAN: How does the three-stack option compare with the single-stack option in cost?

Ms STRICKER: I am unable to answer that question but I am sure that we would probably still have those figures.

Mr RYAN: Is it similar or significantly different?

Ms STRICKER: I am not sure.

CHAIR: The three-stack option, I assume, would cost more in terms of property acquisition. The single stack is being erected on publicly owned land. My recollection of

reading the papers over the weekend is that the three stacks were to be erected on currently privately owned land.

Ms STRICKER: That is correct.

CHAIR: So to that extent, presumably, it would be more costly in property acquisitions.

Mr RYAN: I think the most costly aspect of the stack option is the construction of the tunnel from the roadway to the stack, is it not?

Mr ANDERSON: The changes that were implemented after the consultation process during the EIS cost about an additional $50 million and, of that, a percentage obviously was for the Turrella stack. The amount is not greatly different to the figure I gave you previously.

Mr RYAN: So the original version that had three stacks was already costed in the original project?

Mr ANDERSON: No, what I said was that there were a number of changes made as a result of community consultation, changes that were made to the project. They cost about $50 million.

Mr RYAN: This is post the three-stack option. These changes were made afterwards.

Mr ANDERSON: In consideration of the comment from the community on the project at that time, which was the three stacks, there were changes made not only to the ventilation system but to other aspects of the project. That cost $50 million and, of that, a percentage obviously was for Turrella, which would have been of the order of $30 million.

Mr RYAN: So it is $30 million more to have a single stack than it would have cost to build three stacks?

Mr ANDERSON: Yes.

Mr RYAN: If that is the case - $30 million sounds like a considerable amount of money - could it not have been used for electrostatic fans?

Mr ANDERSON: I think that demonstrates a misunderstanding of the ventilation system for this project. Irrespective of which direction that you head from now on, you still need a stack at Turrella to disperse the gaseous components. There is no system anywhere in the world for treating the gaseous components of a road tunnel. You still need the stack.

Mr RYAN: I do not think there is any doubt about that.

Mr ANDERSON: The other misconception I would like to address is that by introducing electrostatic precipitators to this tunnel you can in fact reduce the cost of the ventilation system per se. That is not the case. It may be the case in Norway, where they have a particular problem with particulates and they have much higher goals for carbon monoxide within the tunnels themselves. In this project we are not in that situation. Our particulate

loads are less but we have a very stringent goal for carbon monoxide.

Mr RYAN: I think you are missing the point of my question here. Apparently you had acceptable environmental goals for three stacks and you then had another $30 million to spend. Why not have spent the money on electrostatic ventilation rather than a large single stack and scrap the other three?

Mr ANDERSON: Well, the process that we went through in terms of the environmental impact assessment, as I said, that has been through the courts and that decision has been verified.

Mr RYAN: Common sense suggests that it would have been an environmental improvement, it seems to be agreed, that three stacks is a better version of dispersion than a single stack. If you added to that the additional requirement of electrostatic filtration for particulates, that appears to have a far greater environmental improvement than a single stack option at Turrella, does it not?

Mr ANDERSON: Albeit the stacks were in residential areas.

Mr RYAN: The current one is in a residential area, and it is in a valley, to boot.

Mr ANDERSON: The current one is on industrial land.

Ms RHIANNON: Can I just follow that up with a question to Dr Holmes? I noticed how your advice changed on this issue that Mr Ryan has been pursuing. In your report to the RTA in November 1996, and I might just quote the two relevant paragraphs:

> Ideally the stacks should be located on high ground. This results in the emission being better dispersed by the stronger winds experienced at a greater elevation, compared to the relatively calm conditions which would prevail in the valley.

Then one year later your position in July and October 1997 was that it was best for the stack to be in the valley. So I was just wondering if you could explain to us why your position changed.

Dr HOLMES: My position has not changed. The ridges are an ideal place to locate stacks because of the better dispersion conditions. I did not say in my report of June 1997 and October 1997 that the Turrella stack was an ideal place. I did not use those words. My position is on this that it is better to locate a stack on a ridge because it does not have to be as tall. You can locate a stack in a valley if you design it properly, and that is what has been done. A stack in a valley has to be significantly taller than an equivalent stack on a ridge.

Ms RHIANNON: So does that mean you did not actually support the stack being in the valley?

Dr HOLMES: No, it does not mean that. It means that I had to design it differently. I had to make it taller. That is the reality.

Mr RYAN: It is in the valley now.

Dr HOLMES: It is in a shallow valley, not a tight valley. I have never changed my position on this. I have said all along that if you put it in a valley it has to be taller, and that is what it is.

Ms RHIANNON: To the RTA people: can you explain to the Committee how you go about selecting your consultants and how you actually verify their work, because that is obviously relevant to much of the material before us making the decision?

Mr ANDERSON: What do you mean by consultants?

Ms RHIANNON: The consultant people who are not part of the RTA who you hire. I am not just talking about Dr Holmes and Holmes Air Sciences, but the various consultants that you employed to give you advice. It is a set practice these days, something that momentous decisions rest on, so I am just wondering how you choose people and how you verify that the background of these people is something that we can be confident of and satisfied that the decisions that they bring forward are correct. How do you determine all that?

Mr ANDERSON: Normally we would undertake a process where we look at the experience of that particular consultant and the cost of those services, so, in effect, it is an assessment of both the price component and a non-price component. What I am saying is that we want value for money, not the cheapest price. In the case of something where the expertise level is very significant, then we would probably give a very high weight to the experience level of that particular person, because, as you put it, if the advice that they are giving is critical to a project, then that needs to be taken into account. That is the general process that we provide on all government projects. We have to go through a process to identify the selection of that particular consultant.

Ms RHIANNON: And would you get outside advice on that independent of the RTA that would also help verify that?

Mr ANDERSON: It is a very general question so I will have to answer it generally. It would depend on the circumstances. If there was a particularly high standard of expertise required, then, obviously, we take whatever advice we require as part of that assessment.

Mr JOHNSON: It was indicated that for 50 years it has been known that a road would be going through this area. Has that been reaffirmed from time to time?

Ms STRICKER: The road reservation was committed in the late 1940s, I am advised. That would have appeared on the local government local environment plans and would be readily available to legal representatives of people searching who would be purchasing homes in that area.

Mr JOHNSON: And Canterbury Council?

Ms STRICKER: And Canterbury Council, yes. All local government councils.

Mr JOHNSON: It was indicated that 150 conditions had been placed on the project by DUAP or the EPA?

Ms STRICKER: The Minister for Planning.

Mr JOHNSON: The additional costs of those 150 conditions, have you any idea what they were? Were they considerable?

Mr ANDERSON: That is an issue that came up during the tendering process. Obviously the conditions themselves, per se, do have a component of cost in them, but there were additional conditions that were considered at the time. I cannot recall the figure offhand, but it was of the order of $10 million to $20 million for particular conditions set towards the end of that process prior to closing tenders, but other than that general answer I cannot be more specific.

Mr JONES: Three stacks along the ridge line would appear from previous comments to be a more desirable proposition than one stack in a valley. First of all, would you agree with that statement?

Ms STRICKER: In an ideal situation if all other things were equal it may be but, as Dr Holmes has pointed out, a stack in a valley that is properly designed and high enough for proper dispersion would have the same level of impact as three stacks.

Mr JONES: So you are saying that the options are the same?

Ms STRICKER: In terms of the air quality, they can be the same if it is properly designed.

Mr JONES: So if the outcome is likely to be the same, why have we moved from three stacks to one stack when the original concept was three stacks if the objective of the exercise is to get the best air quality, or does it not matter?

Ms STRICKER: Well, given that I have just stated that the air quality impacts would be the same if the stack in the valley is carefully designed, the other considerations were the number of families who would have been dislocated who would have had to have given up their homes and moved from those areas.

Mr RYAN: There were people going to have to move from the other stacks.

Ms STRICKER: Where the three stacks were located on the ridges were actually on the sites of current residential properties. Those properties would have had to have been purchased and those people would have had to have moved away.

Mr JONES: But there would be a saving of $30 million because we would not have had to have dug the big tunnel and had the infrastructure, and those people could have adequately been compensated, surely, with that purse?

Ms STRICKER: Could I respectfully submit that that is a value judgment as to whether those people could be adequately compensated.

Ms RHIANNON: But is it not a value judgment with the people there at the moment because a number of people have indicated that they will have to leave too, so have we not got a similar situation with your proposal to put the stack on the present site?

Ms STRICKER: Those people do not have to leave. The air quality goals will be met. They will be as well protected for air quality as people throughout the greater metropolitan area. They do not have to leave. There is no direct impact on them.

Mr JONES: You are building a four-lane highway underneath the ridge. Most arterial roads in Sydney are six-lane highways. We understand that the carrying capacity of the tunnel will be adequate on completion but I would suggest that within a few years you would have severe congestion inside that tunnel and that would mean that vehicles would be crawling through the tunnel and creating far more air pollution than is probably anticipated at the moment. As professional people, can you give an undertaking to the Committee that the facilities which you wish to install will be adequate under those circumstances?

Mr ANDERSON: At the end of the day the conditions remain during any period of the operation of the tunnel, so we are still required to meet those air quality goals. There is limited capacity to increase traffic in the tunnel during peak periods. It will not be operating at capacity on opening.

However, being a four-lane road, effectively, the use of a four-lane road has now come of the Botany West strategy in the early 90s, which looked at an integrated approach to transport in that area, which included both roads and rail, and I guess what you see as the outcome of that is the new southern rail and its integration with the rail network and the M5 East, so, yes, the motorway will during peak hours be close to capacity on opening but we still have to meet the goals. There is also some flexibility in the ventilation system to address any minor inconsistencies that might occur for whatever reason.

Mr SAMIOS: You have mentioned earlier that the project was scheduled to be completed in the year 2002.

Mr ANDERSON: That's correct.

Mr SAMIOS: And that thus far we have got under way with the construction of the tunnel.

Mr ANDERSON: The tunnels themselves are approximately 20 per cent complete, 450 metres from the Bexley Road end and about 300 metres from the Marsh Street end.

Mr SAMIOS: And the cost of the tunnels again?

Mr ANDERSON: The project itself is $750 million. The cost of the tunnels --

Mr SAMIOS: All up?

Mr ANDERSON: All up, the cost of the tunnels themselves is probably about half that.

Mr SAMIOS: So we are committed to completing the tunnels at this stage?

Mr ANDERSON: Yes.

Mr SAMIOS: And it looks as if, therefore, we are committed to completing the total project?

Mr ANDERSON: Yes.

Mr SAMIOS: In spite of this committee of inquiry?

Mr ANDERSON: That is not a matter for me to advise on the outcomes of this Committee or, for that matter, government policy. I am a project manager. My role is to implement the project in accordance with the approval conditions, so within that context at this time I would answer yes.

Mr SAMIOS: And by picking a date of 2002 for the completion of the project you have presumed a commencement date for the stack?

Mr ANDERSON: Yes.

Mr SAMIOS: What date is that?

Mr ANDERSON: The stack structure itself, and by that I am talking about the 25-metre structure above ground at Turrella, probably will not commence until late next year.

Mr SAMIOS: And the tunnel?

Mr ANDERSON: The tunnel itself will commence early next year.

CHAIR: I would just like to clarify one matter. My understanding as a result of reading the submissions to this inquiry regarding the three-stack proposal was that it was substantially abandoned as a result of public opposition. Am I correct in that perception?

Ms STRICKER: Yes.

CHAIR: So that should not be considered as a viable alternative, in a political sense anyway, to the one stack?

Ms STRICKER: No, I do not believe so but the public representations to the 1994 EIS, which did contain the three-stack option, were very vigorous and the RTA took note of those and that is why we looked for another option.

Mr RYAN: Is the RTA familiar with the study done by Child and Associates for Canterbury Council, and has it done some critique of that for the RTA that the Committee could use, because it does seem to be a very detailed matter and very difficult for the Committee to critique piece by piece at a hearing? It would be useful if you had made some sort of response to that for the Committee to have access to that.

Ms STRICKER: We could provide a critique of it. We have been in discussions with Dr Child, and he is currently working with us, as are members of RAPS on the committee to look at one of his recommendations in that report. Did you particularly want the RTA's response to that report?

Mr RYAN: It seems to me, on my estimation, a very well-considered submission which appears to attract general acceptance both by the council and elements of the community, and there are certainly statements in there which I have used in questioning you today and I need some response.

Ms STRICKER: Could I just say that we have given responses to our community consultative committees on Dr Child's recommendations.

Mr RYAN: Which of his recommendations are you considering?

Mr ANDERSON: We formed a working party to look at what, in effect, is an incident management scheme so that if an event occurred which was as a consequence of the M5 East and it appeared that there may be an exceedence, we have a plan for managing that. Now, that is no different from the way we would prepare incident management schemes for fires or for accidents. They are not planned events, but we need to have within our control systems plans to be able to react to those if in fact they occur, so what we have done is, I guess in response to the recommendations of Noel Child and Canterbury Council, to set up this working party to look at the feasibility of, on occasions, emitting from the portals if there appeared to be a likely exceedence at Turrella.

Mr RYAN: You are apparently planning to construct the stack, which I understand is not yet fully designed, with a view that if air quality goals are not met electrostatic precipitators can be installed. Have you estimated the cost of installing electrostatic precipitators in the stack, not as a retrofitting but as part of the current project?

Mr ANDERSON: The cost would probably be similar because we already have to provide in the design for possible retrofitting if that is required in the future, so I guess being, in a sense, isolated from the current work, the cost would probably be approximately the same at today's dollar, if you like, and the estimate of cost that we have for that is $40 million. That information is based on information that we have from Japan.

Ms RHIANNON: Ms Stricker when you were speaking about the three stacks and you acknowledged the strong opposition that there was and how the RTA had taken this into consideration and the proposal was revised, considering that there is now strong opposition to the current proposal, has the RTA made any assessment of the degree of that opposition and compared it with the earlier opposition, because that is what I am looking for, a comparison with what happened before and how you have determined your response, which at this stage seems to be to go ahead with the stack despite this opposition?

Ms STRICKER: The issues are somewhat different. The responses from the community on the three-stack option were focusing on the physical disruption caused by an RTA need to buy the properties to actually construct the stacks and the relocation of a number of families. The opposition by RAPS and the local community is to do with their perception of the changes in air quality. Now, that can be managed. The physical relocation of the families for the three-stack option, there really was no alternative.

Ms RHIANNON: How many families did it involve who would have lost their homes with the three-stack option?

Ms STRICKER: From memory, it was of the order of about 20, but I would have to

go back to that.

(The witnesses withdrew)

MAXWELL GEOFFREY NOONAN, Director, Development and Infrastructure Assessment, Department of Urban Affairs and Planning, Governor Macquarie Tower, 1 Farrer Place, Sydney, affirmed and examined:

MARK DAVID HATHER, Senior Environmental Planner, Department of Urban Affairs and Planning, Governor Macquarie Tower, 1 Farrer Place, Sydney, sworn and examined:

CHAIR: Mr Noonan, have you received a summons issued under my hand in accordance with the provisions of the Parliamentary Evidence Act 1901?

Mr NOONAN: I have.

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

Mr NOONAN: I am.

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

Mr HATHER: Yes, I did.

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

Mr HATHER: Yes, I am.

CHAIR: If either of 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 and resolve into a confidential session. I should warn you that, however, Parliament may override that decision at any time and make your evidence public.

Could I announce to you in case you did not hear it before that we have allocated a maximum of 45 minutes per segment, so I will invite either or both of you to make an initial oral presentation not exceeding 15 minutes and then the Committee will ask you some questions. So could I invite you, Mr Noonan, to start?

Mr NOONAN: Thank you, Mr Chairman. Just to explain how we propose to take you through, I would like to give you an overview for a few minutes and then Mark will talk more specifically about the issues of interest and concern to us.

I am obliged to point out at the beginning that both of us are new to either the organisation or to the project. Mr Haddad, as the executive director, was the leader of the exercise. He, unfortunately, cannot be here today but would be willing to consult with the Committee later in the week if so required.

The fundamental, I guess, for the Department of Planning was that the assessment that was conducted of all aspects of the proposal to build the M5 East was strictly in accordance with the Environmental Planning and Assessment Act and regulations. This is a very comprehensive set of requirements and very prescriptive. It allows very little latitude, so

I think it is proper to say that we followed that to the letter of the law, but, secondly, in the course of the project the assessment process and decisions were challenged in two courts, as you heard this morning, and the process was upheld by the courts.

The implications of that for us are that the decisions of the appeal court, the upper court, are binding on the Minister, so we can only now move on from when that decision was taken and treated as a fact.

Fundamentally, a strategic assessment was undertaken at the outset on the proposal and it was considered that the M5 East would be a strategically significant road, that it would contribute considerably to the economic welfare of the State, the region and the city. To us, that means we need to find ways of making it work.

Quite often in these assessments you look for very specific features to ensure that, if a project goes ahead, it is environmentally sustainable. In this case, we looked for economic sustainability. That flavoured, I guess, the assessment in that we had to look very broadly at the long-term, and two things come out.

Firstly, the assessment process was conduced fully independently. Whilst we rely on proponents such as the RTA to provide us with broad data, modelling that they have produced to support their case and noting that the Act requires this to be credible - it must be totally factual; there is a legal obligation behind their presentation of the information - we did stand back and try to have an independent review.

We used the EPA and Department of Health extensively, and we continue to this stage to rely on them for the scientific expertise they possess in both the environment and health areas. More so because of the longitudinal nature of a freeway, community consultation, community involvement is paramount in our assessment. This is not a means of pushing the decision away.

We still have an extraordinarily difficult job, but in this case we knew that a major freeway going through a highly urbanised area would create a lot of interest, so the process conducted stipulated very, very heavily the requirements for that community involvement, and I keep emphasising it was not a one sort of step decision process. We are involved in all aspects of the approval process from now on and we will be requiring a total community participation.

There are ways in which, as you have seen, the community involvement has changed that decision, and some of the conditions we will talk about have come from that community involvement. It is a fundamental part of the assessment process.

Three points, I guess, are critical. I am trying not to revisit the matters you have discussed already. I think a lot of the matters you discussed earlier on are fundamental to our assessment so I am going to jump over things I think you have covered and just come down to those that are left.

From our assessment, it was the relative potential contribution of the ventilation stack to air quality in the region and subregion more so than the absolute contribution.

We have heard that the background concentrations of PM10 in particular fluctuate, so

it was seen to be: what would this do? What sort of cumulative effect would this have in that region? We focused our assessment on that particularly, PM10.

A discussion occurred this morning on the viability of focusing on regional management strategies to improve the sort of other sources that contributed to PM10, and we do believe this is important. We believe there are regional planning regimes that we could adopt that, if properly designed and properly put in place, can have significant impacts.

The conditions oblige the RTA to participate in these studies and to contribute financially towards them, and this will be part of our ongoing involvement. I agree with the comments made. This will not be easy. It needs to be comprehensive and sustained to get improvement, but it will be part of the exercise.

Finally, I guess, the thing from this morning's discussion is very much that if the exercise of managing the operation of the stack combined with strategies for improving the regional air quality fail to ensure that residents in the area achieve the WHO goals of 50 micrograms per cubic metre reliably, then the conditions provide for retrofitting of treatment systems.

Our view is that we would want to see a pretty solid cost-benefit analysis. The data will have to be rigorous and we will not want investment to be inappropriate or capricious. There is a data collection regime that we expect will take a couple of years, but we are proposing within two to five years to stand back, look at all the monitoring results that will be going on from now, the assessments of the impacts that we have obliged RTA to sort of put in place after operations, and then determine if the subregional goals are achievable, and at that point we will enter into discussion as to whether retrofitting is required.

Mark will talk more about the work that is going on at present to give us a feel for how the modelling, et cetera, is going. I think the key thing for us is that we will be focusing, and have focused in the assessment, on performance outcomes. In many cases, you can get into debating the nitty-gritty of how things are done, but our focus will be on what the options are, and that is a sort of move one step higher.

The community and the RTA will have a range of views of what steps should be taken, what options should be explored, but we will focus on what is the bottom line long-term for the maximum number of people in the region and later on we will have a further community exposure of how we see that being implemented. For the rest of the 15 minutes Mark has specific issues that I would like him to go through.

CHAIR: Before you commence, Mr Hather, there is a gentleman with a camera from a local media outlet who wants to photograph, as I understand it, the Committee in session. Could I ask the Committee members and all witnesses present whether anyone has any objection? That being the case, you may do so, but please be as unobtrusive as possible.

Mr HATHER: Mr Chairman and the Committee, what I thought I would do is give you a bit of an outline of the assessment process to understand how we have got to the situation we are in at the moment.

The proposal was subject to part 5, division 4 of the Environmental Planning and Assessment Act. This requires that where a proponent also has an approval role and an EIS

is required the Minister for Urban Affairs and Planning is the approval authority.

At the time of the exhibition of the M5 East EIS this was a relatively new process, having been introduced in 1994. Before this legislative change the RTA would have had both the impact assessment and the approval role.

The M5 East proposal was a transitional proposal and it was not mandatory that it be subject to approval by the Minister for Urban Affairs and Planning. However, the Minister directed that it be so. The RTA sought the approval of the Minister for Urban Affairs and Planning in August 1997. The RTA's request was accompanied by a representation report, which addressed the issues during the exhibition process and identified a number of modifications.

What is of particular relevance to this inquiry is the fact that the EIS proposal for three ventilation stacks was modified to a single stack at Turrella.

In considering whether to grant approval, the Minister for Urban Affairs and Planning is required to take into account a report by the Director-General of the Department of Urban Affairs and Planning. The purpose of this report is to provide an independent and comprehensive assessment of the proposal before the Minister.

The director-general has a statutory period of three months in which to prepare the report to the Minister and, in preparing her report, consideration was given to the EIS, both the 1994 EIS and the supplement in 1996, representations made to the EIS, the RTA's representation report and considerable advice and reports from other agencies, particularly the EPA.

The department also received some 350 separate representations of concerns about the location of the single stack at Turrella.

Overall, the proposal was considered by the department to be of strategic importance in terms of meeting the objectives of the relevant strategic government planning and transportation documents. In particular, it would provide an important and critical link for freight movements between the National Highway at Liverpool and Port Botany, Sydney airport and the central industrial area.

The proposal would also provide essential transportation needs for the growing population and employment areas in the south-west of Sydney. At a local level it would remove a significant proportion of through traffic off local streets throughout the Kogarah, Rockdale and Arncliffe and Bexley areas. In particular, traffic volume reductions of 30 per cent are predicted for Forest Road and 45 per cent for Stoney Creek Road.

Most of the local network is expected to experience substantial reductions in commercial traffic, up to 80 per cent on Moorefields Road and 70 per cent on Stoney Creek Road.

The key impact issue identified in the director-general's report was exhaust emissions from the tunnel ventilation system and potential associated impacts on air quality. I must stress that the issue of primary importance was whether the emissions were from three stacks or from the one stack, that is, over 80 per cent of representations to the original EIS had

concerns about air quality from the three exhaust stacks.

The director-general's report includes a comparative assessment of the three-stack proposal with the single stack at Turrella. The comparison identified both negative and positive changes. However, no overall change was expected for regional air quality.

There would be overall benefits to those people living in areas near the original three stacks whilst there would be potential negative impacts on those living near the new stack location. Nonetheless, it was of paramount importance in our assessment that impacts from exhaust emission from the single stack still meet appropriate EPA goals.

Given the nature of public concerns about air quality, a senior officer of the department, Mr Sam Haddad, undertook an international survey of tunnel ventilation exhaust systems, including extensive discussions with officials and leading practitioners in Japan, Norway and Austria. Further details on this review and current trends will be presented later in this submission.

In addition, the department commissioned an independent consultant to review the air quality issues. The director-general's report concludes that, based on advice from the EPA and our independent consultant, stack emissions should be able to meet current and emerging goals. However, given the concerns about nitrogen dioxide and fine particulate matter, when taking into account existing background levels, further detailed air quality modelling, including wind tunnel testing and terrain modelling, was recommended.

It was also recommended that a subregional approach to air quality improvements would be more effective than controlling emission from the stack in isolation. Based on the assessment of emissions from the Turrella stack and from examining international practice, it did not appear that there was a strong nor immediate justification for a treatment system. However, it is recognised that a higher stack may be needed for an added safety margin.

Notwithstanding, the department strongly recommended, and it was incorporated in the conditions of approval, that provision be made for the retrofitting of electrostatic precipitators and gas treatment systems and that such systems be installed if required after consideration of the results of monitoring and compliance with EPA goals, taking into account the views of the EPA, the community consultative committee and the outcome of the subregional air quality investigations.

The Minister for Urban Affairs and Planning approved the proposal in December 1997 subject to 150 conditions. Some 12 conditions were specifically directed to the control and management of air quality associated with the ventilation stack at Turrella. Details of these I can discuss later.

Since the approval, the validity of the RTA to modify the original three-stack proposal to one stack and subsequently for the Minister for Urban Affairs and Planning to approve the one stack without the need for re-exhibition has been subject to the Land and Environment Court and the Court of Appeal. Both courts have ruled in favour of the RTA and the Minister in this regard.

The department has an ongoing role in the implementation of the conditions of approval of the M5 East motorway. A number of the conditions require additional

information to be provided to the director-general for approval, including the preparation of environmental management plans, additional studies and reports on detailed aspects of the proposal, urban and landscape design plans, compliance reports and procedures for dealing with a number of critical impact issues.

Mr Chairman, I am aware of the time constraints. I was going to present a summary of Mr Sam Haddad's international tour. I can continue to do that or I can stop here.

Mr RYAN: Can I recommend that you table your written submission and make it part of your evidence.

CHAIR: I think it would be better if you put that into your evidence in written form.

Mr HATHER: I can do that. The additional thing I was going to add is that one of the conditions requires the RTA to submit a report examining international developments in tunnel emission treatment systems. I was also going to give an outline of what the outcome of that report was. Again I can table that or I can summarise that now.

CHAIR: Can you do that within five minutes?

Mr HATHER: Certainly.

CHAIR: That sounds highly relevant, so perhaps you could do that.

Mr HATHER: In summary, the report indicates that there are no new tunnel emission technologies since the date of the approval. Apart from Japan and Norway, there is no widespread use of systems for internal air quality treatment, although systems and concepts continue to be developed and tailored.

Current known operating permanent installations for internal air quality are limited to electrostatic precipitators, although a system for reducing NO2 concentrations is being developed for internal air quality purposes for a tunnel in Norway.

There is no known permanent installation of a system to remove gases for external air quality purposes. There is one known permanent application of electrostatic precipitators to reduce particulates for external air quality purposes in an extreme heavy vehicle environment in Japan. The Meishin Expressway Tunnel, and I do not know if I have pronounced that correctly, carries some 100,000 vehicles per day, of which almost 50 per cent are heavy vehicles.

In Norway, the Svartdal Tunnel is currently under construction in Oslo and no electrostatic precipitators have been installed. An underground treatment air plant to remove just gaseous NO2 is under investigation for the Aurland to Laerdal Tunnel. The tunnel is 24.5 kilometres long with predicted traffic volumes of 1,000, although I have seen in another report where the predicted traffic volume is 5,000 per day. Treatment is proposed only because of the difficulty of sourcing fresh air.

The report concludes that in view of the continuing improvement in vehicle emissions it is unlikely that the use of tunnel emission cleaning systems would become widespread. This report is publicly available. And I might add a footnote.

Mr RYAN: That RTA report you have just quoted - that is an RTA report, is it?

Mr HATHER: It is an RTA report in compliance with condition 79.

Mr RYAN: Complete by someone within the RTA or a consultant?

Mr HATHER: I think a consultant to the RTA, yes. As a footnote, I would say that it has come to the department's attention that Residents Against Polluting Stacks, or RAPS, has some concerns about this review and suggests that the review has ignored recent successes, and misquotes the literature.

RAPS has also expressed some concerns about the calculation of costs included in the report. The department has not yet had the opportunity to review these concerns and therefore is not yet in a position to make any comments on RAPS' concerns.

Mr RYAN: Is it possible for Mr Hather to provide a copy of that to the members of the Committee today because I think some of that would be suitable?

CHAIR: The document?

Mr RYAN: The document.

Mr HATHER: The RTA report on the international review?

Mr RYAN: Yes, that segment in particular because some of it will be relevant in interviewing other witnesses today.

CHAIR: Could you make that available and we will have it photocopied?

Mr HATHER: In fact, I have it here.

CHAIR: We will go into a question segment now and I will have to conclude in approximately 20 minutes time. We are under extreme time pressure. Could I ask, within the DUAP approval and the conditions that have been imposed, is there one that deals with the height of the stack and, if so, what height is proposed?

Mr HATHER: There is a specific condition which says a minimum of 25 metres but does not specify the maximum. The RTA is required to provide additional modelling information, et cetera, to then justify whichever height it chooses to build it at.

CHAIR: So, depending on further studies, it might well be that the approval condition is varied to raise the height?

Mr HATHER: It could well be. The condition does not specify it must be at 25.

Mr NOONAN: Condition 37 for the report emphasises that the wind tunnel testing has to be a fundamental part of the assessment.

CHAIR: Reading the papers, as I did over the weekend, it seemed to me that ESPs

in tunnels overseas were largely for the purpose of improving visibility?

Mr NOONAN: In the tunnel?

CHAIR: Yes, in the tunnel. Is that your view, that that is the primary purpose to which they have been put overseas?

Mr NOONAN: It seems to be the major problem. The exercise that we have read is, for instance, in Norway using metal-studded tyres for ice causes enormous particulate matter inside the tunnel. Visibility can be down to metres, so they have had to go to the exercise of reducing particulate matter in the tunnel.

In Japan, one of the problems they had was the very, very heavy demand by diesel trucks to use the tunnels, a far greater percentage of the traffic than we have in Australia, so that was the closest we could find relevant to the circumstances.

Mr JOHNSON: Gentlemen, who makes the final decision about the capacity of the proposed ventilation system to meet air quality goals that have been set for this project?

Mr NOONAN: The final decision will be the Minister, who may delegate down to the director-general. I will have to look at the actual way in which the approval would come in. As I mentioned before, the process will be the obligation upon the RTA to provide us with periodic and then a final analysis of the next few years of monitoring data, so the approval will be based on that data and modelling of that data.

Mr JOHNSON: What steps will be taken if, in DUAP's opinion, the project fails to meet these goals?

Mr NOONAN: We would go to the Minister. We would tell him that the conditions appear not to have been complied with and then refer his attention to the condition which says that retrofitting - my words, not the condition's words - is required, and then that would be put to, I imagine, government at that stage in support of the $60 million expenditure.

Mr JOHNSON: What is the purpose for the requirement for the preparation of a subregional air quality management plan?

Mr NOONAN: As I said before, the important aspect for us was the relative contribution of the stack to achieving those goals or not achieving those goals, so that if improvements could be achieved in the regional area, as long as that 50 micrograms per cubic metre is not exceeded for an average of 24 hours, then you could argue that it gives greater scope for the RTA to negotiate over the management of that tunnel. For instance, it could be occasionally in peak hours there are exceedences.

Now, the question for the community would have to be whether that expenditure was needed if it was once or twice a year. That would be the balancing exercise, the trade-off exercise we would have to run through at that stage.

Mr JOHNSON: Are you aware of any proven exhaust gas treatment plan at operational scale in a road tunnel?

Mr NOONAN: Gaseous phase, not particulate phase? I am not being technically pedantic here but there is particulate management --

Mr JOHNSON: Both.

Mr NOONAN: It is very difficult to extract gases that are part of the gas environment. The particulate ones, yes, do exist.

CHAIR: Is there a specific condition imposed by DUAP that allowance be made for retrofitting of an ESP in the future should it be found to be necessary?

Mr HATHER: Directly there is, yes. I can quote you the condition number.

Mr RYAN: The condition would not take long to read in full, would it?

Mr HATHER: I did actually prepare a list of the 12 conditions relating to air quality and the status of each, if that is of use to the Committee.

Mr RYAN: These 500 conditions, for example --

Mr HATHER: 150.

Mr RYAN: 150 conditions - do they relate to the whole of the M5 tunnel or just the stack?

Mr HATHER: No, the whole project, not just the stack.

Mr RYAN: So the stack itself only has 13 conditions?

Mr HATHER: The air quality operation stage has 12 conditions.

Mr RYAN: Twelve conditions which do not relate specifically to the stack?

Mr HATHER: Yes, they do.

Mr RYAN: All of them relate to the stack?

Mr HATHER: They are air quality conditions. Some may --

CHAIR: Mr Hather, I am sorry to interrupt, are you in a position to tender a copy of a document containing those 12 conditions, because they seem to be very apposite to what we are considering?

Mr HATHER: The actual conditions themselves?

CHAIR: Yes.

Mr HATHER: Yes, I have them right here.

CHAIR: And the status of them?

Mr HATHER: Yes, I have got that in a separate submission.

Mr RYAN: Something I wanted to have a look at is that it is obviously possible that there will be exceedences of the 50 micrograms per cubic metre over a 24-hour period, and it may well be that DUAP will not require the RTA to retrofit this equipment at all. That could happen, could it not?

Mr NOONAN: My answer to that would be that if it was shown that the vent was not a contributor, that those contributions were collected from other sources, you would waste $40 million.

Mr RYAN: I would not disagree with that, but at the moment there are no base level measurements from what the current level of air quality is in this area. One imagines that the EPA intends the general public of Sydney to enjoy an air quality of 50 micrograms per cubic metre over a 24-hour period generally but the RTA has been given permission to put this stack in this area. Even if their level of contribution to that air quality might only be marginal, nevertheless, they are the source of the breach. Under what circumstances would they be required to fit the electrostatic precipitators?

Mr NOONAN: Firstly, we agree totally that it is senseless not having base line data now if you are going to be looking at extrapolations for changes. We have actually put it to the RTA in the last couple of weeks. They really should be collecting proper data at the proper sites.

Previous data has been open to interpretation for the sites were chosen for other purposes, so we have started that exercise saying that if they could set up a base line grid before the tunnel came into operation, then that modelling of the impact of the tunnel would be far more sensible. I believe that will happen. That is a belief as opposed to a final statement, but I know we want that data very badly.

Mr RYAN: I am just wondering when could it be determined that after the stack is operational in the year 2002 - I think, is it not - that it has breached and it is necessary to install the electrostatic precipitator? It does sound to me just from what you have said to be an option that may not be exercised because there might be other political considerations, for example.

Mr NOONAN: I believe, reading the conditions and in discussions we have seen that you would need two to three years operation of that system to give you sufficient reliable data. Also, if you are trying to put it in the context of the regional environment as well. I will defer to the EPA when they follow, their air quality specialists, but from our looking at it, to get a pattern of the relativities, we would need that database. It would be necessary.

Mr RYAN: You have made reference in your tunnel studies along with the one the RTA provided you with that most of the use of electrostatic precipitators was related to improving visibility within tunnels. Would you not agree with me that if the visibility and if particulates are removed, nevertheless, the discharge must be improved as a result?

Mr NOONAN: Yes.

Mr JONES: Just so I can clearly establish the role of the Department of Urban Affairs and Planning, you have acted to set parameters of air quality goals; you have worked from RTA reports; you have looked at the precipitators which are being designed and installed around the world; and you have suggested perhaps that they are not as suitable for Australian circumstances as we are led to believe by others. What assistance has the Department of Urban Affairs and Planning rendered to the air extraction systems of this project of a positive nature other than acting as a controller or an analyser of reports?

Mr NOONAN: If I may, there may be different perceptions, but the way I read our obligations is that we receive submissions from proponents, be they commercial infrastructure or whatever. In our branch we do the major projects for all commerce for government, anything over about $20 million. In each case the proponent puts in front of us the package. We then run through the social, economic and environmental analyses to look at impacts, and the social, often being labour, employment generating, and things like that.

If we turn around and say, "Well, look, we do not like your proposal. What we think you should do is this," you get into a debate as to whether the planning system is anti-innovation, and I know commerce does not like the demand, "Come back with options. Do not do it this way."

Our main role is to assess impacts, so, in response to your question, our primary role for the M5 East was to take the proposal prepared by the RTA and look to see whether it was viable and, if it was not viable for the environmental amenity issues, especially issues which the community identified it was concerned about, to see whether or not steps could be taken to make it viable and acceptable to the community and, if not, then to use the regulatory capacity to project.

We are still in that second phase. The RTA is telling us that they have management options which will satisfy the community and satisfy the air quality requirements. We would not be going to the interventionist statement until we know that is viable.

Ms RHIANNON: You touched on this issue about the monitoring and the collection of data and how you are very keen to really get some solid base line data. That came up when we were talking with the RTA people earlier about the fact that that still is not happening. They say that it is about to happen. So I was just interested in how DUAP has seen its authority and the fact that that has occurred, that they have been collecting data quite a way away from the actual stack site. Has DUAP done anything about that and, you know, what is your authority considering this quite unusual situation?

Mr NOONAN: The authority vests in the conditions. I would have to trawl back through every word of every condition to see if I could find sufficient to give us absolute authority. In this case, though, we know that in five years, or whatever it is, we will be sitting down with them and doing an analysis of what they bring forth then in accordance with the conditions.

Our advice to them has been that unless they get this base line in we will not be able to make a proper decision on that later data; therefore, they could risk sort of a bad decision or whatever, so we believe the overall system would be better understood by us, and I go back to the community. All data will be open as well. The data they bring in on the performance of the tunnel will make more sense if it can be compared to the pre-operational

data. So at this stage my answer is that it is the wealth of logic that we are applying as well as the regulatory capacity to impose later on.

Ms RHIANNON: And just when you gave your introductory remarks the comment was made that you recognised that you had not addressed RAPS' concern about the report. I think it was when you were talking about the international work. Considering that there has been quite a lot of warning about the inquiry and it has been obviously quite controversial and people obviously being seen to do the right thing is very important, I was wondering why RAPS' concerns have not been addressed and what is going to be done about them.

Mr HATHER: We only received the advice on Thursday.

Ms RHIANNON: Which advice?

Mr HATHER: The RAPS' letter to our Minister indicating they had had some concerns about that report.

Mr NOONAN: It came to us Thursday evening through the Minister's office.

Ms RHIANNON: So you only got it on Thursday?

Mr NOONAN: Yes, and I received Pucher's paper on Friday that the RTA tabled. We got both effectively within 24 hours.

Mr HATHER: It was very recent so we just did not have the time.

Mr RYAN: We have not of them very much longer ourselves.

Ms RHIANNON: We will follow that up because we are surprised that it has taken so long to reach you.

Mr RYAN: First of all, you referred to the fact that if you were going to require the RTA to fit the ESPs retrospectively you would require a cost-benefit analysis on that expenditure. Was there any cost-benefit analysis applied to the $30 million decision by the RTA to replace three stacks with one?

Mr NOONAN: I cannot answer that. I would be doing it an injustice if I said no and they had.

Mr RYAN: Given they are roughly similar figures, would it not be reasonable to have expected the RTA might have done that?

Mr NOONAN: I will ask Mark to help with this because I am under the impression that that decision, that change, they saw themselves responding to the request of the community.

Mr HATHER: That is quite true.

Mr JOHNSON: Following on Mr Ryan's question, was it your province to do so?

Mr NOONAN: It was not our province. The RTA made that decision, and their capacity to make that decision was tested in court.

Mr JOHNSON: Was it your province to query it?

Mr NOONAN: The court process queried it and upheld it.

Mr RYAN: That is not the question I am asking. Is it reasonable that the RTA would have applied a cost-benefit analysis to the expenditure of $30 million? If you are going to require a cost-benefit analysis for an expenditure of a further $40 million, is it not unreasonable that the RTA would have carried out the same requirement within their own internal planning arrangement?

Mr NOONAN: It is logically reasonable, but I do not know what was done. There may well have been sufficient done to make the decision sort of stand.

Mr RYAN: The regional air quality plan that you were referring to that might be in place after the stack is completed and the road is operating, can I put to you that one of the difficulties I imagine the community has with that concept is that it does sound a bit nebulous and it does not seem to indicate that there is anything specific that they can have confidence in which either the RTA or any other government instrumentality can require since most of the people you will be requiring to regulate are probably private operators rather than public operators?

What sort of assurances can you give to the community that the regional air quality plan will have the desired impact if air quality in this area is breached as a result of the construction of the stack?

Mr NOONAN: I agree fully with your comments. It is a nebulous concept. It does require a lot of hard work between regulators at State level and councils, often councils because they have a pretty good record of local businesses, their performance, design, like a shop that is cooking stuff, putting out particulate matter, et cetera. They would have good registers, so you do need all players being together. It has been done.

There have been many pockets around, say, the US, UK, et cetera, that have horrendous local air quality problems and when they have actually sat down and looked at the major contributors, you can often get a sort of part efficiency - for 20 per cent of the input you get 80 per cent of the efficiency, and you often find a limited number who can be helped quite effectively, so I am not going to be overly pessimistic except that I do appreciate your concerns. The concept is nebulous. And we have asked for funding for this from the RTA.

Mr RYAN: The difficulty I imagine the residents have is that it seems like, in common parlance, a bit of a punt to take in which they have an adverse effect and if the regional air plan does not work, they still have a stack in their area and no significant improvement in their air quality?

Mr NOONAN: Well, then it goes back to, with the regional plan and proper management of the stack we still have that option to retrofit. All we are saying is that for retrofitting to be cost effective we would need to see a comprehensive analysis of the circumstances demanding it.

Mr RYAN: Some of the things that you are describing that would happen in the regional air quality plan sound to me like the sorts of things that happen in the normal course of business of these agencies, that is, that they normally try to monitor and control air pollution within Sydney. How do we know that there is something special happening for the residents around the M5 East?

Mr NOONAN: Yes, and no. If you are sitting in a country town which has no air pollution problems at all, it may be quite legitimate for you to operate in a certain fashion but if you bring that back into an intensely urbanised area where you may have a hundred such contributors in an inversion, you have to change your practices. Again, the EPA is far more expert than us, but there have been many circumstances like that.

Mr RYAN: But is not the EPA right now monitoring air quality in the area of Bexley and Hurstville and Rockdale? Would it not be making efforts to control the existing industry and ensure that existing contributors to air pollution are meeting a standard of 50 micrograms now?

Mr NOONAN: No, because that standard is a goal ambient, not a pipe discharge. They are fundamentally different concepts, and WHO says it is the air that you breathe in, not what someone's pipe puts out. A pipe coming out in a high windy area does not have to achieve 50 for the ambient to be 50.

Mr RYAN: But the EPA will obviously use as its ambient quality the readings that are currently taking place as the metropolitan air quality study, which is what is happening at Beaman Park now. Now, Beaman Park does not breach the 50 micrograms per cubic metre requirement, so one imagines that if that is going to be the benchmark nothing is going to happen?

Mr NOONAN: If, for instance, the air quality study shows an ambient exceedence early, then my argument would be that we would sit down with the EPA and say, "This is a bowl, an area, which needs intensive study. We want to know what the contributors are to that bowl having an ambient exceedence. How do we come up with a target of forces that are offending?"

That is, first, a condition; second, it has funding from the RTA to get in and find the sources; third, that there are scientifically legitimate strategies for doing it that have worked elsewhere, but you need to know the point.

At this stage, as I said, I do not know whether there are one, two, three, four major offenders in that area or a whole range of little ones. If it is a whole range of little ones only marginally above, yes, your comment before that it is going to be awfully difficult for them to achieve is quite valid.

Mr RYAN: Just a final specific question. Apparently condition 73 from DUAP requires further wind tunnel testing to be undertaken by an independent organisation approved by DUAP. Now, it is my understanding that Hornibrook have appointed some consultancies from Monash University and that they have been appointed evidently by Hornibrook.

Is that considered independent and how will DUAP ensure that the results of those wind tunnel studies are in fact independent, because they do appear to be pretty critical in terms of the behaviour of the air stream above the stack and so on and whether the project is improved or modified> How do we know that that is going to be independent?

Mr NOONAN: It is not an unusual circumstance that we have the proponent pay for the cost of independent studies because some of them can be tens or hundreds of thousands of dollars. In this case, or in this arrangement, we go straight to, say, Monash University and establish a direct reporting line. We have probably got about five major projects where we have got this relationship. We have not done it yet, and I take your comments that it has to be done immediately.

Mr HATHER: Could I just add to that one too, that the whole manner in which that testing has to be done has to be approved by the EPA, so, in other words, it is a consultant which the department has okayed, but the actual manner in which it is done must also be agreed to by the EPA.

Mr RYAN: I have no objection to Hornibrook paying for the study but I think what people are concerned about is the appointment of who does the study, and the appointment at the moment appears to be, by your agreement, Hornibrook has appointed somebody to do the study.

Mr HATHER: No, we have approved MEL Consultants to undertake the physical and wind tunnel testing.

Mr RYAN: Who appointed MEL?

Mr HATHER: I do not have that information.

Mr NOONAN: That is one I would like to take on notice. There should be no reason that that should be a compromise. That is our sort of bread-and-butter sort of work. I will certainly clarify that.

Ms RHIANNON: Can I just ask about the community consultative community quickly? With that committee do you follow through considering the controversy that there has been in the community about it and with people concerned about the operation of the RTA? Do you have an overview of how that CCC operates and if it is satisfactory, because, obviously, and I have seen this in other cases when government bodies have moved in to replace a consultative process, it can very much depend where they draw the community from, so have you got an overview of how the CCC is working.

Mr NOONAN: Two comments. We do get the minutes of the meetings but often large volumes of paper do not really tell you the heart and soul of has happening in an operation. This year we have met with the RTA on five occasions and said, "Well, okay, take us through what is happening, who was there." On one occasion I went to the office and sat with them to find out what sort of information was coming out of it.

I suppose the personal feel is no, but what I guess we rely on is that if the process is in place, the process is prescribed in an instrument of law that that committee shall exist and shall function. Then, if the information is not appropriate, the community can bring that

higher, either to Mr Scully, who has the committee structure in his portfolio, or to our Minister, who has our oversight of it.

Of about 100 projects that we are working on - these exist in all towns around the State - probably about 10 express dissatisfaction with the process, so we intervene and have that in front of us.

(The witnesses withdrew)

STEPHEN MALCOLM McPHAIL, Manager - Air Science, Environment Protection Authority, Post Office Box 29, Lidcombe, and

COLIN JOSEPH WOODWARD, Director, Sydney Region, Environment Protection Authority, 79 George Street, Parramatta, affirmed and examined:

CHAIR: Dr McPhail, in what capacity are you appearing before the Committee?

Dr McPHAIL: As a representative of the scientific community within the EPA in relation to air science.

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

Dr McPHAIL: I have.

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

Dr McPHAIL: Yes, I am.

CHAIR: Mr Woodward, in what capacity are you appearing before the Committee?

Mr WOODWARD: I am a representative of the management of the Environment Protection Authority.

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

Mr WOODWARD: I did.

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

Mr WOODWARD: Yes, I am.

CHAIR: If either of 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 and would, in that event, resolve into a confidential session. I should warn you, however, that Parliament may override that decision at any time and make your evidence public.

Mr WOODWARD: We have no objection to everything being made public.

CHAIR: Could I invite either or both of you to make, if you wish, a preliminary oral submission in support of your written submission exceeding not more than 15 minutes in length in total?

Mr WOODWARD: I will make a very short opening submission and then ask Dr McPhail just to make a short presentation on the environmental goals. The EPA made a written submission to the inquiry so I do not intend to go over that, and there were quite a

few issues raised this morning. I think it is probably more productive to deal with any issues arising by questions rather than going through a detailed presentation on that. I would just like to clarify the EPA's role.

The EPA is an environmental regulator for this particular project. The EPA has worked to ensure that air quality issues are properly addressed for this project, and the EPA's role has been to advise the determining authority, which was the Minister for Urban Affairs and Planning in this particular case, on the appropriate air quality goals for the project.

The EPA's role is not to specify the technology but to specify the goals and to then assess the proposals and the modelling and the monitoring information to be convinced that the goals would be able to be met and then to advise on appropriate conditions of consent, including any contingencies, as to whether the goals may or may not be met, and that advice had been given to the determining authority and the EPA's recommendations were taken into account in the conditions of consent that were issued by the Minister for Urban Affairs and Planning.

I think I will leave it at that and simply hand over to Dr McPhail to talk very briefly about the basis for the goals.

Dr McPHAIL: I would like to use the overhead, if I may?

CHAIR: Could you bear in mind that you need to articulate anything you wish to be recorded?

Dr McPHAIL: Yes, I shall. I would just like to spend a few moments going through the methodology that is used to establish goals and how they particularly apply to the particular case in point. Firstly, there is a goal-setting process that is used essentially around the world for what are called criteria pollutants. They are things like particulate matter and nitrogen dioxide, which have been known about for quite a long period.

Those particular pollutants are normally evaluated by either chamber studies, where you expose people to a particular concentration of a pollutant and see how they respond, what health outcomes result, or you might do an epidemiological study, where you look at the exposure of a large community with the natural fluctuations and again measure end points by somewhat different methodologies. From that technique it is normal to try to establish a no effect level, a level below which you cannot see demonstrable health effects in the population or the subjects you are examining.

To go on from there you then would need to consider the fact that the people that you would normally expose, particularly in a chamber study, are not the most sensitive individuals in your population and that you then need to allow for the fact that they may have a larger response than the community that you have actually exposed. For that reason, for instance, the WHO for some of their goals has at times suggested that a factor of three or a factor of five safety margin might be applied to the levels of lowest effect.

From that set of considerations you then come to a goal, a standard or a guideline, depending which jurisdiction you are in. For this particular project that has led to goals, one for nitrogen dioxide, which is very close to, in fact, the level that was set by the National Environment Protection Measure for ambient air, a national goal- setting, standard-setting

process, the goal being 0.125 parts per million. In fact, that was the goal that was being suggested at the time. It has been slightly changed now. The national goal is 0.12. They have just removed one of the significant figures in the determination.

The second goal, which is the most important to this project because it will actually determine how everything is run - all the other goals will be met, from our understanding, if the PM10 goal is met, so the PM10 goal here is again equivalent to the National Environment Protection Measure goal of 50 micrograms per cubic metre.

Now, I should mention that PM10 is a little unusual compared to some of these other pollutants because you cannot actually do chamber studies. It is very difficult to put people in a chamber and expose them to particulate matter at a concentration. So here you are based much more on the epidemiological information that comes forth.

The other pollutants that we are concerned with in this tunnel are particularly the carcinogens, the air toxics. Now, again, in the case of carcinogens, it is very difficult to go out and actually expose people. No-one wants to volunteer for an experiment where the end point is death, after all, and where the end point may be 70 years from when you have the exposure. So, not surprisingly, there are few goals worldwide for air toxics.

What tends to be done, rather, is that you examine the effects at industrial levels of exposure - that may be a thousandfold more concentrated than you are likely to find in the average environment - and then you extrapolate that risk down to levels that are likely in the ambient environment.

As I have said before, there are basically few goals around the world, and when this project came along the EPA turned to the only extant goals in the Australian context that we could refer to, and those are the Victorian EPA goals, which are basically, remember, in this case, intended to be design goals, so they had very short averaging times related to the way you would do the modelling assessment for a project such as this. The only other compounds that I want to talk about --

Mr RYAN: You might need to read those so that Hansard can record them.

Dr McPHAIL: The benzene goal established for this project was 0.033 parts per million on a three-minute averaging basis, and for 1,3 butadiene, 0.45 parts per million, three-minute average.

Odorous compounds - there are potentials for odour to be developed. Odour is one of those things that is very subjective. All odour goals are based on, essentially, taking a panel of people, exposing them to various dilutions of the odour and determining when they no longer can smell the odour, and on that basis we have goals for both formaldehyde and acetaldehyde for this project, again relating back to the Victorian EPA experience.

CHAIR: Do you wish to add anything to your oral presentation, Dr McPhail?

Dr McPHAIL: Not at this time. I will just take questions, thank you.

CHAIR: Can I ask Committee members if they wish to ask any questions?

Mr RYAN: There has been a recent change in the measure for PM10, or there appears to be a recent change from 150 to 50. Can you explain when and how and why that change occurred?

Dr McPHAIL: Until the national environment protection measure for air, the New South Wales EPA referenced goals that were around the world because there was no standard-setting process for that goal here in New South Wales. So up until the National Environment Protection Measure, which came into force in July of last year, we would have referenced the US EPA goal for PM10 at 150 micrograms per cubic metre.

Mr RYAN: Why have we changed to the lesser goal?

Dr McPHAIL: There are a number of reasons. Firstly, the national environment protection measure did bring in the need for Australia-wide goals, and that re-examined the body of scientific evidence relating to dose response relationships of fine particles with human health.

It is fair to say that over the last period of time the scientific community and the health community have focused on particulate matter in various size fractions and that the evidence is that additional protection was required than would have been given by the PM10 goal that the US EPA was using and, indeed, the US EPA is also in the process of re-examining its fine particle goals.

Mr RYAN: Your submission says that this goal is, in fact, occasionally exceeded in the subregion and that at the Earlwood air quality monitoring station this has occurred on average two times per year in the last five years. Then it says that the National Environment Protection Measure standard for PM10 allows exceedences of the standard per annum. Would it be fair to say that the air pollution conditions at Turrella are close to meeting the edge of that standard already?

Dr McPHAIL: Yes, indeed. Throughout the Sydney Basin and particularly in the subregion we are close to meeting PM10 standards as they are currently written.

Mr RYAN: What would be the impact of a breach of the goal of 50?

Dr McPHAIL: Well, breaches already do occur. They often occur with things like bushfire hazard reduction burning or bushfires, where you can have quite significant excursions above the goal or with, for that matter, wind-blown dust events, and in those cases it is often difficult to actually, according to my discussions with my health colleagues, see the direct impact. However, there is a statistical correlation between increasing particle levels and health end points, such as people ending up in hospital, additional asthma attacks and things like that.

Mr RYAN: I understand that the EPA is working on a new goal of PM2.5, largely because apparently PM2.5 particles are so small they can lodge in even more dangerous parts of the human anatomy. When are you expecting to be able to have a standard for PM2.5?

Dr McPHAIL: We are certainly very actively moving to gain the scientific information in the Australian context that would enable us to set that level within the national environment protection process. The intent is to review the current standard for

PM10 and either replace it or establish alongside of it a PM2.5 standard some time around the review period, which is 2001.

Mr RYAN: Is it possible that if you had a measurement for 2.5, that would have had a significant impact on decisions made about this specific stack?

Dr McPHAIL: I think it is fair to say that PM10, being particulate matter less than 10 micrometres in diameter, and PM2.5 are very closely related. For a project such as this, the majority of the emissions anyway are likely to be in the 2.5 category, so the PM10 standard is, in fact, a surrogate measure of all the other particles which are likely to be emitted as well.

If you take the American experience, where they have tried to establish a PM2.5 goal, they did that by applying a percentage mass factor to their PM10 goal, or their PM10 understandings, so they are very closely linked. In fact, PM2.5 is nothing more than a subset of PM10.

Mr RYAN: As I understand the DUAP approval, one of the conditions of the approval says that the project is not to cause any exceedences over the 50 microgram level of PM10. How would the EPA know that this had occurred if it were to occur?

Dr McPHAIL: One of the things that we are collaborating with the RTA and DUAP in doing is establishing a set of monitoring stations around the new proposed stack to look at impacts upon levels of pollution in the air, so that would give us direct measures of the most impacted areas and, hence, whether the new stack was actually causing new exceedences.

Mr RYAN: At what point would the EPA make the decision that the levels of exceedence were sufficient to constitute a breach?

Mr WOODWARD: Perhaps I could answer that. The EPA would take into account the significance of the exceedence - in other words, if there was an exceedence of 51 versus a much higher level of exceedence, the EPA would also take into account the frequency of exceedences. As Dr McPhail mentioned, the national measure allows for five exceedences a year, so we would take the number of exceedences into account.

If on the basis of both the significance of any single exceedence or the frequency of exceedences was great enough to suggest that there should be action taken, the conditions of consent do allow for action to be taken, and that action can relate to either retrofitting of environment protection control technology in the stack itself or other subregional measures, and there has already been discussion this morning about the development of the subregional plan.

Our focus is on the environmental goal and achieving the environmental goal, and if there was a better opportunity to achieve a better environmental goal for the local area or the region affected by doing subregional measures, then the EPA would support that rather than spending more money for less improvement by retrofitting, so there would need to be a cost-benefit analysis on the improvement that would be achieved from the various measures.

Mr RYAN: These sound to me like judgements that are made in the view of a longitudinal level of study. It does not appear to me that there is an objective level at which

both the community, a court if necessary and the EPA would have decided that a breach of the specific condition requiring there to be no exceedences of the air quality goal would have occurred.

Mr WOODWARD: There is some judgment required in this. It is judgment based on technical input. The best information we have at the moment is that the development should not trigger additional exceedences, and that was the base for the recommendations for the consent, but in accordance with the concerns raised by the community and the possibility of a doubt when you are doing modelling such as this, the contingencies have been included in the plan. The EPA's desire, as I said, is to achieve that goal, and there is a range of other measures in place through the Action for Air plan to achieve lower air quality levels or more improved air quality levels both in this region and across the Sydney area at large.

Mr RYAN: Who from the EPA would make the decision that a breach had occurred?

Mr WOODWARD: The wording of the condition is not such that a breach occurs. The condition actually indicates that if there are exceedences then there are other measures that will be considered. If there are exceedences that are triggered, then the EPA would take into account the information. That would be based on the information from the scientific part of the EPA and the management part of the EPA, and the EPA would make a determination and make a recommendation to the Minister for Urban Affairs and Planning, who would make a final statutory decision.

Mr RYAN: What would cause the EPA to make a judgment of any kind? What would trigger the EPA providing this information?

Mr WOODWARD: The monitoring that is required and is being installed will be the basis of the information that the EPA will be reviewing and will form the basis of the information that would cause a decision to be made.

Mr RYAN: Sorry, I am having difficulty in trying to work out - the community would obviously want to know when a breach has occurred which is of significant weight to bring about an adverse judgment from the EPA. The community would want to know how and when that would occur and at what level that would occur, otherwise it could be said that the condition is somewhat meaningless until someone decides to act on it.

Mr WOODWARD: I think it has been explained already this morning that the emissions from the stack and the general air quality across Sydney are quite variable, and you saw the graph this morning with the peaks that go up and down, so it is not possible to boil this down into an absolute equation. What is required and is in place is to install monitoring equipment prior to the tunnel coming into operation, and as we heard from the RTA this morning, that is to be installed now more than the six months that was originally intended before the equipment comes into operation.

That will give a base line of information about the emission and the air quality prior to the tunnel coming into operation. When the tunnel is in operation the monitoring from the stack will be available to the EPA and also the community committee, and it will be that information which will identify if there are additional exceedences, and if there are additional exceedences, then the factors that I mentioned before, such as how many are those

exceedences, how often are they, will be the factors that will be taken into account by the EPA, by the community and ultimately making recommendations to the Minister to make a decision.

Mr RYAN: Who initiates that further action? Which government department is it that initiates that further action taking place?

Mr WOODWARD: It can be whoever wants to. Well, that is beneficial because it is not limiting it to one single department. The EPA has a responsibility to assess that information on an ongoing basis and, if it does not meet it, then the EPA has a responsibility to take that up with DUAP.

Mr RYAN: So the EPA could take action if it wished?

Mr WOODWARD: The EPA is required, has responsibility for monitoring that information and providing advice to the Minister for Urban Affairs and Planning. The Minister for Urban Affairs and Planning has responsibility under the requirements as well to monitor the information. Also, the conditions of consent provide for the community to be provided with this information, so the community also has the opportunity on top of the responsibilities that government agencies have.

Mr RYAN: At what point would you expect the EPA would take action of its own accord to express concern if a condition were not being adhered to?

Mr WOODWARD: If there were exceedences, additional exceedences?

Mr RYAN: Any exceedences.

Mr WOODWARD: Yes.

Mr RYAN: How many? One? Six??

Mr WOODWARD: This is exactly what I said before. It cannot be boiled down to an equation --

Mr RYAN: In your written submission --

CHAIR: Mr Ryan, let the witness answer the question.

Mr WOODWARD: If there are any additional exceedences whatsoever, the EPA will be reviewing each and every one of those to identify the need to trigger the actions which are required in the conditions of consent.

Mr RYAN: DUAP classified this project as being strategic, and that meant that there were a series of changes made and how they gave this project consideration. It was indicated by that witness that they were meant to not stand in its way if that was at all possible. Does this classification of the project as being strategic have any impact on how the EPA assesses the project and regulates it?

Mr WOODWARD: It has no impact whatsoever on the environmental goals or the

requirements that the EPA would put on the project.

Mr RYAN: Would it have any impact on how you regulate the project?

Mr WOODWARD: No.

Mr SAMIOS: You mentioned before that the monitoring is to be put in before you make an assessment of the quality of the air, but how do you handle bushfires, for example, which only occur intermittently and may not occur during the monitoring period before the stack goes in?

Dr McPHAIL: We actually run a very extensive monitoring network across the Sydney region anyway. We have 18 stations. They will continue to operate during the life of this project, as I understand it. Certainly, unusual events, such as duststorms or bushfires, or substantial hazard reduction burns will be captured by that network as well. So whether they occur will be captured by the network.

Mr SAMIOS: How?

Dr McPHAIL: They record information on a continuous basis, so they will measure fine particles that are likely to be quite widely spread throughout the region from those sorts of activities and we can then factor those in to the data that we actually receive from the network of stations around the stack itself, so it is a regional evaluation.

Mr SAMIOS: But you may be monitoring for six months and for six months there may be no bushfires. How can you accurately assess the effect of bushfires?

Dr McPHAIL: The intent will be to continue the monitoring on a regional basis that the EPA does with its core funding on into the future. We have now monitored in Sydney continuously for 30 years. That will continue to happen, and then you will see the very sporadic events captured in that network without any impact from this proposal.

Mr SAMIOS: But asthma, for example, would be a big worry, would not it?

Dr McPHAIL: Certainly Australia has very high rates of asthma.

Mr SAMIOS: It is almost a national disease?

Dr McPHAIL: We would certainly be, according to my understanding, amongst the world leaders in the incidence of asthma.

Mr SAMIOS: The stack, how do you see the stack? Could you guarantee that the stack, as it were, would not be adding to the problems of asthma?

Dr McPHAIL: My training is not in medicine. I am a scientist by trade. However, what we learn, or what I have learnt from my relationship with my colleagues in Health is that, yes, there are always going to be some very sensitive individuals within the population that these goals may not protect. We have all heard of the boy in the bubble, who is essentially allergic to the environment at large, and there is no way to protect that sort of individual. Certainly there may be asthmatics who will be affected by fine particles at levels

below goal levels, and that is a judgment that is taken into account by the health experts when they try to set goals.

Mr SAMIOS: I know you are not a health expert, but it is fair comment, is it not, that those people who may be deemed to be sensitive are not unusual in numbers in our urban areas?

Dr McPHAIL: Certainly there are a large number of people in the community who are asthmatic. The degree of protection that is included within the goal is something I am not really qualified to speak about, but my understanding of the process would be that you endeavour to set it so that sensitive sub-populations are protected, but certainly there may be even more sensitive sub-populations within those that may find some element of lack of protection at any level you were to set a goal at.

Mr SAMIOS: And a bushfire would aggravate the output from the stack?

Dr McPHAIL: Yes, the impacts will be additive to some extent although the conditions that typically lead to wildfires in the Sydney area are likely to be very windy conditions, and those windy conditions mean that the stack output will, in general, be a smaller contribution because pollution concentration goes with the inverse of wind speed.

Mr JONES: I would like to revisit, if I may, the topic raised by my colleague John Ryan. With this project receiving special attention, how quickly will the public be made aware of adverse pollutants coming from the stack?

Mr WOODWARD: There is a requirement under the conditions of consent for a community committee and also requirements under the conditions of consent for the monitoring information to be made available to the committee. That is there. I am not sure of the actual details of the transmission of that information to the committee.

Mr JONES: If there is no regulation to this, it could be anything from two weeks to two years?

Mr WOODWARD: I am sorry, when you say "no regulation", you mean no regulation of what?

Mr JONES: Come back to my question. How quickly will information, and I will assume for the sake of this argument adverse information, of the pollutants coming from the stack be made known to the public?

Mr WOODWARD: I cannot answer in relation to that information going out to the public and the timing of that. It is a requirement that it be provided. I cannot answer the information on the details of that. It is information that probably might best be addressed to DUAP in terms of the requirements or the RTA in terms of managing the process. We can talk about in general the information that is contained in the EPA's air monitoring network and that information which goes out to the public twice a day, and Dr McPhail can talk about that.

Dr McPHAIL: Certainly the way we operate our network is that we draw back the information from our monitoring stations twice daily and make it available to the public in

terms of a pollution index. I am not yet aware of the exact detail of how this proposal seeks to inform its local community.

Mr JONES: When you say "general index" that is Sydney-wide?

Dr McPHAIL: We at the present moment run Sydney broken up into three regions for an index.

Mr JONES: So it would not be area specific for this project?

Dr McPHAIL: Our reporting process would not be and we would not see ourselves necessarily reporting this project specifically. That would be done through a different mechanism.

Mr RYAN: A specific report would be prepared, though, would it not?

Mr JONES: Therefore, if I can come back to the question, if it is not your duty to advise the public on this specific project but, say, to advise the Minister for Urban Affairs and Planning, how quickly would that Minister or the RTA or the public bodies be made aware of an adverse effect from the stack?

Mr WOODWARD: This is a level of detail that we are unable to answer at the moment. There is a requirement that the information be made public and to the community. You are asking the details of when and how that can be made public and we do not have that information.

Mr JONES: Okay. But I would suggest that if there is no time scale you could make it available in 10 years time.

Mr WOODWARD: I am just saying that I have not got the details of that. I am not saying that that information is not there. I am saying I do not have the details of that.

Mr JONES: You answered a question about who would take action, which government department would take action, including your own, and the answer was, "Whoever wants to take action on adverse pollution from the stack." May I ask you, what if nobody wants to take any action?

Mr WOODWARD: I thought I clarified that, that there are certain agencies that have responsibility to take action, including the EPA and, on top of that, whoever wants to also can take action, so departments do have responsibility to take action and others can take action. They are not excluded from taking action if they wish.

Mr JOHNSON: Gentlemen, how stringent are the air quality goals for this project?

Dr McPHAIL: These are essentially at or close to world's best practice for the goals we are speaking of. To give you a feel for that, as I mentioned earlier, the US EPA goal for PM10 is at 150. This is three times more stringent than that.

Mr JOHNSON: Can you explain how these goals are or were established?

Mr WOODWARD: I will probably just address that, if you like. As Dr McPhail mentioned earlier on, in the past we used to take note of various goal-setting bodies around the world, such as the United States EPA, which we always saw as a bit of a world leader; also the World Health Organisation and the United Kingdom as well. But there has been a change in Australia for setting goals in recent times which results from an inter-governmental agreement in 1992 signed by the Commonwealth and the heads of the States and Territory governments in Australia, which committed to a uniform goal-setting process within Australia, and that led to the establishment of a National Environment Protection Council and national and State legislation to provide for the setting of national environment protection measures for the whole of Australia, which then must be taken up by all the States and Territories within Australia.

The air national environment protection measure has been established in Australia now as of last year, and that provides now goals for all the States and Territories within Australia to actually use, and they are broad goals. They are designed for ambient regional air quality, not for air quality necessarily adjacent to particular activities, and as we have already heard, they are goals which talk about having exceedences, and so on.

In this particular case we have taken account of that goal and we have applied the numbers associated with that particular goal, so, largely, this is the leading-edge requirement for this sort of project within Australia in terms of the stringency of these environmental goals.

Mr JOHNSON: In your considered opinion, can the RTA meet the goals with the ventilation systems it proposes to use?

Dr McPHAIL: The information that has been provided to me to date in terms of the modelling, and I have not seen the final modelling results yet, suggests that indeed the project can meet the outcomes, the environmental goals that have been established, in the way they plan to run the tunnel.

CHAIR: Can I just ask one question of Dr McPhail. I understood you to say a short time ago that the density of pollution is in inverse proportion to wind speed. I would just like you to clarify something for me. My recollection of evidence that Dr Holmes gave early this morning, supported by an overhead, was to the effect that on a still day pollutants from a stack rise vertically, whereas on a windy day the process is broken up, so to speak, and in some cases pollutants come down to ground level. That is my recollection of what she was saying. Can you relate that to your comment that I have just put to you?

Dr McPHAIL: Indeed. The way an individual stack behaves can be quite complex in its local environment but the general process still applies. If you look at the concentration of the plume of pollutants coming out of the stack, its level is inversely proportional to the speed of the wind over the stack. Now, there will be conditions where the stack is brought to ground earlier under windy conditions than in still conditions. Under the same circumstances, however, the concentrations within the plumes will be different in the way I have described.

Ms RHIANNON: I just want to clarify because then I will determine my next question. When you replied to Mr Ryan, Dr McPhail, I think you said that there will be no specific study for the stack, that you will be assessing it in terms of the three regional studies that the EPA carries out in terms of air quality?

Dr McPHAIL: No. Indeed, when we look at, say, any exceedence that may occur in the monitoring stations associated with this stack they will be assessed in a much more detailed way than that. All I was describing earlier was the way at the present moment we supply day-to-day information to the general public on air quality throughout Sydney.

Ms RHIANNON: So there will be a more specific monitoring task force?

Dr McPHAIL: Indeed.

Ms RHIANNON: On that monitoring, as you are obviously aware, there is a co-generation plant out at Botany and sometimes the comparison has been made that the impacts in terms of what is released would be similar. Are you able to describe how that one works and how that stacks up, to use that expression, against this stack?

Dr McPHAIL: I have had some involvement with the Botany co-generation proposal. The most relevant piece of information for this inquiry I believe is the fact that the Botany co-generation proposal seeks to replace an existing steam generation facility on the site and that the co-generation plant will produce essentially the same environmental outcomes because it is replacing an existing plant.

Ms RHIANNON: So in terms of just the particulate matter and the gaseous component, is it about the same impact?

Dr McPHAIL: That question is difficult to answer. In reality, the Botany co-generation plant is replacing an existing facility on the site, so it has effectively no new impact in its own right. It is replacing an existing impact.

Ms RHIANNON: No, I appreciate that. I was just trying to get to the bottom of whether there were better controls. That is what I was just trying to work out. Maybe you do not have that information.

Dr McPHAIL: I am sorry, I cannot remember the mass emissions of each of them and how relative they may be.

Ms RHIANNON: We have heard all day about the 50 micrograms per cubic metre, and that is an important figure, but I just was wondering if you would be interested in commenting because I understood that in some of the literature now there is a recognition that that is quite a high level and that there is recognition that at 20 parts we have often got health problems kicking in at that level, so I was just wondering if you could comment on that?

Dr McPHAIL: Certainly the health research that was conducted in the health and air research program concluded that statistically if you took the cleanest days in Sydney and compared them with the most polluted days for fine particles you found a correlation with adverse health end points. On the basis of that, yes, it is fair to say that there is yet no data that clearly establishes a no-effect level.

Some people would suggest that there is a point, although, as I said earlier, it is difficult to make that decision because you cannot really easily expose people to controlled

levels and see where they stop responding. So it is a little difficult, but certainly we would seek to and as part of *Action for Air* we are seeking to minimise fine particle pollution in the Sydney region basically as a precautionary measure.

Ms RHIANNON: Just coming to how we come to this project in a strange way with no environmental impact study, as you describe the role of the EPA as a regulator, not having an EIS to determine, to compare things to, that it has limited your work on this project, do you see that it will or could limit your work?

Mr WOODWARD: I can probably answer that. The information that the EPA has required has been provided for us to do our assessment. An EIS covers much broader issues way beyond the scope of the EPA, but from the EPA's perspective we have had all the information that we would have required regardless of whether it is through an EIS or through some other process. We have had all the information.

Ms RHIANNON: I suppose it does lead on to questions. It sounds a bit dangerous that maybe EISs are not needed. Is that what you are suggesting?

Mr WOODWARD: No, not at all. I am saying that the EPA is only one of the players in this and we have a particular role and we have got the information for that. The EIS is a very important process but it is covering a much broader scope of things than the EPA considers, such as roads and social effects and all sorts of things like that as well.

Mr RYAN: I have material which I understand will be contributed to the Committee later prepared by RAPS in which they make the comment about the fact - I do not know whether this is true or not; I would like to find out whether it is true. It says:

> It is a fact that the patterns of Sydney's weather change from year to year as a result of global scale variations (eg "El Nino"). Relationships established under one set of weather patterns may or may not be valid under another set of patterns. To claim some form of scientific certainty about the likely effects of the stack from measurements over one seasonal cycle is scientifically invalid.

Quite apart from commenting on that, would it be fair to say that weather patterns and other things do impact on measurements that are to be taken in relation to air quality? How much of the time will it be necessary to monitor air quality at the site to determine what an appropriate base level is?

Dr McPHAIL: You are right in saying that meteorology is a quite important driver of the pollution levels you see. Just to comment on the underlying first question there, which is, if you try to model something, however, and you take a year's worth of data and do that, you are inevitably not going to get precise relationships between time and space with predictions of what may actually have occurred.

However, the variability in the process over a full year normally gives you all of the potential meteorological conditions, so that you actually do get a reasonably good assessment of the total impact and the modelling is designed to be conservative in its own right.

Now, in terms of trying to actually get a base line of a particular area, obviously the longer the better. I am pleased that the RTA is now looking at putting the monitoring station in 18 months in advance, but if you look at cycles within Sydney's pollution levels, they can

be quite long-term. There is no question about that.

You could easily have two wet years, which might give you an artificially low result, remembering that we still maintain the much longer monitoring station we have at Earlwood, with which we can take that longer term variability into account.

Mr RYAN: Do you think there is any validity in a proposition that has been put to the Committee, so far only in writing, that given that the stack location is located only two kilometres away from one of the boundaries of the Kingsford-Smith Airport, the readings taken at Beaman Park, which is the Earlwood site, may not necessarily reflect the full air quality picture at Turrella?

Dr McPHAIL: Ideally, you would want to have on-site monitoring for anything you did. We believe that our monitoring at the Earlwood site is a good regional representation of what happens in the area and, remember, that in this case we have the additional confidence that the modelling based on those Earlwood data is backed up by physical modelling which will replicate the flows in the region ab initio, from first principles way, which gives you a far greater confidence than if you only took the numerical modelling, so you have both of these in this instance.

Mr JOHNSON: Are you aware of any proven exhaust gas treatment plant at operational scale in a road tunnel?

Mr WOODWARD: We have no further information other than has been provided already to the inquiry this morning. We have not done any further research by the EPA on top of that work that has already been researched fairly extensively by the RTA and DUAP.

There was some discussion this morning about what are the other things that are being done in the area to actually reduce emission, and there have been several references to Action for Air. I am just happy to table that, which does talk about cleaner fuel and cleaner vehicles and other reductions for air quality to try to bring all these goals down.

CHAIR: Thank you very much for that and thank you very much for your assistance to the Committee. It is very much appreciated.

(The witnesses withdrew)

(Luncheon adjournment)

MARK CURRAN, Retired, 38 Hocking Avenue, Earlwood,

GISELLE MAWER, Education and Training Consultant, 13 Wavell Parade, Earlwood,

RICCARDO ROSSI, Architect, 3 David Street, Earlwood,

PETER SIAPOS, Telecommunications, 158 Bayview Avenue, Earlwood, sworn and examined:

DEPUTY-CHAIR: Mr Curran, in what capacity are you appearing before the Committee?

Mr CURRAN: As a representative of the RAPS organisation.

DEPUTY-CHAIR: Does that apply to each of you?

Ms MAWER: Yes.

Mr ROSSI: Yes.

Mr SIAPOS: Yes.

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

Mr CURRAN: Yes.

Mr ROSSI: Yes.

Mr SIAPOS: Yes.

DEPUTY-CHAIR: Are each of you conversant with the terms of reference for this Inquiry?

Mr CURRAN: I believe so.

Ms MAWER: Yes.

Mr ROSSI: Yes.

Mr SIAPOS: Yes.

DEPUTY-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 will be willing to accede to your request and would then resolve itself into a confidential session. I should warn you, though, that Parliament may override that decision at any time and make your evidence public. Could I invite any or all of you to briefly address the Committee, orally if you wish, and take no more than approximately 15 minutes in all to do that, and then we will have a questioning session.

Ms MAWER: We just want to thank you, first of all, for the opportunity to have this hearing, and especially thank those of you that came out last Friday to see where we live and work. We know this project has been a controversial and a problematic one. It has had a very long and controversial history, and we really are not here to say, "Put it back to three stacks up on a hill". We want to make that very clear from the beginning. Since the decision was made to go for a tunnel option, the issue where stacks should be built has been a bit like a nuclear waste dump. No one wants it in their backyard, and with good reason. We are not a NIMBY group. We do not think anybody should be dumped with it, not even workers in a supposed industrial area.

We are not here to cause mischief. All we want to do is really move forward and sort out this mess, get back to our normal lives and leave Governments, Parliaments, construction companies and their consultants to get on with their business. We certainly hope that lessons from this project will also have some influence on other proposed RTA projects, like the Cross City Tunnel and the Lane Cove Tunnel.

I am going to briefly talk about our concerns with the health impacts, which are of primary concerns, and some of our frustrations in having those concerns addressed. Mark will address some of the more technical arguments and present a draft proposal that might see our way out of this mess, so that not only can we go back to our own lives but the Government and the people of New South Wales can have a cost effective solution, one which we can all live with and be proud of, even our friends at the RTA, with whom we are on a first name basis now.

As you heard this morning, the 1996 supplement to the EIS came up with three stacks on high ground, and people were justifiably angry. I think Jay Stricker this morning said that there was very vigorous protest. We went to see Mr Scully, who said he was almost lynched. At the time there was also some reports that were undertaken as a result of this proposal. Rockdale Council, for example, commissioned its own study in February 1997. That report pointed out significant flaws and deficiencies with the study that Kerry Holmes had undertaken, and told the Government then that air treatment technologies were available to treat vehicle emissions. Similarly, the NRMA in February 1997, the same month, questioned Kerry Holmes' study's methodology and results, and also pointed out that treatment emissions not only were available, they were also cost effective. I will table both of those reports. The internal investigations undertaken by DUAP and by the EPA also had serious reservations about the basis on which the decision was made to site a stack in Turrella, in terms of the air quality modelling and a whole lot of other things to do with the topography of the area.

In July 1997, when it was announced that we would get one huge stack in the valley, it was significant that that huge stack was going to be at the boundary of Rockdale Council, but most of the pollution was going to be in the Canterbury Municipal area and the Marrickville area. Both of those areas were not consulted and did not have much to do with it at all. I heard about it as a good news radio story, and when I rang up the RTA, I was told not to worry, I would not be affected at all. At my insistence a few weeks later we got this pamphlet dropped, and I think it is part of our submission for you to have a look at. It says things like, "No stacks near homes". As you saw, and I think you will see if you had a chance to look at our submission, there are thousands of homes not only around this stack but also in Marrickville and the Cooks River Valley where the plumes get dumped, as you saw in that

diagram this morning, in the Bardwell Valley depending which way the wind blows, and now the new suburb of North Arncliffe, where we are going to have 5,000 new people moving in in the next year or so.

Better air quality – not for people within two kilometres of this stack, especially in the valleys around. Our air quality is already bad, and you have heard quite enough about that this morning but I would just like to make the point that if the air was water, it is clear that we are already up to our chins in it. For the RTA to say we are just adding that little bit more, that little bit more is going to put it over our noses, especially the children's noses, our parent's noses. Those are the people who are young, those who are asthmatic, those who are old. We really feel that risk is unacceptable. The reports from DUAP in 1997 clearly pointed this out and were ignored. We have put some excerpts from that, again, in the appendix of our submission.

The pamphlet that I just flashed up before you told us that the stack was going to be in an industrial area. It is quite true, it is an industrial area. It is an industrial block of land. But all around it there are these thousands of homes. To us, this pamphlet has been very symbolic in that it has been exactly that kind of story we are being told. We have been told a very cropped view of reality, and been told to accept that as the truth and the whole truth. Anything that we say to protest about things leaves us seen as pests or as whingers. For example, the air quality study. When Kerry Holmes this morning talked about being able to make predictive data based on the studies that they had undertaken – they used the most favourable year with the lowest emission rate, and then used that as the base line data. It gives you no predictive validity whatsoever.

A lot of us in our community work pn contracts. It may be printing or building or education or whatever. We have been absolutely appalled at the lack of rigour and the lack of ethics that has been used by the RTA and their consultants in pushing this project ahead at all costs – at the cost of our lives, our homes, and our lifestyle. Most of us did not even know that PM10s existed a year ago. We now know not only they exist, but we also know what they do. What they do is kill you. They create leukaemia clusters. They trigger off asthma. They cause a worsening of cardiac cases. This is a fairly pedestrian kind of study, from my understanding. Above 20 micrograms you get these kinds of increases in mortality. We have already got more than 20, and this information is also detailed in our submission.

DEPUTY-CHAIR: What is the authority for that?

Ms MAWER: Vedal 1995, and I think you will find it is cited in our submission. There are some articles from the Australian Medical Journal, and Noel Child, in his study, has done the same sort of analysis. There are quite a number of experts like that, who come up with exactly the same sort of data. I think the EPA confirmed that this morning.

Some examples about our problems with the consultation process, and especially the documents that became available just in the last few weeks through a motion in Parliament, the consultants seem to be able to be appointed by the RTA without a selective tender process without anybody reviewing their work. You can have people like Kerry Holmes, who do a study in 1996, have their work discredited. Not only are they employed by the RTA, but they continue to be employed on this and every other tunnelling project. The same with Evans and Peck, the technical support consultants who seem to have problems with figures in terms of adding up. They go out of their way when you send them off to do

an international review to avoid one of the major manufacturers of air treatment technologies. They are asked to do a costs benefit analysis. They do not even attempt to do one. Devine Erby Maslin, the urban design consultants, who do not seem to know how to use scales or measurements. It just seems to us, as residents, that the RTA either cannot tell when it is being taken for a ride, or it makes sure it hires people who will not let facts get in the way of a good story.

The Hon. J. JOHNSON: What evidence have you got for these statements, for example that so-and-so cannot even do figures?

Ms MAWER: Mark will actually speak to that in a few minutes, if that is all right.

The Hon. J. JOHNSON: You are making the statement.

Ms MAWER: I understand they are statements that sound a bit extreme. For a lot of us, the only reason we have been involved in this is because we have been frustrated out of our minds to actually get somebody to listen to us and actually have a look at the facts.

DEPUTY-CHAIR: Emotion is understandable in this context, but I would like to remind all witnesses, you are on oath and you have a duty to tell the truth and nothing but the truth.

Ms MAWER: I certainly appreciate that, and I can assure you that the only reason that we, as residents, have come together, has been out of a sense of incredible frustration and betrayal, because we feel that we have been – as that pamphlet showed – that we are only being told part of the story. We have been given assurances that all will be okay, if only we would go away and let people get on with their business of building a huge toxic stack in our valley that is unfiltered. The only reason that I am standing here, and these people have taken time out from work and their daily lives to come here, is because we cannot afford not to. I am sorry if it sounds insulting, but that is exactly – we have been at this for two years.

The Hon. J. JOHNSON: It is not insulting, but we are a Committee of Inquiry, and our evidence must be based on fact and, as the Chairman says, not emotion.

DEPUTY-CHAIR: Could I also indicate that we will allow you the same time as groups of witnesses were allowed this morning, but if you erode the time otherwise available for questions, we will still end at the same time.

Ms MAWER: I appreciate that. I will just table a couple of memos, for example in 1997 from DUAP, which indicate that there was ministerial directions not to distribute materials on post-exhibition changes, that DUAP had problems at the time with ambient levels being used for point source emissions, and I would like to just address myself to the conditions and -

The Hon. J. RYAN: I do not want to interrupt you any more than I need to do, but you are putting the documents down on the table at such a fast rate, I do not think anybody will quite work out what they are for.

Ms MAWER: I will give them to Stewart at the end. I think we have been told there are 150 stringent conditions that will address our concerns, 12 of them actually relate to

air quality. We are already being told that exceedences are occurring. The conditions do not talk about exceedences perhaps occurring, and if somebody decides to do something about them, they will be addressed. The conditions say no exceedences are to occur, and that has already been watered down, before the design of the stack has been approved. The conditions that talk about treatment do not talk necessarily about retro fitting. They talk about the need to incorporate treatment systems, if there are exceedences. As residents we can see that exceedences already are occurring. Therefore, common sense will tell you that perhaps consideration should be given now, not later, to incorporating filtration systems. Already we are also seeing that the monitoring of international developments, instead of looking at treatment systems, is looking only at monitoring what happens with stack emissions. There is a big difference between those two.

It has taken us two years of haggling to get monitoring stations set up, when common sense, again, will tell you that if they had set them up in the first place, back in December 1997 or August 1998, we would have base line data to know what we have had before the stack, to know what we will have after the stack. Conditions also require things like that DUAP appoint an independent verifier of stack designs, of wind tunnel modelling, of computer modelling. We know for a fact that the RTA or its contractor, has appointed people like MEL consultants in Monash University to do things without DUAP approval. We are told that is independent. One of the conditions requires an annual report of overseas technologies, and a cost benefit analysis. That has been undertaken by Evans and Peck, only a few weeks ago, at the insistence of the RAPS members and other community members on the Consultative Committee. You have got that report. It is interesting that we seem to have more information about this project than a lot of the Government Departments themselves do, as you saw this morning. That report, if you look at it, has four pages of new data. The rest of it is articles, and it misquotes information, Mark will talk about that. It does not do the cost benefit analysis it is supposed to.

In conclusion, we feel that we have got very little confidence in the evidence for the design for this stack, either on air quality matters or on urban design, or on health risk analysis or on property value guarantees. When that pamphlet came out, one of the big ticks it has there is property value guarantees. Yes, there is a property value guarantee for you if you live on top of the tunnel, but not if you are going to be choked by it. We do not think this is fair. A lot of us here stand to lose a lot, both in terms of our health, our property values, our kids. Every independent expert that has looked at this proposal has come out and said it is risky. No consideration at all has been given to the fact you have a 900 metre tunnel leading up to the stack, which is going to act like a processor, because you are going to have particles interacting with each other.

We feel that we are being unwilling guinea pigs in what has been described as a giant, uncontrollable experiment in environmental chemistry. We really do not want to breathe in toxic fumes, either as we lie in our beds at night, work in the factories by day, or in the schools up around the ridges.

Mr CURRAN: I have provided you with a number of hand-outs. The first one is "No Need for New Technology". That is basically what I am going to be speaking to now. The stack and portal emissions, oxides of nitrogen and the costings which I will provide to you later on.

When we spoke to you, Mr Dyer, last Friday when you came to look at the site of the

stack, one piece of advice you gave us was that I should keep it simple, so I will try to keep it simple. We have heard lots of stuff today. The whole problem boils down to the fact that car exhaust and truck exhaust is bad for you. They are always bad, they are never good. Less is always better than more and none at all is best of all. All the erudite arguments about PM10s and micrograms per cubic metres and NEPMs all probably come down to that.

The stack in the valley will increase all the harmful pollutants in the area. It will increase them more than an open road will. It will increase particulate matter and nitrogen dioxide and benzene. It will never reduce them, it will only increase them.

From time to time the actual concentrations will go above the air quality limits and the RTA has basically accepted that. But ultimately this is really beside the point. The position of the stack in the valley will ensure a permanent heightening of the air pollution levels where we live and that is just not acceptable really. Although the NEPM levels – we heard about no effect levels and things like that, particulate matter that we are talking about, that causes effects which are detectable at 20 micrograms per cubic metre and the NEPM levels are 50 micrograms per cubic metre. You can detect and measure those effects. That is the gist of all that research that we produce there. No one else would tolerate an establishment of a garbage dump in the valley. It would be just completely out. That would be very convenient, would it not? Garbage dump down at Wolli Creek, plenty of space. This is what this proposal is doing. It is basically dumping garbage in our air. It is as simple as that.

We believe we have got a solution for this, but before we look this whole process, you think how the hell did we get into this situation? How did we do it? Because it is just so illogical. The stack was moved to the present position after public pressure and the people were entitled to be upset about it, but it did not get there by a rational design process. That is one thing that is absolutely sure. The RTA chose three stacks on the hill, that would have been fine presumably so far as air quality goes, but there was no rational design that made the decision to move it into the valley. If that happens then the RTA is faced with the problem of justifying the move, because you cannot say, "I just gave in to pressure". They have got to try and justify it. In justifying it, they appear to have been fixated on using a stack. That is where their major problem comes from. They could not think past using a stack.

Part of the justification for the move was found in a report that was produced by these consultants, Evans and Peck, and they produced a report on the single stack ventilation system. This stack is demonstrably flawed. The evidence basically is set out in detail in this eight pages, "No New Technology", but I will go through some of the real reasons for it in a moment.

It is interesting to note that we can find no evidence that Evans and Peck ever got this job through a competitive tendering process. They just appear to have been appointed. That is by- the-by. One part of their report is called "A comparative study of road tunnel and exhaust systems" and it was evidently produced to discredit the suggestion that air cleaning equipment be used, a suggestion made by community members and the NRMA. The method they used to discredit was fairly simple. I am suspicious but I have no evidence that it was deliberate.

What they did, they produced an exaggerated estimate of the cost of the equipment. They estimated it was going to be $60 million. They got these figures – this is in their report

– by asking not the manufacturers of the equipment – they did not go to them – they asked a firm in Hong Kong for an estimate of cost. Then they used the unrealistic figure for the volume of air that was going to be treated as a multiplier and they end up with this $60 million. The current figure that we have ascertained from the suppliers of this equipment as of last week, sufficient to do the job required in this tunnel is not $60 million, it is $10 million. I can produce evidence for that.

They estimated 2,000 cubic metres a second was the volume of air that had to be moved out of the tunnel. It is too high. The current air volume estimate produced by the current designers are using a figure of 600 cubic metres a second. The difference between those two is a three-fold difference. That should have been obvious to any engineer looking at this. Who is looking at these things?

When you look at the tunnel and the size of the tunnel, that means for that amount of air to be sucked out of the tube, the air inside the tunnel going along the tunnel where the cars are, is going to be travelling 60 kilometres an hours. It is a simple "back of the envelope" calculation. The air in the tunnel, the volume of the air going through it. It is a simple straightforward calculation. Nobody did it. Nobody woke up to it. I went away and I looked to see if I could find examples of this sort of volume being used in a tunnel anywhere and I found it in one place, and one place only. In the Logan Tunnel in Boston it carries 150,000 cars a day and 2,000 cubic metres a second is the maximum rate at which they can extract air in the case of a fire. That is the fastest they can pump their fans up – 150,000 cars. Someone should have been aware of it.

I will give you an idea of what 2,000 cubic metres of air is. It is six times the volume of this room roughly and it has got to get out through that door in a second. It is really moving. They keep on using this figure and they use it in the air quality modelling and they use it to estimate costs and it just destroys the whole process. It is a silly figure and they continue to use it. Who checks it? Where is the quality assurance? Where is the independent monitoring? Someone should have been awake to it.

Once the $60 million figure was produced the arguments are all over. No one can afford to spend $60 million on filtering the air. But you cannot make the decision and show it as made on a basis of cost, that is political reality, I believe. You cannot say that just because it costs too much we are not going to do it, you have got to find some other reasons.

There are so many examples of errors, distortions, concealment of facts, misrepresentation and tendentious arguments in the reports that they have got to be worthless -

The Hon. J. JOHNSON: By who?

Mr CURRAN: By Evans and Peck. They are in that document that I have provided you. I have detailed, I have gone through and explained which ones are. I will give you a couple of examples.

In the Norwegian report when they talk about Norway, it says, "In the Granfoss Tunnel particulate levels within the tunnel and outside the tunnel are such that the equipment is not utilised at all". The RTA said that this morning. My correspondent in Norway tells me that the actual reason is that the whole tunnel is currently closed. The inside lining is falling

off the tunnel, the cars cannot drive through it, so they have shut it down. The report is technically true – the air quality is fine inside the tunnel because there are no cars in it. It is completely and deliberately misleading. Ask Hans Andrel when you talk to him, ask him "Is the tunnel open yet or not?" It has been closed. There is traffic chaos in the middle of Oslo they tell me.

We can go on, errors, distortions, all that sort of thing. It is in the papers. What is obvious to us, is it the Minister – Mr Scully, Debus, they are using and depending on this report and they quote it. We sent them a letter and they sent back saying it all comes from that report. And basically it is bull. I am sorry, I cannot put it any clearer. They are being misled by it. That report is worthless.

What is the solution? I really do believe this is a solution. I got onto CTA and to the people who make air filtration precipitators, and I suggested this the way we can solve it. This is what they do in Norway and it is a development of what they do.

Electrostatic precipitators and material to actually clean the air of nitrogen dioxide and as a sideline, it also takes sulphur dioxide and a number of the volatile organic compounds. The EP is established technology. It has been used in about 30 tunnels in the world. There is no question about being established as technology. The most recent installation, the Yong Pyong Tunnel in South Korea just opened about three or four months, so it is not only in Norway and Japan, it is also in South Korea.

The nitrogen dioxide equipment is new and is developed from the test installation in the Oslo Tunnel and that, it is reported, ran for over three years without decrease in efficiency. It runs, it is a simple process. It is the one that is going to be in the Laerdahl Tunnel which is the longest tunnel in the world. It was developed and is being sold by ABB Alstom Power, which is part of the largest and one of the most respected engineering firms in the world, a firm that includes your famous firms like Brown Boveri and things like that. They would be prepared to guaranteed its performance. Their professional integrity will depend on it working.

In tandem, the equipment would remove 90 per cent of particulate matter, including the finest grades, the nitrogen dioxide, it also removes sulphur dioxide and heavier volatile organic compounds.

The electrostatic precipitators use electrical energy but they also reduce the maintenance cost of the other equipment inside the tunnel. We have a report from Japan which shows that comparing all sorts of tunnel ventilation under the right circumstances, the longitudinal ventilation using EPs is the cheapest way to go when you take everything into account. The costing is interesting. This is what it all comes down to, it is dollars and cents. I have compared the three possibilities. One is to do nothing, one is to fit after completion, and one is to fit now.

The do nothing thing which is actually what they are doing at the moment, the exhaust stack is currently planned, that is the extra cost. I can provide a copy of that table. It would make the Duff Street air intake unnecessary, it would reduce the ventilation equipment. You could sell the land at Duff Street, so the actual cost comes out at about $36 million. That is what it is going to cost. It is more than that, but that was the figure that Evans and Peck got right I hope.

If you fit after completion, you have got all the costs of building of the tunnel, plus the costs of fitting the electrostatic precipitators and the cost of the nitrogen dioxide equipment. The electrostatic precipitator equipment is under $10 million, the nitrogen dioxide equipment is $9 million. You have got to dig some more tunnel, it is going to cost you a bit more.

It seems to me, and the people overseas agree, that we have a potential saving of $10 million, and we get clean air and do not have to build the stack. What are we doing? Why are not we really seriously looking at this? This stuff is there available. Overseas they use this equipment to save money. It is in all the papers, they all say, "Save money, do it this way". We seem to be incapable of that.

What are we actually asking for? We are not asking for sort of acceptance of what we say, we do not say, "Do what we tell you". What we would actually like is we would like the work to stop on the exhaust stack because it is possibly a waste of money. We would like an independent and rigorous public review of an impact of the current single stack and look at the risk management. We would like the actual people who make this stuff to make a proposal, to actually come out, look at what is required, and say, "This is what we can do for you, and this is what it will cost you". We get specialist advice, then we look at the alternative proposals and see which one adds up and then the adoption of the most environmentally responsible cost effective solution. We are not trying to impose a solution. We are saying, "Just for once, do the planning process correctly and really look at what are the alternatives available". We do not believe that has happened.

DEPUTY-CHAIR: That concludes the initial oral presentations. Could I invite the Committee members to ask questions.

Ms RHIANNON: About the property values, I think you were here this morning talking about where the three stacks were and the impact there. Has there been any assessment on the impact this project will have on property values, particularly around Earlwood and North Arncliffe?

Mr SIAPOS: Yes, there have. Recent sales have indicated that houses have sold for $70,000 to $100,000 less than market estimates at the time. In our proposal you will see that around the stack currently, there is only single digit increases in prices, whereas beyond the boundary of that, you will find double digit growth which is more akin to normal Sydney growth. We have evidence and we know of people that have actually had to sell because of health reasons, they cannot stay. They will not be able to stay in any environment, and what they are doing is they are selling and they are losing somewhere between $70,000 to $100,000 right now.

Ms RHIANNON: Is any of this being fed into the Community Consultation Committee that you have out there? Has there been any response from the RTA, because that is what we were trying to assess this morning, what the RTA responded when there was all the pressure when there was the three stacks, so therefore, I am just wondering what their response is now?

Mr CURRAN: I am on the Consulting Committee, we are only allowed to discuss the approved project, nothing outside the approved project can be discussed in those

Committees.

Ms MAWER: We have written to Dr Refshauge about that concern and I have got a letter that I could table. Basically he says that any major infrastructure project would have impacts and that those impacts need to be balanced against the benefits of that for local communities. That is it, full stop. It is really bad luck, that is all.

The Hon. J. JOHNSON: Can you produce names and addresses of these people that have lost $70,000 to $100,000?

Mr SIAPOS: Yes, we can, we have one here in the audience right now.

Voice from body of court: Yes, if you want a name I can give you name.

The Hon. J. JOHNSON: What research evidence can you present for the effective removal of particles by electrostatic precipitators?

Mr CURRAN: The Pucher paper that you were given this morning is one which shows a graph of the effectiveness of his particular one, which is not actually regarded as being particularly efficient by the Norwegians.

The Hon. J. JOHNSON: What evidence can you present?

Mr CURRAN: In our submission you have a paper which is published in 1995 which actually goes through both the nitrogen dioxide and the electrostatic precipitator efficiency. It actually gives graphs of its efficiency, it shows the testing results.

The Hon. J. JOHNSON: In your view, are oxides of nitrogen a concern?

Mr CURRAN: I have actually given you a paper on that, because it is quite a complicated business. Yes, they are a concern, but there are concerns of two different types. Oxides of nitrogen contain two components. One is nitrogen dioxide, the other one is nitrogen oxide, 5 to 10 per cent nitrogen dioxide is the remainder. The one that does you harm immediately is nitrogen dioxide. It is corrosive, irritating gas. The problem with nitrogen oxide is that as it moves into the air shed and is exposed to the sun, it is slowly converted to nitrogen dioxide and that is part of smog formation. That is all involved in the process of smog formation. It is possible to actually calculate quite easily what happens with that.

In our proposal, if we were to remove all of the nitrogen dioxide, there would still be about 90 per cent of nitrogen oxide remaining. The half life, in other words, the time it takes for half of the total stuff to be converted, is between 10 and 20 hours. You do a calculation of what comes out of the stack, it takes about an hour and a half for the nitrogen oxide, which has not been absorbed to be converted so that sufficient nitrogen dioxide is present there to come back to the original concentration. So that, after an hour and a half, the air that has come out of the end of the tunnel is a long way away. It is part of the regional problem. We are putting a harder set of conditions on the tunnel than we are on the road. We do nothing about nitrogen dioxide and oxide of nitrogen on the open part of the road, but we seem to be demanding that the tunnel emit nothing. What we are saying is the tunnel should emit nothing which is immediately harmful, it is still going to contribute to the general

air shed pollution, but less because the road is a good idea remember, the road is going to reduce the total contributions. But the tunnel should not be judged more difficult, under harder conditions than the road itself is being.

The Hon. J. JOHNSON: Are you aware of any proven exhaust gas treatment plant at operational scale in a road tunnel?

Mr CURRAN: No, that was the gist of what I was saying there. I said it has been developed, it is being offered for sale by a highly reputable engineering firm who are prepared to guarantee its performance.

The Hon. J. JOHNSON: Are you aware that the Norwegians and many other European countries are still building road tunnels using the same tunnel ventilation process being used on the M5 East?

Mr CURRAN: Of course. In Norway, if you were to put all the road tunnels in Norway end to end in Australia, you could travel from Sydney to Albury in road tunnels. A lot of the road tunnels are out of the bush. They go under fjords, they go through hills and things like that, in open country, where there is no problem with pollution. This is a solution which is suitable for the built-up area where you have got people living around them where you have an immediate concern. There are people here within 150 metres of the top of that stack. They look straight onto the top of the stack. That is what the original solution in Norway was produced for, and that is what they continue and where they continue to use it. Of course, if you do not need it, you do not use it. If the pollution in the tunnel is not high and does not require it, you do not turn it on. It is a demand thing, you use it as a control mechanism. You do not wash yourself when you are not dirty.

The Hon. J. JOHNSON: Are you aware that the air quality standards set at the end of these tunnels are the most stringent ever imposed on an Australian road project?

Mr CURRAN: I am prepared to believe that. I would note that California is in the process of adopting rather more stringent controls that we have having -

The Hon. J. JOHNSON: We are ahead of them?

Mr CURRAN: No, we are not actually. They are going down to 30.

The Hon. J. JOHNSON: Are you aware that the standards were set by the Department of Urban Affairs and Planning and the EPA?

Mr CURRAN: Yes, of course I am aware of that. And they did a very good job and their report, the DUAP report, is excellent. I could not have written it better if I had done it myself. But it seems to have been ignored. The Appendix F, I think it is called, is a report on tunnelling around the world. It is an example of a good level report. But when you expect the conclusions from that to be transferred over into the Director-General's – the logic sort of falls apart.

The Hon. J. JOHNSON: Are you aware that these standards are based on similar standards set by the WHO and the US Environmental Protection Authority?

Mr CURRAN: They are rather stricter than them, some of them. But as we pointed out before, with PM10s, the effects are coming in at levels considerably below the levels that are set. It is measurable at 20.

The Hon. J. JOHNSON: You do know that since your consultative process has been in operation, that the Government has committed an extra $50 million to the project?

Mr CURRAN: I have no idea where it is going.

The Hon. J. JOHNSON: Are you aware that in Sydney nitric oxide can be readily converted to nitrogen dioxide in the atmosphere?

Mr CURRAN: That is precisely the point I made about five questions ago.

The Hon. J. JOHNSON: You do know that there were similar concerns when the tunnel went under the Sydney Harbour Bridge?

Mr CURRAN: Yes.

The Hon. J. JOHNSON: Do you know where the stack is on the north side?

Mr CURRAN: It is in the pylon.

The Hon. J. JOHNSON: Next to one of the largest schools.

Mr CURRAN: Yes, I went there. The actually monitoring site is up on top of the school. I will make a point about that though. A large provider of the particulate matter and of the nitrogen dioxide comes from diesel things. The diesel usage of the Habour Tunnel is much lower than is expected in this tunnel. Where maybe 5 to 7 per cent of the traffic in the Harbour Tunnel is diesel based, 20 per cent of this tunnel with a high proportion of heavy vehicles is going to be travelling in that tunnel. They are not really comparable and even so, they had peaks inside the tunnel of up to 500 micrograms per cubic metre. That is not a problem in the tunnel because people are only in it for a short moment of time, but the air that will be emitted from out of the tunnel will be up to 1,500 micrograms per cubic metre. In other words, three times more concentrated. And there is nowhere that is within 200 metres of the top of the pylon where people are living, not even at St Aloysius College.

The Hon. J. JOHNSON: Are you aware that the standards that have been taken into account, the health impacts on the most sensitive members of the community, not the average person?

Mr CURRAN: I think that that was refuted this morning.

The Hon. J. JOHNSON: By who?

Mr CURRAN: By the EPA. Their answer to a similar question refuted that. Certainly not the most sensitive, there was a differential in sensitivity, but certainly not the most sensitive.

Ms MAWER: Could I just perhaps add here, as a mother of someone who has

asthma, it seems to us the conditions are quite stringent, that as I tried to say in my talk, they are not worth the paper they are written on if they are not going to be applied. And I think the discussion this morning seemed to indicate that it was everybody's responsibility and no one's responsibility. It will be really reassuring for us to know who decides when the condition is breached, who is going to do something about it, how long it is going to take them to do something about it and what do we do in the meantime?

The Hon. M. JONES: Ms Mawer, you said, and I quote, "You have a 900 metre tunnel working as a processor, particles interacting with each other". Can you just expand on what you meant by that?

Ms MAWER: I am not a scientist, but it has been explained to me that if you have two tennis balls bouncing around in this room, the probability of them colliding is fairly small. If you put 200 of them in this room and allow them to bounce around, that they are much more likely to collide, to absorb, and to combine. You need two variables. Two critical things. One is concentration, and the other is time. You have got a lot more of them, and you have got not only a 900 metre tube, but my understanding of the ventilation system is that the air in there is going to circulate for 4.5 kilometres worth.

At the back of our submission there is a short extract from a speech given by Dr Gordon Rodley, and it is supported by Dr Bradley, who has done his PhD in particulate matter, and their concerns are that this stack poses as much of a risk as the actual tunnel itself, because of the re-activity of the chemicals inside. When we have put that question to the EPA, they have come back and said, "We will monitor for the toxins coming out of that stack". What they do not monitor for is their combination, and their changed – it is a bit like putting coffee in a hot cup of water. It goes in there and makes a different kind of liquid than what you had before. I think that information is in your submission, but we suggest to the Committee that you should watch that five minute video.

The Hon. M. JONES: I would like to ask all of you, please, whether the target of air purity or air pollution, whichever way you want to look at it, laid down by both the Department of Urban Affairs and the EPA, whether those targets are either acceptable or unacceptable to you, unequivocally?

Mr CURRAN: Could I make a comment about that? It is always advisable, it is always desirable, to reduce the exposure to any deleterious material as much as it is possible. I believe that that should be the aim of the ventilation system, to reduce the exposure as much as possible. But you have to be able to measure the effectiveness of that, and that is what the goals are designed for, to give you a maximum goal. Those goals were never designed that people would live at the maximum permitted by that goal, all of their life. Those goals are not designed in that way. You could not survive at those sort of levels. They expect that there will be the natural fluctuations and what they are defining is the highest level which they can reach. I believe that the goal that has been set in those terms is a good goal, but it does not suggest that we should be subjected to that level of pollution all of the time, nor do the air quality goals imply that.

The Hon. M. JONES: The answer is, if I may paraphrase you, that the targets set down are not acceptable to you. However, what you have just said must be added as an adage, up to that.

Mr SIAPOS: At the same time we also need to commit. I am not sure what the targets will be or the likely health impact will be when my daughter, if she survives, living in that area, will be what target she finds acceptable, or what target her children find acceptable. It is always downward. Targets are always downward, we would like that downward trend.

The Hon. M. JONES: With due respect to my question, your daughter is not here to give evidence today. I want your opinions, please.

Mr SIAPOS: I would like a lower target than is there. If I am going to be subject to this pollution, I would like the lowest possible target. It is inadequate. My daughter, if she was here, would also say it was inadequate.

Ms MAWER: It seems a lot of us here have become involved in this because of health impacts, that any additional load is going to mean an additional risk on our health. I know, personally, that the days that Sydney's air pollution is high is a night that my son is up in the night with his nebuliser. There is just a direct correlation. It does not cause it, but it triggers it. There are some things you can prevent, and some things you can't control. This is an opportunity to clean up the air, to prevent, to reduce the health bill. I do not see why we do not take it.

The Hon. J. RYAN: One of the arguments that has not been actually lead by the RTA, but it is included in the documentation given to us, is that electrostatic precipitators have their best effect on the larger particles, not on the smallest particles, and to some extent, the ones that it would remove are the least likely to be damaging. Is it not possible that you are asking for a technology which will remove, if you like, the safest of the particles and leave the most dangerous ones still floating radically in the atmosphere?

Mr CURRAN: If you look in the paper which we provide you in the back of the submission, it gives you actual efficiency levels. That shows the very finest particles, through to the coarsest particles. There is a slight drop off in efficiency with the finest particles, but they are efficient over the whole range. It is in the paper, "Ventilation Air Cleaning and Technology", on the third page.

The Hon. J. RYAN: Just as the RTA and Hornibrook might be seen as having a conflict of interest, it could be said that some of the people providing you with prices have a similar conflict of interest. It is in their interest to make their technology as cheaply as possible. What sort of assurance are you able to give to the Committee that the price then given to you has not been a loss leading price, if you like, it is intended to get a headline, and perhaps when they finally come to give a quote to the Government, it is going to wind up being something significantly different?

Mr CURRAN: I am aware that, yes, they are into it to make money. They assured me that the prices that they gave us were based on the costing that they just established for the tunnel, that they have just done the installation in South Korea. They based their prices on that.

The Hon. J. RYAN: What information were you able to give them about the volumes and the construction of the tunnel?

Mr CURRAN: I gave them the schematic of the tunnel design that was provided,

which shows the two-way tunnel and the stack, and the volume of air that has been estimated to be moved, that is the 600 cubic metres a second, which was what was provided to the Consultant Committee by Hyder, and I gave them what the air quality goals were and I also gave them a short description of Sydney's weather.

The Hon. J. RYAN: Did that result in some correspondence between yourselves and -

Mr CURRAN: Yes, there is quite a considerable correspondence.

The Hon. J. RYAN: I have not seen your submission, actually. Is it included in your submission?

Mr CURRAN: It is not, actually, because it has all happened within the last week or so.

The Hon. J. RYAN: Is it possible for you to provide that?

Mr CURRAN: Four weeks back – yes, I would be delighted to provide that. It is in the form of e-mails and faxes and things like that.

Ms MAWER: We also actually suggested that the director of one of the companies be an expert witness, and I think that is being arranged for tomorrow or the day after. I think it has been like a lot of the other things. We have just seen it as a problem, we have referred it on and said, "Please, can you do something about it?" Nothing has been done in the last six months. We have become community activists, which we never wanted to be, and gone out and sourced some possible solutions.

The Hon. J. RYAN: The Department of Urban Affairs and Planning have said that the final air quality has been guaranteed by the conditions of approval, and that if the tunnel produces an adverse effect, it will be possible to get a more beneficial effect by attacking other sources of air pollution around your district. What confidence do you have in that process? That seems to me that if they are offering you an air quality goal which is acceptable, why would you not be prepared to accept that guarantee?

Mr CURRAN: Pie in the sky when you die. Really, what do we have which says that it is going to happen? It could happen here, just exactly as it happened in the USA. When the US brought in their new air quality goals, the truck lobby held it up in the courts for three years. The same thing could actually happen here. We have no guarantees. But what we believe, and this could be supported, is that although the emissions from individual vehicles are being reduced, there are more vehicles on the road and there are more vehicles that are going to use this tunnel. The total amount of stuff is going to increase.

Ms MAWER: The diesel rebate, also.

Mr CURRAN: All that story about the diesel rebate. The best of intentions knocked down by one strong lobby group. They had a point. The other thing is one of those catch-22s. As you make engines, especially diesel engines, more efficient, then the oxides of nitrogen emissions go up. The higher the temperature in the engine, the more oxide to nitrogen you get formed. As these more efficient sorts of engines come on line, the

oxide nitrogen will likely go up. You are going to depend on some sort of technology, perhaps, which will take it out of the exhaust stream.

The Hon. J. RYAN: If we accept that there has to be a road, and RAPS accepts that it is desirable, in fact, for the impact on local communities and what have you, to have a road, is there any level of additional air pollution that you regard as acceptable in order to achieve that other objective of a better road management, of getting trucks, for example, off Bexley Road?

Mr SIAPOS: The local area we live in is actually going to see an increase in traffic, as opposed to a decrease in traffic. The tunnel is beneficial to people beyond the area the stack is in. I can table an extract from a report done by the Urban Affairs and Planning which highlights that in Homer Street there is going to be a 31 per cent increase. In Sydenham there will be a 170 per cent increase in traffic over 10 years. I would like to table that as an extract to show you that where we live, we will actually not be getting any benefit from the tunnel itself. What we will be getting, however, is all the concentrated pollution from that area.

DEPUTY-CHAIR: However, it is generally true to say that the population of Sydney is growing, is it not? It is not getting smaller. The city is becoming more congested, the roads are becoming more congested.

Mr CURRAN: Yes.

DEPUTY-CHAIR: The previous Government, as I understand it, intended to send a road through the valley, not through a tunnel. You do not think that is a good idea, do you?

Mr CURRAN: For different reasons, I believe.

DEPUTY-CHAIR: You do not want to revert to that, do you?

Mr CURRAN: A road roaring through the Wolli Valley? No.

Ms MAWER: No.

Mr SIAPOS: I think in this day and age, what we have discovered here as being activists is you can actually get the best of both worlds. You can have the tunnel, and you can certainly have ventilation, as far as we know, that will actually preclude you putting up 40 metre stacks that are unfiltered, that does two things. One, spread the health and air quality risk for the community, and also degrade the quality of life in the community. You can certainly, I think, get a win/win out of this particular circumstance and not pay through the nose for it.

The Hon. J. RYAN: If there is to be no stack, where did you envisage the gas would be coming out?

Mr CURRAN: We would envisage that the same way as they do in Norway. The only gas of concern, which is remaining in the actual tunnel, is carbon monoxide. Carbon monoxide, of course, will kill you. That is why that determines the ventilation rate. But

carbon monoxide is not something which is a cumulative thing. If you escape from it, it does not kill you 20 years later. All of the other things we are talking about have those sorts of effects. The tunnel has to be safe. That was the gist of what I was trying to say. It has to comply with all of the regulations that were set down. We believe that we can do it more simply. We are not asking for any sort of relaxation of those conditions. The portal emissions, everything, has to comply. But we believe that that is possible.

The Hon. J. RYAN: That you would have it ventilated from the portal zone?

Mr CURRAN: Ventilated from the portals. It is also possible to eject the air upwards, if you need a little bit more dispersal. This is a technical problem. I am not really competent to discuss the minutiae of that. I am just saying, this is how they are doing it overseas. It seems to work for them. In at least some cases in Norway, the air quality goals are rather stricter than ours. In my correspondence, people were rather surprised about our air quality goal for nitrogen dioxide. They thought that that was rather high, compared to theirs. I can only depend on that. But they seemed to be able to solve the problem. We are clever people, we should be able to solve the problem, too.

DEPUTY-CHAIR: Thank you very much for your evidence to the Committee.

(The witnesses withdrew)

NOEL GEORGE CHILD, Consulting Engineer, 22 Britannia Road, Castle Hill, 2154, New South Wales, sworn and examined:

DEPUTY-CHAIR: In what capacity are you appearing before the Committee?

Mr CHILD: I am appearing before the Committee in two capacities I think. One is the author of a report which was commissioned by Canterbury City Council. As I understand it, Canterbury City Council submitted that report, so it is appropriate that I am here to speak to that report and answer questions in that respect, and also as part of that, in my own professional capacity in support of comments made in that report to the extent that there is an interest in those.

DEPUTY-CHAIR: Have you received a summons issued under my hand in accordance with the provisions of the Parliamentary Evidence Act 1901?

Mr CHILD: I have.

DEPUTY-CHAIR: Are you conversant with the terms of reference for this Inquiry?

Mr CHILD: I have read those terms of reference.

DEPUTY-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 your request and would then resolve into a confidential session. However, I should warn you that Parliament may override that decision at any time, and make your evidence public.

Mr CHILD: To the very best of my knowledge, there is nothing in what I would have to say that would call upon that provision. I cannot anticipate other than publicly available information on my part.

In submitting evidence, I think it is appropriate to give some background as to my involvement and that was, in terms of the report, to have been commissioned by Canterbury City Council to prepare for them a report in terms of quite a narrow scope of reference into the proposed single M5 East stack. The commissioning of that report followed, obviously, some degree of community pressure on Council, and expression of community concern. The scope of the report, in effect, while the words in detail are there, was to review the stack situation and particularly the documentation pertaining to it, and to give advice to Council as to whether that single stack, as it was then proposed, and as I understand, still is – that is, that it would be the sole mechanism for the discharge of exhaust pollutants from the tunnel section of the M5 East, which is under construction, and whether that was likely to result in exceedences of air quality limits in the vicinity of that stack. If so, in effect, what other options might exist in a practical sense to treat those emissions so that that problem was dealt with, or what other considerations might apply. Those words from the point of view of the record are in that report which was submitted by Canterbury – on pages 22 and 23 of the report I prepared for Canterbury City Council, set that brief out.

In terms of the work undertaken, I undertook for Canterbury a review to the best of

my ability, of all of the available documentation that followed the proposal, and generally found as follows. That the proposal in my view represented a completely reasonable undertaking. That is, the construction and the provision of a piece of road infrastructure that generally was held to be a necessary piece of road infrastructure.

In saying that, I am mindful of the fact that there are those in the community who believe the provision of more roads leads to more problems. It is something of a catch-22 argument I think. My view on that matter, and I should state it because it is relevant to my evidence, is that it is completely appropriate that we provide the best possible road systems we can. However, in providing those systems, we should also pursue in the longer term, the appropriate transfer of people to public transport, and we should have due regard to the impacts of those systems. Nonetheless I am not an anti-road person, if you like, and I do not take a view that the M5 East, is other than a very worthwhile project.

In pursuing this exercise, my analysis really followed the track of the single stack being given. I know there is some background to that single stack, why it became a single stack rather than multiple stacks, but from the point of view of my brief – and I am sure other people have commented on that – it was really a matter of looking at that single stack as, if you like, a proposition and what would be the likely impacts of it.

In looking at that, it seems to me that the key elements in the issue are two-fold. One is the existing level of background pollution in the vicinity of the stack, and in Sydney generally, because that is one element of a problem. And two, what likely contribution that single stack would make in the intermediate vicinity. I took the view in my report, which I hold to, that in an overall sense, the introduction of the M5 East will be net beneficial, in that it should result in a given volume of traffic travelling more efficiently than it otherwise would, and so that in the terms of the total emissions into the total Sydney air shed, one could expect a reduction. I know there is a counter-argument to that along the lines of inducing traffic, but it becomes a very convoluted argument. For a given number of vehicles, they are going to be less harmful for the environment travelling at optimum speed than stop/start in congested streets.

However, the difficulty that emerges is that the proposal effectively takes all of the emissions from what is given to be something like 60,000 vehicles a day and discharges them through one point, untreated at this point in time. In trying to assess that you strike great difficulty because no one knows exactly what the background levels are near that stack. The data taken for reference was drawn from the EPA's monitoring station at Beaman Park, which is some 1,500 metres as the crow flies, if you like, to the west, and that is effectively behind the Arncliffe ridge. There is another reference point which I believe needs to be taken into account to get a worse case scenario, and that is the data that is available from the airport and I think it has relevance because it is 2,000 metres as the crow flies in an easterly direction.

But the difficulty I see with the single stack is principally this, that it is proposed to be erected in a topographical or a geographical environment which is one of a containing ridge and at those times of the year when you have a gentle onshore breeze, (a) the pollutant burden which is significant from the high traffic area in the vicinity of the airport will be drawn into play, in terms of background, and added to that, the discharge from that stack under those circumstances, given that the stack is variously estimated to be 25 to 35 metres high – and I am working on that variable, will not disperse as effectively as it is theoretically

expected to do. Therefore you face the prospect on occasions of a build-up of pollutants in the immediate area of the stack.

I believe that ozone, which is the net product of photochemical smog and results from hydrocarbons and nitrogen oxides being cooked up by the sun, will in that vicinity exceed the current guideline or goal that is set down by the environmental authorities and that fine particulate matter will also exceed the new goal, which is one of 50 micrograms per cubic metre recently reduced from 150.

The Hon. J. JOHNSON: Is that based on scientific evidence?

Mr CHILD: It is based on an analysis of the existing background levels at Beaman Park and at the airport on the assumption that both of those backgrounds will come into effect in the area of the stack. That is an assumption because there is no background data at the moment in the immediate vicinity of the stack. So it is based on that scientific analysis.

The Hon. J. JOHNSON: I thought you just said that nothing had been taken from the airport.

Mr CHILD: No, there is four years of records from the airport. There is nothing taken in the vicinity of the proposed single stack.

My conclusion on that, based on that analysis of existing air quality data and allowing some provision for the impact that the stack would have in the situation of poor dispersion, would be that on occasions you will see exceedence as a result of the construction of a single stack.

In drawing my evidence to a conclusion, there is a difficulty in drawing the distinction between what is attributable to the background and what is attributable to the stack. And there must be a temptation in this, I think, to consider, there is a background air pollution difficulty and that really the background is more the problem than the additional material. It is very difficult to draw that.

If it is appropriate I would like to table eight copies of a letter from Professor John McNeil who is the Head of the Department of Epidemiology and Preventative Medicine at Monash University, and explain the relevance of it.

The relevance of it is this, that Profession McNeil was called upon by Environment Australia to act as an independent expert in the matter of the proposed airport at Badgerys Creek and the effects of air pollutants. I have highlighted at the bottom of the second page and the top of the third page of that letter, in referring to a project, the air quality difficulties of which relate to 70,000 vehicles a day which is the impact of an airport in Western Sydney. It is a contentious issue as we all know – 70,000 vehicles a day, as mobile sources into the general Western Sydney air shed, and I think it has got some relevance in that what we are talking about here is 60,000 vehicles a day, the emissions from which are converted to a fixed emission point from a single stack.

The point I wanted to make supported by Professor McNeil's comments was that there is virtually no comfort at all in respect of ozone between the existing regulatory limit and the point at which medical impairment is known to take place. In fact, he makes the

point there that I think is relevant, that we are currently working to a limit of 100 parts per billion, or .1 part per million, and he introduces the reality there, and he is a highly regarded epidemiologist, that it is now known that human health impairment, particularly in the respiratory area, begins to take effect at 80 parts per billion or .08 part per million. That is, before you hit the current limit.

The point there is that in looking at the exercise where, I believe, and I think it might be generally conceded, although not how often, but that from time to time you will exceed those limits, you are in the unfortunate position of not having any comfort between the existing goal or regulatory limit, and where harm starts to occur. Often times you will have a limit of 10, but damage is known not to occur to 100. So you have got some room to move.

What Professor McNeil is saying there that I think is relevant to the Committee's considerations, is that we have to be terribly careful with ozone because we now know that the limit which we have set as a community protection measure as an environmental goal or guideline, is really a little bit past where harm starts to occur. So we have no comfort in the process. The situation we are in, is akin to being in a pool of water up to here, already by way of background, and facing a situation where a relatively small increment can be harmful. And I think there is an argument afoot that you blame the background. But in this instance, a relatively small increment in respect of ozone, and I think also particulates, but there is less medical evidence around as yet about particulate, has to be taken seriously. It is something of the straw and the camel's back argument I think.

I think, Mr Deputy-Chairman, that summarises the key elements of the view.

DEPUTY-CHAIR: I think it was a finding of your report that the proposal to vent exhaust gases from the M5 East through a single ventilation stack would almost certainly from time to time result in breaches of air quality goals in the vicinity of the stack. As I understand it, the EPA permits what are termed in the jargon, "exceedences", five times a year. Is that correct?

Mr CHILD: I understand that is an interpretation the EPA apply, yes.

DEPUTY-CHAIR: What prediction, or expectation, do you have regarding the venting of exhaust gases so far as frequency?

Mr CHILD: With the qualification that I previously applied, which must be stressed that we just do not have background data, but taking an average of the two closest points, I would expect the exceedences would be greater than five times per year.

DEPUTY-CHAIR: Can you quantify what you are saying?

Mr CHILD: I will attempt to quantify it, but I think one of the great difficulties here is, with the best will in the world, I do not think anyone can quantify it. I would have thought that you may face difficulties based on an analysis of background and an attempt to look at overlay, you may face difficulties up to 10 per cent of the time. I qualify that in terms of the lack of background data, but if you wanted to put a number on it, I think there is a very real risk of exceedences up to 30 times a year. In recent times, we have seen substantial exceedences of ozone and this question of the background versus the impact comes into

play, I must say that.

There are great uncertainties because of the lack of background data, the complex topography and it is therefore incumbent on someone to err on the side of caution, I think. But having said that, I would put it above five.

DEPUTY-CHAIR: In your report you have three scenarios or options – the do nothing option, the modified single stack option, and the multiple stack ventilation option. I think it can be assumed you do not favour scenario 1. As to scenario 2, you appear to place considerable reliance on a system of jet fans to express tunnel air.

Mr CHILD: To answer that, I believe, given some of the realities that surround this proposal, I looked as closely as I could at what was available within the existing design, to provide some level of load sharing, if you like, in terms of the emissions. The difficulty that presents itself, I think, is one of seeking to place all those pollutants through a single stack at a single point. If you had a sure-fire way of cleaning them up, it would be terrific, but we do not, in my view.

What I have sought to do within the design structure, is offer an option there that would enable on a regulated basis, depending on pollution levels, background levels and meteorological conditions which contribute very much to the circumstances, to seek to vary the consent condition of approval for the project which requires that all of the emissions go through the stack. There is a consent condition there you would be well aware of that every reasonable step has got to be taken to make sure nothing goes out of the portals.

However, it seems to me that it would be prudent by way of a contingency plan or a plan of environment management on it, or a risk management plan, whatever you call it, to have in place a plan where if, having constructed the single stack – because that clearly is the way the thing is going – problems do emerge and it is my view that they are very likely to emerge and we have just talked as to frequency and I have qualified that, but to have in place a plan whereby something could be done straight away.

The other difficulty, if I could put it this way, if we reconvened everyone in two year's time I might have to wear a dunce's cap and be wrong. We might measure that air quality for two years and not have a problem near the stack. I would be delighted to wear that dunce's cap. However, if we ran it for two years and we strike a problem, the difficulty that emerges is that in an operational sense, it is going to be very difficult to stop that road, although I guess the regulators will say it is simple, we just stop using the road. But that has got great difficulties in operational terms, and in terms of the use of public funds. It would just seem to me to be highly appropriate with the level of risk that I am certain exists as to exceedence, and it is my view that the argument is only as to frequency, not as to the fact that the exceedences will be there, that you have in place a plan.

It seemed to me one such plan would be to look at the possibility of spreading that burden, and it is done internationally, not only through the stack. It might be fine to put it out of the stack on a windy day for example, or a period of time in the year when it is known that the conditions are favourable, but to have the option of at least being able to take the pressure off the people in the vicinity of the stack by partly discharging – partly I say – the pollutant burden with jet fan assistance through the various tunnel portals, and there are quite a few, because apart from the main exit portal there are various points where vehicles leave.

It seemed to me that gave an option to take the spread of the pollutants – and I am talking here untreated – because I am not aware of a magic fix for treating them and that could be a separate question – but it would take it back more to the spread that would apply to a surface road. In other words, you would get back to the situation where, given what I said at the outset, that you could expect an overall benefit and that the problems in the aggregation under poor dispersion conditions that you are able to spread that load, if you like, in a very mechanised and planned way. That was the basis for putting that recommendation, because it is available within the design capability of the tunnel, to me.

DEPUTY-CHAIR: In your review scenario 3 is multiple stack ventilation, and you say in very simple terms, "Two stacks appropriately sited would have the effect of halving local impacts, three stacks would reduce local impacts to one-third of those which would result from a single stack" and so on. We know it is part of history that three stacks were proposed and now it is one. We also know that it is part of history that the community did not find the three stack option suitable, possibly because of where they were located. Are you still saying as a matter of principle, that you would prefer multiple stacks rather than a single stack?

Mr CHILD: In terms of the dispersion of the pollutants untreated, multiple stacks will give a greater spread, and the original proposition was that those stacks be on high ground where one would expect the dispersion naturally to be greater. But in answering that, you have got to put the caveat on your comment as to being aware of the realities of the matter, and my understanding of the realities of the matter, as stated by the Minister, were that the level of objection to the multiple stacks was so great as to threaten the project. And that overall, the project, as I said at the outset, in my view, has got benefits.

I understand there is a great political sensitivity to it, but nonetheless, the shift of the ventilation option, from a multiple option on high ground, if you like, to a single option in a valley could only be expected to reduce the efficacy of dispersion rather than increase it. I think that is reasonable to say. I think that is a matter of fact. The RTA's own consultant has acknowledged that in the documentation.

DEPUTY-CHAIR: If that were commonly understood by the community, would not it follow as a matter of logic, the community would favour that as a safer option?

Mr CHILD: Yes, I think it is, but I think here and internationally, there is a great spectre that hangs around a stack, and sometimes the facts that surround that spectre get tangled up with the fear that surrounds it. I think there was a very widespread concern, as I understand it, held that each of those multiple stacks would present a major problem and that, therefore, the problems, in fact, were seen to be three-fold.

My view would be that appropriately placed, one should expect the dispersion to be better under those circumstances, in terms of physical dispersion. Whether it is better politically is a different matter, of course. That is a totally different area, and it is a real area. I do not say that flippantly. That is a real consideration in achieving the outcome that the road can deliver. I do not say that in any sense other than in a constructive way, that I believe, to the extent that this is relevant, the motivation of the Minister in this matter is to deliver a piece of infrastructure that is a worthwhile and necessary piece of infrastructure. I am in a luxurious position of only having to comment on one narrow aspect of the

technology involved which I am very pleased to do. I suppose you have got to recognise that the Minister has got to deal with that across the gamut. It is only fair to say that. That is my answer nonetheless.

The Hon. J. JOHNSON: Could you tell me how affected would ESPs be in the removing PM10s from the road tunnel such as currently under construction?

Mr CHILD: The one thing that we do know internationally is that one thing that we can have a degree of success with is getting particulates out of the air with electrostatic precipitation. My understanding of that matter is the success of getting them out reduces when the particles become very fine. So the experience where it has happened overseas has been that, in some European tunnels, for example, you have got vehicles with metal studded wheels because of ice conditions and so on, and so in those tunnels you get a tremendous amount of coarse metallic and rubber particulates from these tyres tearing on the road. And it presents a vision problem apart from any health thing. And the electrostatic precipitation method, which puts a charged particle in these things and knocks them out with baffles, works extremely well there.

The understanding I have, as you deal with the situation I think we would confront here, which is more the very fine particulates in the tunnel, because by and large, our wheel and road situation does not quite churn up as much destroyed tyre and stud and so on, that there is improvement every year in the technology. But as you get down to the so called PM10s and even further down to the PM2.5s – a quarter of that size, which many of the medical people are expressing great concern about in terms of health impact – the efficacy of electrostatic precipitation does reduce. In other words, you knock out less as they get smaller but you do knock some out. I have said in that report that, certainly, electrostatic precipitation is an option that needs to be considered, and that pulls up short of the economics of it and all the rest. But that is one thing that is available. It could be placed in a conduit or a tunnel that would without doubt have a positive effect, to what extent would need to be the subject of more detailed work and the RTA would be looking at that, or their consultants.

The Hon. J. JOHNSON: Are you aware of any proven exhaust gas treatment plant at operational scale in a road tunnel?

Mr CHILD: No, I am not, sir. I am aware of many very advanced pilot plant projects and it may be there are projects emerging that I am not aware of, but in the review I did, I was not able to find the treatment technology that was available off the shelf, proven. That has to be the answer to the question, and that is not to say there is not great progress being made in the area.

The Hon. J. SAMIOS: You made reference to the exceedences being estimated at five times a year, but you thought that they could be as high as 30 times. What would be the effect on the health of the community if it did reach 30 times a year?

Mr CHILD: I would like to qualify my answer by saying I can only rely on my interpretation of medical reports in that respect, and it is not my field of expertise. Having looked at that exercise recently in relation to a number of projects, it is my understanding that, particularly in respect of a pollutant like ozone, where the form and the track record is pretty well established, that the effect on people, particularly those susceptible to respiratory conditions, becomes immediate when the level is exceeded.

In other words, it is not on the tenth day of 10 consecutive days that a problem emerges, but it is a triggering response. So that if you have someone in the community and regrettably, it is my understanding we have a high percentage of people in the community subject to the unfortunate impacts of respiratory conditions, that you have a situation where if the ambient level of a particular trigger or pollutant, and ozone is one of those, exceeds the level, the medical evidence suggests that the impacts start with the exceedence, and do not depend on that exceedence occurring on a certain number of days in the year. The negative impacts start with the exceedence.

The Hon. J. SAMIOS: Surely you would regard it as difficult that there is no indication that any action taken would be immediate by any of the Government agencies.

Mr CHILD: If a problem did arise?

The Hon. J. SAMIOS: Yes.

Mr CHILD: The difficulty I have there in a practical sense is that unless there is a plan in place before the event, that fairly and properly takes into account the worse case, I think in all honesty, apart from other factors about visual amenity, and which are legitimate, but in terms of air quality, I am sure everyone would like to think that you are able to get the benefits associated with a road, open it up and have no problems. I would be delighted if that were the case, but it seems to me – and my background is more in the practical applications of my technology, I am not an academic, I am not a theoretician – that it is appropriate when you are this close to the wind, that you would have plan in place that could deal with the situation with a high degree of confidence, hoping of course, that it is never had to be put into place, that people like me were wrong and that, in fact, not only was it not five times a year, it was no times a year.

There is enough evidence around of concern that I think that it is prudent on a project of this scale – any substantial project – that you have a contingency plan that deals with that eventuality, and not to have it, I think, is inappropriate.

The Hon. J. SAMIOS: To your knowledge, there is no such plan?

Mr CHILD: To my knowledge, no, but there may well be a plan developing that I am not privy to, of course. In what I looked at, at the time I reviewed the documentation for Canterbury City Council, I could find no such evidence of a plan, although subsequently a working group has been convened, as I pointed out in my covering letter to the Committee, with the intention of looking at that. That was convened following discussions with the RTA and Minister Scully with a view to looking at putting that in place. It would be quite improper for me to say there was no move in that direction, and I am not being coy when I say I am not sure how advanced it is, there is no reason why it would in the loop on that, and it may be well advanced, but I cannot answer it beyond that. I am not aware of it, no.

The Hon. J. SAMIOS: It was suggested earlier in evidence that there are a number of Government agencies that have the right to intervene, but if I remember correctly, there was no plan that specifically said they had to, or which ones had to and in what order they had to.

Mr CHILD: I think that is one of the great difficulties in this, that the old question of justice not only being done but being seen to be done. Whether it is true or not, I think there is a feeling afoot in the community that from time to time agencies turn a blind eye because at the end of the day – and I do not mean it with any disrespect – they are handmaidens of Government. They are part of the Government process, and having said that, I am sure they proceed with the utmost integrity and independence. But I think unless there is a plan that embodies that advice, the degree of discomfort that might be held by the community – and it is my view that it is genuinely held – in terms of air quality, while I do not pretend to know the absolute answer, I am absolutely convinced as an individual, a concern held by the residents in and around that stack, is genuinely held.

I think, therefore, a plan that encompasses not only tight monitoring and an offset arrangement, or some contingency, and over-communication if necessary, would be terribly helpful in taking a group of people who are currently very concerned about an issue, and bringing them to a position where they might still remain concerned about other aspects of it that are outside of my brief and that I do not want to comment on – and there are other issues I know. But that in terms of this key issue of air quality and health, that there was seen to be a transparent and dynamic position put into place, not necessarily exactly what I have suggested but it would need to be tweaked up and modified by people with the ability to do within the Government's agencies and so on, that said, "We do not think this will go wrong, but if it does we are going to do (a), (b), (c) and (d) and this is how it will happen and this is how you will know it is going to happen". At least, if I was one of those residents, I think that would give a degree of comfort and it is all the more relevant because I think this city will face the need for further road tunnels, obviously, in the future. There is the Lane Cove situation, there is the Cross City Tunnel, and it is a very difficult situation to deliver these things up because where do you site the stack? People have concerns.

I think that sort of methodology or approach may be entitled to a bit more prominence than it has had. I think it is important.

The Hon. J. RYAN: Are you familiar with the report prepared by Evans and Peck Management relating to international developments in tunnel emission treatment systems?

Mr CHILD: I believe that is one of the reports I reviewed. I have not looked at it in recent times, but I will answer the question and say, yes, I have been through it.

The Hon. J. RYAN: This is the one that looks at various different tunnel filtering options, and it ultimately concludes that there are no new tunnel emission treatment technologies since the date of approval, and that there is no known permanent installation to remove gases for external air quality purposes. And finally, that in view of continuing improvement in tunnel emissions over a number of years, it is unlikely that the use of tunnel emission cleaning systems will become widespread. Would you agree with that conclusion?

Mr CHILD: No, I do not agree with that conclusion, because I think what we are dealing with here is the rate of traffic growth and tunnel usage compared with the steps taken to work through, say, fuel formulation or engine design to reduce emissions. That is clearly the equation. In terms of engine design, we have reached a fairly high stage of sophistication, in fairness to engine manufacturers. In terms of fuel formulation, while people of the United States have gone further than we have, I do not think there is huge gains in that area, in terms of the quality of our fuels. In terms of the volume effect, which is the number of cars,

there seems to me no evidence around that that is going to greatly reduce over the coming decade. The rate of registration of motor vehicles, whether one privately thinks it is a perfect trend or not, is on the increase. So I would have to say in answering your question, that I disagree with that conclusion drawn by Evans and Peck to the extent, as I said earlier, I would have thought it was prudent – and it is my understanding that engineers that work in the field agree with this – to have options available, and that in fact, technology is moving ahead in the area. No, I could not agree with that conclusion.

The Hon. J. RYAN: Were you present in the room during the time that there was evidence being given by representatives of RAPS, where they suggested that perhaps this report was a bit more conservative in the way in which it viewed technology and was inclined to take advice from other consultants about technology rather than going to the proponents of various pieces of technology itself?

Mr CHILD: In the first instance, I was not in the room because I take the view that it is better to present at a Committee like this without having heard what other people say, so that what I am about to say has not been coloured by that, and I think the room is full. It is probably a conservative report and I think it is certainly a desktop report. In other words, it is a review of other people's work rather than a research into the thing itself. I think that is what Evans and Peck were asked to do. They were asked to look at a range of reports that were around, survey the literature, bring it all together in a concise report and give a summary, so no criticism of Evans and Peck in that. I do not think it sought to go down the burrow, if you like, in terms of looking at what innovative practices might be near coming through if you like.

In terms of the broad conclusion, you are hard pressed to find the technology, I certainly found that in looking at stuff. The question was raised earlier. Is there something around that you can go out tomorrow, send someone out with a cheque book to Germany and buy? No there is not. Are there things around that are nearly there? Probably.

The Hon. J. RYAN: Is it a fact that something is at a pilot stage of development, a reason for not incorporating it into a project such as the M5 East?

Mr CHILD: I think the difficulty is that if you have got to hang your hat on something. In other words, that if for example, you were concerned enough about the environmental outcome that you needed to reduce the level of emissions and that, therefore, on a project that is many hundreds of millions of dollars, a very significant public outlay and an important piece of infrastructure, you are taking a bit of a punt I suppose if it is non-proven. That you might say, "Everything is right about the project except emission quality. If this particular black box that is being developed in Sweden works, that will solve our problem, so we will put it in place". If all of that is right, that is terrific, but if it fails to work, and that is the distinction between something that is commercially proven and something that is almost there. It is a difficult question. I do not think you should discard them but it is a question of whether you can place 100 per cent reliance on something that is not quite proven.

The Hon. J. RYAN: With regard to electrostatic precipitators, the estimate given by the RTA on installing this equipment is around $60 million, which is obviously a considerable amount of money. The Committee was given some evidence that perhaps there may be a flaw in the calculation of that cost because there is a requirement – one of the factors which

contributes to the cost is the rate of which gas is expelled. Is it possible that there might have been an over-estimation of the cost of the gas needing to be expelled which would have resulted in a significant increase in the estimated cost?

Mr CHILD: In the work I did, I was not called on to look closely at that and because it is a very specific question, I am reluctant to guess an answer on it, and I am not suggesting that it is not right, but I am really not in a position to add to that. It is a very valid point to consider but I cannot add to it. It is not to say someone should not.

The Hon. J. RYAN: I may have just been confused with the figures, but I just wanted to be careful. You were referring to the fact that there is not much room to move in terms of our current air quality standards?

Mr CHILD: That is right.

The Hon. J. RYAN: In terms that there is a level of exceedences, we have already started to do harm, and you referred to a figure 150 parts per billion. Is that the current standard which applies to the stack? I understood there had been a revision from 150 metres per cubic -

Mr CHILD: 150 to 50 micrograms per cubic metre.

The Hon. J. RYAN: - per second. Is that the same figure you were referring to?

Mr CHILD: Yes, just to clarify that, the ozone figure averaged hourly, the current goal is 100 and I tabled that letter because Professor McNeil is saying that difficulties start to emerge at 80, which I thought was relevant. In terms of the fine particulates, the standard was 150 micrograms per cubic metre and was reduced to 50 in the so called national environment protection measures some 12 months ago.

The Hon. J. RYAN: Would your comments about having room to move be as applicable to the particulate measure as there might be to ozone?

Mr CHILD: I think in answering that, the advantage in discussing ozone is there is a lot more technical information available. People have been studying it longer. The question of fine particulates, I think the quantum of that walk-back that the people who advise the Government on these things, from 150 to 50 is a big walk-back. That is indicative of some level of concern. It is indicative to me that probably in the opinion of those who advise the Federal Government on those goals, there is not a huge amount of comfort in that, but it is only an opinion. The reason I thought it would be of interest to the Committee to table Professor McNeil's letter, is that he is someone who has got some credibility in the area and he is talking absolute numbers, which is helpful.

The Hon. J. RYAN: It has been put to the Committee that one of the impacts of the stack will be to process the various materials that are going to be emitted by having them come into contact with each other, and therefore, make them potentially more hazardous because they have been in close contact with each other. I imagine what they are referring to is that some of the particulates, for example, might absorb benzene, and other air toxics and so on, and become different than they would otherwise be measured. Do you think that there is any validity to that concern?

Mr CHILD: My view on that is in two parts. One, in terms of the chemical gases themselves in the exhaust stream, one of the things that is known to occur, of course, in the photochemical smog process is that the various oxides of nitrogen change from nitrogen dioxide to nitrogen oxide, the other way around really. And that interrelates with the formation of ozone. It generally occurs under the influence of sunlight and over some considerable time. The proposition here is that in a conduit or in a stack, given the flow rate of the gases, are you going to get significant chemical change in terms of the constituent primary pollutants, oxides of nitrogen and so on? And my belief in that is that you would not. However, what may happen is that the adsorption process on the fine particulates, and I think it is fair to say that the people internationally that are researching the potential health impacts of fine particulates, are concerned not only about the particulate itself, because it is fine enough to get down into the respiratory system, but what is stuck on the surface of it in terms of perhaps a trigger for a cell mutation that would result in a cancer situation.

There are no absolute answers on that, but capacity for a particle to absorb material onto its surface in that relatively concentrated confine, you could not rule out. So I would say this, I do not think the fundamental chemical gases would change much in that 800 metres, but the fact that a particle initially burdened to a certain extent with gunk on the surface, could finish that journey with a bit more. That is quite a reasonable proposition. To quantify it, you would have to measure the things, but I would see it in that light.

The Hon. J. RYAN: There was evidence given this morning that there is a reverse relationship between the likelihood of material from the stack coming down onto the community from where the stack is located and high particulate levels. I think it was put to us that high levels of particulates tend to be very high in the winter time when people are using solid fuel for heating. And that because the air quality would be such that the stack is likely to operate to its maximum potential to disperse, but in the summer time the reverse would be the case because there are breezes and so on, it would be more likely to bring the material down onto the community where the stack was located. But since there was not a lot of other particulate matter, this would not be such a significant problem.

Mr CHILD: And it would all work out all right in the end.

The Hon. J. RYAN: Yes. Are you aware of this particular theme of logic and is there any validity in that?

Mr CHILD: The work that I have done on air quality supported by reading the results of other people's work, tends to suggest, for example, if you are recording air pollutant levels – which I have done – in, say, George Street, Sydney, and you are looking at toxic pollutants, say, you tend to get levels approximately twice as high in mid winter as you do in summer because of the thermal capping that takes place. So I would have thought there could be some flaws in the logic of that hypothesis, but you would want to have a look at it more closely. But you do get high levels of – it is horses for courses – certain pollutants occur at high concentrations in winter because they are subject to thermal capping. Other pollutants, for a variety of reasons are less pronounced. But I do not think there is enough comfort in that to draw the equation that it will all balance out. I think that is a bit too simplistic. It is a complex situation, but I do not think you could rely on that totally. If you had concerns elsewhere, you would not want that as your only argument, I would not have thought.

The Hon M. JONES: What levels of benzene would you imagine would be discharged from the stack?

Mr CHILD: It is a very difficult question. I was involved in some research that sought to measure levels of benzene in George Street, Sydney in 1994 and 1995, and that research, which used a technique called "open path spectrometry" and basically you run a beam of light through the pollutants and through the interaction of light with various chemicals, you can measure it. It is a Swedish instrument and it is widely used in Europe and in Asia. It came up with levels of concern in respect of benzene. I know the view held by the EPA is that the levels are much lower. I think our difficulty with volatile organics or reactive organic chemical which include benzene, which is a known human carcinogen, we are a bit light on on knowledge. The work I have done would say it is something you would want to look at very carefully. I say that in the context that the United Kingdom Department of the Environment have recently reduced their allowable limit on benzene, or their goal, from five parts per billion to one part per billion in ambient air. In the work that I did as part of UTS research team in Sydney, we were seeing averages in winter at 10 and peaks at 30. That is a function of, in large, part fuel formulation.

To answer your question I would have to err on the side of caution if I was looking at that. I know there is a counter-view that those figures were somehow wrong. They were based on one month's observation taking observation every two seconds, and they looked pretty good and I do not include myself in this. I was just the hired help. They were done by some very, very highly reputable people – other reputable people I hope. But there was enough concern in that if you put it alongside what the people in the UK are doing and in Europe, to say you would want to watch it. We do not have any background data at all. We do not really have any goals, other than there are some figures that the Victorian EPA play around with. Without being alarmist, it is an area where you would want to be on your metal I think, and be concerned and be aware of what is happening internationally and measure it.

I suspect, to answer your question, and that qualification was necessary, that it might be that the levels could be higher than you would be comfortable with, given that we do not have a formal goal.

DEPUTY-CHAIR: Mr Child, thank you very much indeed for your assistance to the Committee.

(The witness withdrew)

CHRISTOPHER WINDER, Head of School, School of Safety Science, University of New South Wales, The School of Safety Science, University of New South Wales, Sydney, sworn and examined:

DEPUTY-CHAIR: In what capacity are you appearing before the Committee?

Dr WINDER: I am not sure. I made a submission and was invited to attend, so I believe as an independent expert.

DEPUTY-CHAIR: As an interested expert or academic. Did you receive a summons issued under my hand in accordance with the provisions of the Parliamentary Evidence Act, 1901?

Dr WINDER: Yes, I have.

DEPUTY-CHAIR: Are you conversant with the terms of reference for this Inquiry?

Dr WINDER: Yes, I am.

DEPUTY-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 and the matter would then resolve into a confidential session. However, I should warn you that the Parliament may override that decision at any time and make your evidence public.

Dr WINDER: That will not be necessary.

DEPUTY-CHAIR: Could I invite you to make a short oral submission?

Dr WINDER: I should say at the outset that I am not medically qualified, but that I have a PhD in toxicology and my research interests include the study of problems of low level chemical exposures that produce toxic effects. I am not specifically interested in the M5 East problem or proposal, but in the past I have been concerned about a number of developments in which the potential for adverse health effects exists from poorly designed or inadequately located emission sources. These include, over the last 10 years, matters relating to emissions from the Waterloo Process Plant, the chemical industry complex in Botany, airborne emissions from landfill sites and location of child care centres near main roads.

My initial comments today are divided into two main areas, those related to vehicle emissions and those related to the M5 East Tunnel. I would like to turn to vehicle emissions as a source of problems in the environment first. It is well established, and I think this Committee is now quite familiar with the fact, that vehicles are a significant contributor to atmospheric pollution and processes that can lead to concentration of airborne pollutants in a localised area can be problematic from either a public health or an environmental protection viewpoint. There are a number of possible contaminants, some of which we can discuss today, in vehicle emissions, including what might be divided into dissolved chemicals such as oxides of nitrogen, lead, oxides of sulphur, carbon monoxide, and volatile organic chemicals such as benzine and butadiene. As well as chemicals that are dissolved in air, there are also particulate matter which is suspended in air, and these include things such as soot,

organic mists and other particulate matter. Most concern on vehicle emissions in the last five to 10 years has concentrated on particulate matter which has a certain size, and that size is considered to be less than 10 micrometres, or microns.

There has been a lot of discussion about what PM10 is, and I want you to bear in mind that PM10 is lots and lots of particles that are less than PM10. In general, you would find that most of the particles in PM10 have an aerodynamic diameter in the order of one to five microns, and not all equal to 10. That is quite important, because those small particles are available not just for inhalation and get stuck on the airways, but actually a delivery down into the lungs. So PM10 really is a collection of particles, probably averaging about PM2.5 to 5. There has been a lot of concentration on PM10 and what it can and cannot do.

As well as what is in the air, there is also a range of factors which affect air quality from roads with heavy traffic. Certainly, within Australia we have been worried about lead, now we are less worried about lead because lead is being phased out of petrol, but we still remain worried about PM10, oxides of nitrogen, and the circumstances that will lead to degeneration of ozone. Air quality standards have been set for a range of contaminates found in emissions from vehicles, including carbon monoxide, lead, nitrogen dioxide, and total suspended particulates and PM10. It is perhaps unfortunate that whenever we talk about these standards, we always use them as a benchmark, and not as they are supposed to be used, that they only really represent a best estimate of the upper limit of acceptable risk.

Rather like today, we have been talking about the PM10 standard of 50, there is some assumption there that if you are exposed to 49 you are perfectly safe, and if you are exposed to a 51, you are not. That is not the case. It is a gradient of effects from very low levels to very high levels, and it is intrinsic in the concept that when you have a standard like 50, that most of the levels that make up the 50 would actually be much much lower. To suggest that operationally, 50 is where an emission should be, is in fact a misinterpretation of what the goal, the objective or the standard is trying to do. Basically, 50 means probably an average of around 10. Therefore, from statistical purposes, the concept of the public health standard or the environmental air goal or whatever it is, is always abused, because people just assume it is somewhere up near 50, when really, if we want to meet this particular 50, we should be down around about 10. That is an important consideration which virtually everybody ignores when we look at the operation of these standards. I wanted to make that point today.

While these standards offer some measure of risk, and normally they are considered to be a measure of acceptable risk, often they do not take into account those groups of individuals within the community that have inequitable risk. They will take into account some of them, but not all, and they will not take into account, for example, people who may be chemically sensitive, or the young, or the elderly, or the sick, or the pregnant, or the immunologically compromised individuals. In case the last one scares the Committee, and it scared me because I could not say it, asthmatics are a case in point. They are immunologically compromised, they have susceptibilities to exposures, and asthma is produced when they are exposed to things that provoke the asthmatic reactions. I do not believe that any exposure standard set in the environmental area, and certainly not the ones discussed for this tunnel, would take into account people with asthma or people who are chemically sensitive. I do not believe that those standards apply to everyone across a given community.

Further, those standards are usually moving targets, and from time to time when new

evidence comes available, they undergo revision when more information becomes available. I note at the moment there is significant discussion in the literature of the adequacy of the current standards for benzine and PM10. I would imagine that the standard for PM10 currently as set at 50 is too high, and certainly in other countries around the world they are lowering that number to either 30 or 25 or some number like that, and the level for benzine, which I am not sure was mandatory in Australia, but if it was it would probably be set at about five, and in fact, that is really too high. There is evidence coming out of Europe that suggests that one may be a better level, and I would imagine that even that would eventually, with time, be subject to challenge.

If we look at the studies that investigate the effects of vehicle emissions on health, generally there has been a range of them, and generally they do not look at the whole picture, they look at specific aspects. They look at lead, or they look at particulate matter, or they look at oxides of nitrogen. Some are questionnaire studies, where you go out into the community and you give people questionnaires to fill out. Some look at outcomes from hospital studies. Some studies are of children, some are of adults, and some are of mixed populations. Most investigate the impact of high density traffic sources, and to the best of my knowledge, none have looked at proximity to an emission source of vehicle emissions.

There is little consistency of design or methodology, and that was always used as a problem in interpreting that result. I would just like to make one point. Even despite all those limitations, even despite all those methodological flaws and all those particular problems of what they are trying to do and what sort of analysis comes out of them, generally virtually all the studies of vehicle emissions on health report some deficit, and there is a tendency for health problems to intensify as pollution, either by proximity to pollution sources or intensity of traffic increases.

I would like to ask you to turn to my submission, and go to page 12. You will see I have on the top of that page a figure which I have extrapolated from a study in America which looks at vehicle exhaust as an independent risk factor for childhood leukaemia. You will see that the figure that I have presented shows that the association of traffic density with leukaemia increases, and above 10,000 vehicle movements a day, there is a significant increase in the incidents of leukaemia. I wanted to bring this particular study to your attention. I have not got it with me today, but I am happy to make it available should you wish it. This is a study which looks at people who reside on main roads. We can argue that the distance from the main road to the front door, or to where the person lives, may be five or 10 metres, and we can argue that the front of the house where the person happens to reside is maybe 10 to 20 metres. With those sort of provisos and those sorts of conditions, you will see that above 10,000 vehicle movements a day, we have an increased rate of leukaemia in children.

It is difficult to correlate this information with what is happening with the tunnel, but I want you to imagine that instead of having a 20 metre frontage we have a 4.5 kilometre road, and instead of 10,000 vehicles a day we have 60,000 cars a day. You can see that delivery of those vehicle emissions in a single concentrated form would suggest there may be an impact on health. I am not going to say much more than that about this particular study, but I do feel it is a significantly important one because it shows an association of a significant health effect, not just bronchitis or skin problems but actually a condition like leukaemia, which is very closely associated with vehicle movements.

Most studies report increased rates of respiratory symptoms. They report irritation,

bronchitis, they report asthma, they report increased numbers of people going to hospital with life threatening asthma, and other evidence such as leukaemia and cardiovascular disease. Although it is more important to interpret, if it is true, it is alarming. As well as the direct effects of vehicle emissions on the health of local communities, other issues which have been touched on in other submissions and today, including the contribution of local concentrations on smog formation, on greenhouse gases, or ozone depletion, have been addressed poorly in all the documentation I have seen.

If I can turn, then, to the health aspects of the M5 East proposal, I believe there are significant problems with the current proposal, both with its science and with the procedures that led to the proposal that has come about. Once the decision was made that there was going to be a tunnel, the Roads and Traffic Authority has focused almost entirely on one option, and all the debate has been basically about a stack or stacks. I am not an engineer, so I cannot talk about gas cleaning or gas filtration technology, but it would seem to me that the inability of the RTA to consider other options has limited the possibility of discussion with regard to this proposal. The RTA's assumption about diesel transport underestimate the problem and I believe that the proportion of 20 per cent diesel vehicles. If that is true, then that also relates to a problem because diesels produce more PM10 and more oxides of nitrogen.

Very little consideration has been given to the possible physico-chemical changes that may arise in concentrating 4.5 kilometres worth of emissions into one emission source, and apart from the evidence that you have heard today, there is another problem which has not been considered, which is that diesel particulates clump together with time. Diesel particulate emission, which may have very small particles in it, may actually grow, and with time they actually get larger particles, which again may present a problem for health problems when they are emitted from an unfiltered source. Further, chemicals dissolved in air such as some of the organic chemicals, may actually absorb onto the surface of diesel particulate, and may, rather than be made available as a dilute source in air because it has been ventilated, may actually concentrate, so that when the particle is inhaled and reaches the deep portions of the lung, may deliver higher concentrations that react to chemicals than you would otherwise predict. I think those are issues that have not been given any consideration, and need to be thought about before this, or any other proposal, for an emission source that can create these problems is finalised.

The RTA also chooses to marginalise, or disregard, concerns raised by other interested parties about the significance of the proposal. I note the Department of Health's view that incremental increases in PM10 would exceed recommended levels, that the EPA's view that emissions from a single stack at Turrella has the potential to become one of the major point sources of oxide of nitrogen in the Sydney region. The Department of Urban Affairs and Planning's regard to the mathematical modelling on which the approval process is developed is uncertain and unreliable. The incremental addition of emissions from a signal source to local levels is significantly worse than previously assumed, and I think Mr Child made that point and I would reinforce it. I find that the Road and Traffic Authority's view that they are unable to provide any solution to the problem of elevated levels of PM10 to be almost criminal. Their proposal of doing nothing and relying on Australian Design Rule changes, or changes in flow or improvement in engine technology, does not really seem to be dealing with this particular issue. It is their issue, they should fix it.

The location of an emission source in a shallow valley, instead of having the emissions cleaned or treated or somehow fixed, or locating the emission source on elevated land is

cause for concern. The possibility of pooling or swirling of emission plumes being captured in such a topological feature should assume a much more higher significance than any possible calculations or models can predict. I would note that on a warm day, in Sydney, where there is no southerly or no westerly or no northerly, that the potential exists for emissions coming out of that stack just to fall into the valley and swirl up towards Bardwell Park without really any possibility of them being swept away.

In conclusion, there is a general view emerging that there will breaches in air quality goals in the immediate vicinity of the stack. The RTA concludes that our quality goals may not be met, and that is supported by their colleagues in the EPA and the Department of Health, and their colleagues at the DUAP questioning their modelling methodologies. I consider that the RTA's response to these and other issues is not adequate.

There are a number of changes that have been made in relation to the decision to locate the emission stack for the proposed M5 East Tunnel, some of a significant nature. These changes do not appear to have been evaluated appropriately, and the process of community consultation with specific community groups has been incomplete. I would just like to make a point there, and that is that when this proposal was first brought out in 1994, and with subsequent proposals to change the scope of the M5 East Motorway, community consultation was carried out with those groups that the road was going to impact upon. The final decision to change from the three stack option to a one stack option was made without probably any consultation with the groups such as RAPS, mainly because the stack was not there. The discussion was held in Rockdale, and in those areas, where the stacks were going to be. With a decision to move the stack, it is assumed that the community consultation is complete. But in my view, it has not really started.

The last point I would like to make is that where a proposal is considered to be a radical change, there should be community consultation. I understand that in June 1999 the Supreme Court issued a majority judgment about whether the single stack needed another environmental impact assessment in, and concluding that the RTA had not carried out a radical modification to the earlier application. Therefore, the Supreme Court considered that there was no radical modification, there was no need for another EIS. However, one dissenting judge noted that the new proposal imposed new significant and detrimental effects on different localities, and different persons from those who had the opportunity to make representations with respect to earlier proposals. So we had community consultation to this. We had community consultation of the 1996 version, but the latest one has not had adequate community consultation.

My last point is that where there is inadequate consultation, and where there is some doubt about the impact of a development on the environment or on public health, it would appear appropriate to apply a precautionary principal. As such, it would appear that the public health and environmental protection implications of the M5 East proposal have not been properly evaluated, and in all fairness, they should receive proper consideration.

The Hon. M. JONES: Could you just expand very briefly on what you meant by "diesel particulates may grow with time". What sort of time scale do you mean?

Dr WINDER: My knowledge about diesel particulate clumping is available from the study of diesel emissions in mines. It may not be particularly applicable to road traffic, but I have seen – and from studies done by the National Occupational Health and Safety

Commission here in Sydney, I have seen pictures where diesel emissions have very small, almost blob-like particles in them, and with time – and I cannot tell you how long – but with time these particles tend to aggregate and form clumps and chains and so forth. My evidence in that regard is based on what they were doing at Worksafe, probably five years ago. At that time we were worried about the carcinogenic potential of diesel emissions. We now know diesel emissions do cause cancer in mining and other occupational groups. Therefore we were looking to see what was happening with the particulars. Whether that would happen on a road, I do not know. Certainly it could happen in a tunnel.

The Hon. M. JONES: We cannot put a time on that?

Dr WINDER: No. That information could be found for the Committee, but I do not have it with me today.

The Hon. J. JOHNSON: Are you aware that the air quality goals that have been developed for this project have been based on extensive community health studies?

Dr WINDER: Yes.

The Hon. J. JOHNSON: Were they rigorous?

Dr WINDER: They were rigorous for the time they were done.

The Hon. J. JOHNSON: Are you saying that they need to be updated?

Dr WINDER: I am saying, as I said earlier, that for some pollutants the available evidence suggests that acceptable air quality levels for benzine are probably now too high, and they are also for PM10. In fact, there is a vigorous debate about whether 50 is adequate or not, and there is some evidence to suggest that it should be lowered.

The Hon. J. JOHNSON: Are you aware that they take into account the possible effects on sensitive members of the community?

Dr WINDER: I do not believe that to be true for all sensitive groups. Some maybe, but not all. It is certainly not true for people with allergies.

The Hon. J. JOHNSON: What studies have you done on road tunnel ventilation systems that might assist the Committee in its deliberations?

Dr WINDER: None.

The Hon. J. JOHNSON: Are you aware of any proven gas treatment plants at operational scale in a road tunnel?

Dr WINDER: That is not my area of expertise. I would like to make one point to that question, though, that anything is better than nothing. I think what we have at the moment should be considered akin to pumping raw sewerage out into the ocean, and I would rather see something done to reduce those levels at source than rely on the old, the very old concept that the solution to pollution is dilution, because it is not, any more.

DEPUTY-CHAIR: You appeared to be saying earlier that the multiple stack option was to be preferred.

Dr WINDER: The reason the multi-stack option is preferred is not because there is more stacks, it is because they are up on hills. That would aid dispersion. The idea of putting it in a little pocket where it could pool and cause all sorts of other problems seems to be a very poor option. If you are going to get rid of the stuff by not treating it properly, then build a stack 100 metres high or 200 metres high, and get it up there. But do not have it down low where it can fall out and fall on local communities, either on a ridge or anywhere else.

DEPUTY-CHAIR: Historically, though, is it not the fact that the multiple stacks were in elevated locations?

Dr WINDER: Yes. Two stacks is better than one stack, stacks on hills are better than stacks in valleys. They are all better options. But whether or not they all reduce the risk to acceptable levels is something I cannot comment on.

DEPUTY-CHAIR: The community did not find that to be a favourable option at the time, did they?

Dr WINDER: I see this in my work a lot. I see people resisting development which might lead to an emission source or a source of pollution or some other thing. I accept that. I am not sure what your question is. Are you asking me about the relative acceptability of these things? Because all of them are unacceptable, as any possible development that has a significant impact on the environment might be.

DEPUTY-CHAIR: Yes, I am asking you about the relative acceptability. The previous witness referred to this in one of his options as being more acceptable than the do nothing option. That is, the multi-stack option.

Dr WINDER: Well, again, if we took a concentrated emission source and divide it against more than one stack, then that would reduce the risk. If we put those stacks in an area where the gases could be significantly dispersed, that would reduce the risk. If we build the stacks higher so that the emissions were spread over a larger area, that would reduce the risk. All these things will reduce risks, but I am not quite sure why you are asking the question you are asking, and I am not sure that I can answer it properly.

DEPUTY-CHAIR: I am entitled to ask a question to try to elucidate your evidence, and that is what I am doing.

Dr WINDER: Anything you can do to reduce the risk, more sources of emission, more dispersal mechanisms, they will all reduce the risks.

DEPUTY-CHAIR: Thank you, Dr Winder, for your assistance to the Committee. I will adjourn the Committee until next Wednesday.

(The witness withdrew)

(The Committee adjourned)