REPORT OF PROCEEDINGS BEFORE

GENERAL PURPOSE STANDING COMMITTEE No. 5

INQUIRY INTO THE M5 EAST VENTILATION STACK

¾ ¾ ¾

At Sydney on Thursday 3 May 2001

¾ ¾ 4¾

The Committee met at 9.00 a.m.

¾ ¾ ¾

PRESENT

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

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

PETER SIAPOS, Manager, Telecommunications, representing Residents Against Polluting Stacks, 158 Bayview Avenue, Earlwood, affirmed:

CHARLES BRIERS, Senior Project Manager, representing Residents Against Polluting Stacks, 21 Bayview Avenue, Earlwood,

GISELLE MAWER, Education and Training Consultant, representing Residents Against Polluting Stacks, 13 Wavell Parade, Earlwood,

MARK CURRAN, Retired, representing Residents Against Polluting Stacks, 38 Hocking Avenue, Earlwood,

JUDI ROSSI, Senior Education Officer, Department of Education and Training, representing Residents Against Polluting Stacks, 3 David Street, Earlwood, and

RIC ROSSI, Architect, representing Residents Against Polluting Stacks, 3 David Street, Earlwood, sworn and examined:

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

Mr SIAPOS: As a representative of Residents Against Polluting Stacks [RAPS].

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

Mr SIAPOS: Yes, I did.

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

Mr SIAPOS: Yes, I am.

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

Mr BRIERS: As a representative of RAPS.

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

Mr BRIERS: I did.

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

Mr BRIERS: I am.

CHAIR: Ms Mawer, in what capacity are you appearing before the Committee?

Ms MAWER: As a representative of Residents Against Polluting Stacks.

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

Ms MAWER: Yes, I did.

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

Ms MAWER: Yes, I am.

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

Mr CURRAN: As a representative of RAPS.

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

Mr CURRAN: I did.

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

Mr CURRAN: I believe so.

CHAIR: Mrs Rossi, in what capacity are you appearing before the Committee?

Mrs ROSSI: I am here as a member of Residents Against Polluting Stacks.

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

Mrs ROSSI: I did.

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

Mrs ROSSI: I believe I am.

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

Mr ROSSI: Local resident.

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

Mr ROSSI: Yes, I did.

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

Mr ROSSI: Yes, I am.

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

Mr CURRAN: I would like to do so.

Mr BRIERS: At this stage I thank you for the opportunity to address the Committee. Our address will comprise four presentations by Mark, Giselle, Peter and Judi. We will intersperse those presentations with a short video. We will try to keep our presentation as brief as possible to allow the maximum amount of time for questions. We were held up this morning by the blockade of trucks around the city.

Mr CURRAN: I would also like to thank members of the Committee for their patience. This is a fairly dry and tedious sort of subject. We appreciate your attention and we thank you for the effort that you have put into this inquiry. We, as members of the community, appreciate that and will not forget it. About 18 months ago I appeared at the Committee's first set of hearings with an optimistic set of proposals—what we thought were practical and responsible solutions to the problems that we then saw. Although our thoughts about the technology have been refined, our fundamental position has not changed.

We still believe that there are viable technological solutions to the problems that we see. However, I do not propose to revisit those problems. I think that members of this Committee are

perhaps the best informed set of politicians in the world, with the possible exception of politicians in Norway, to determine the best available technology for the filtration and treatment of tunnel emissions. This morning I want to try to convey to you what is possibly a new or at least a different view of the problems of air pollution from what we saw expressed on Tuesday by all the representatives of all the different departments.

I want to tell you a little story—a parable, which has quite a good precedent. About a year ago I got an email entitled "Whale". I hesitated before opening the email as I did not know whether or not it contained a virus or something like that. When I opened the email I discovered that it was a copy of a news report about a dead whale that had been washed up on a beach in Oregon in the United States of America. After the whale had been on that beach for a few days it was distinctly on the nose. The local parks and wildlife authorities decided that they were going to remove it by blowing it up.

By this stage a rather large crowd had gathered and they witnessed the experts packing explosives under the whale. They placed the explosives on the landward side of the whale so that it would be blown out to sea. The police arrived and moved everyone well back from the immediate scene. One then sees on the video what is really quite a big explosion. Immediately the crowd started running because suddenly it was raining lumps of rotten, stinking whale meat. One fellow who was sitting in his car had half a tonne of whale meat land on his car. His car was almost squashed flat. Some people were hit by pieces of whale meat.

The general conclusion was that that was not the way to get rid of a beached whale. Something very like that beached whale has just turned up in front of our houses. The Roads and Traffic Authority [RTA] proposes to cope with the problem in exactly the same way. It has a technical term called "disperse and dilute". You disperse it and you dilute it, just as was done in relation to the whale, with air in between. We hear that this is the best way to do it and that it represents world's best practice. Somehow they are confident that they are going to stay below the whale meat dispersal goals, shall we say.

Then the Department of Urban Affairs and Planning [DUAP] says, "We are going to put safeguards into place for whale meat dispersal. They will not be allowed to exceed the national goals. There are national goals for the dispersal of rotten whale meat. If they do, we were put in some filters and we will protect the community against whale meat. We will even be able to pick up where we will stand to monitor the distribution." Maybe it is an exceedence if you get hit by more than one bit. The national standards were described by the Environment Protection Authority [EPA] which assures us that, although it is hard to be certain, on a regional basis this amount of rotten whale meat will not cause any harm as long as it does not exceed one piece per square metre, or something like that, because the EPA has been measuring it in the past. Then the Department of Health told us, "Well, this is thought to be safe because of overseas experience. It is difficult to be certain of the local level." They do not want to study it because, well, they might find out something harmful and that might upset the big bullyboys in the Roads and Traffic Authority [RTA].

Perhaps this somewhat ridiculous analogy well help the Committee to understand our feelings and our concerns. There is an axiom in pollution control, "Dilution of pollution is never the solution". The EPA has a good slogan, but it applies only to things that people can see. They say that “every bit counts” and that is the correct approach. The late Gordon Rodley said, "If you could see vehicle pollution, something would have been done about it a long time ago and we would never dilute and disperse." You can see the wood smoke, and look at what happened to that: It was stopped. People cannot burn in their backyards anymore and that was an appropriate thing to do. Over the whole of Sydney, it is an appropriate thing to do. There is a strange assumption that seems to run through the whole approach that was tacitly accepted by all the departments yesterday: It is acceptable to make things a bit worse for a few people, as long as you make things better for many. Because of this, we should not complain. The attitude is that the stack is not going to make things very much worse. Big Brother has decided that it is okay to pollute, as long as you do not do too much.

The National Environment Protection Measure [NEPM] for air quality talks about things such as providing an acceptable level for protection on a regional basis and that means that it takes into account what is possible. It definitely says that we have to look at what is possible. Of course, the goals do not provide any full protection to sensitive members of the community. That is all in the NEPM documentation, all those words. None of the goals for the project are set at levels of pollution

where there is demonstrably no ill effect, certainly not to the sensitive members of the community and in many cases not to the whole community. That is what the six city study tells us: It is the whole community that is being affected. At the ventilation conference, Dr Corbett said, when pushed a little bit, that people are finding effects at very low levels, even at current levels of pollution in our cities, even in cities like Sydney where, by international standards, pollutant levels are quite low. He said that people are discovering all sorts of effects on the immune system, in the lungs as a result of exposure to fine particles, and that there has been much great concern about the role of these very fine particles and diseases such as asthma. He said that there is certainly a very active area of research at the present time and "we are keeping a close watching brief on the developments". That was said by Dr Corbett from the Department of Health.

In answer to a question, "Is there a safe level or threshold for health effects?", he said, "Is there a safe level for health effects in general? The answer for most of the pollutants is no. There are continuous effects above zero and this is the case for almost all of the pollutants with which we deal." This degree of openness from a member of the Department of Health would have been very welcome last Tuesday; that is our observation.

No-one has ever asked us if the levels in the goals are acceptable to us—not ever. I have heard it put to me seriously—because I have been involved with this for a long time—that the NEPM has been developed with community consultation, and that is true. But that ignores the fact that the National Environment Protection Measure [NEPM] also specifically states that the goals are unsuitable for point sources. The reason for that is really quite simple. The NEPM deals with a fairly random variation in the general air shed and there are lots of ups and downs. Although it is not set as a level that is safe to all, I think it is an appropriate and effective way for this purpose, looking at general air equality. It is a benchmark for regional air quality.

But to apply the same air quality concentration—because this is what they have done: they have taken the number that is used in the NEPM and they have applied it to the stack—to a point source means that it is always permissible to increase the quality of pollution in the air around the source. The problem is that the pollution will never be decreased by the action of the same polluter. It will always be up. It will never been down, whereas in the general air shed it tends to go up and down and you lose some and you win some. What we have is a project that contains—let us look at it objectively—an element, the stack, which is completely unacceptable to the local community. The motorway is not unacceptable. The motorway is a good thing. But we cannot even look at the stack and say, "Well, it might be nasty, but at least it is cheap and it works." It is enormously expensive, it does not work, and it is still nasty. And why is it nasty? That is because of what it will do to people and what it will do to people like Julie and her four little steps and stairs—the family. They do not see the stack, but they are living right next to it.

Will they end up with asthma or something worse. Elderly couples who have lived there are all their lives do not want to move or be bought out; they just want to pass the rest of their lives in peace and comfort and not be affected by the stack. There are people who look down into the stack in that sort of situation.

John and Chris, who live on the other side of the valley, have just had a baby. They are worried about their baby. It is nasty for David. He was born and bred in the area. He just manages to control his asthma so that he can work. Then there is Joe, whose son lives just outside the circle. His heart actually stopped during an asthma attack. This is what we are talking about. We are not talking about abstractions; we are talking about real people with names and aspirations and, I would mention, the vote. What we require is not something that we believe is unreasonable. What we require is an approach that demonstrably takes effective action to reduce to the greatest degree possible this localised and deleterious impact so that all may benefit from what is really a very important project—the M5 East.

CHAIR: Are there any more statements?

Mr SIAPOS: Yes, thank you. The statement I wish to make to the inquiry is that the inquiry has already proved the point previously, in 1999, with regard to the issue of the M5 East stack: there was an impact. The job has been done in terms of proving the point that having unfiltered stack in the bottom of the valley is a health problem. The job has not been done in terms of convincing the RTA of

exactly the same thing. You have seen through our submission and you heard on Tuesday a number of RTA reports—consultants and other areas—come through to satisfy the criteria as far as they are concerned and as far as DUAP is concerned that there is no issue. Later in some discussions we will be showing you that some of these reports sit within the old stack boys club as far as we can see. Every report we have seen smacks of being done by people that are within the realm of having done work with the RTA and continuing to do so.

We find it ridiculous that the RTA is led by a person named Paul Forward whom I used to work with at the water board, and when I worked at the water board with Paul Forward the single biggest issue he wanted to tackle was that if we could get rid of the point sources of pollution there would be an overall benefit. Now Paul Forward, as the chief executive officer of the RTA, has created a point source of pollution in the bottom of a valley and is doing nothing about it. The inquiry may want to ask Paul how his sentiment has changed from one to the other in that area. You may also want to ask how Jay Stricker is the international representative as far as Australia is concerned on PIARC the international committee for community consultation. Community consultation is one of the areas, apart from getting the planning and the engineering wrong, where the RTA has suffered. Personally, I feel that it would be ridiculous to have someone like Jay Stricker and the RTA representing the doyens of international best practices on community consultation. If it were not for Residents Against Polluting Stacks no-one in the area affected would know anything about the issues. The RTA would use its own boys club again to get more consultants out there to rubbish everything.

On Tuesday you heard testimony from DUAP. It expects that there will be an operating protocol in place for the tunnel when there are emission exceedences. You heard from the CSIRO that as far as it was concerned, in terms of reviewing the adequacy of the modelling done, there could well be exceedences. In fact, it could be out by a factor of two. There will be exceedences. The CSIRO has said that there is no evidence yet that the RTA can stop sea breezes coming in and adding to the impact. The CSIRO suggested that extra vents would be a possibility. The CSIRO also said that three stacks is obviously more than three times better than what we have today in terms of unfiltered.

You heard Mark talk about the whale in terms of the EPA and so on. Every report we have seen says that the stack, as far as the RTA and DUAP are concerned, will not exceed the goals by any safety margin. What they are saying is that they can fill the glass and we pray to God that it never rains or does anything else because the glass is full as we have designed it. There is no allowance for the fact that goals over time will reduce. You heard from the Health Department that it had no submission. From the documents we have obtained from freedom of information the department has not been asked to comment on the project. The only time it commented on it—we will elaborate a little later—was in relation to reports written by people such as Bongiorno, and those reports are written by lawyers, not by doctors. You heard the Health Department say that the sample size would be too small. That sample size is all the people we live with. Unfortunately, we are too small.

I would also like to address one element of the last findings that have come to bear and one of the terms of reference of the inquiry, which is the methodology for the property value guarantee, and the adequacy of the property value guarantee. The methodology was formed without any science. The RTA, as far as we can see in terms of evidence, never used any form of methodology, whether people or anything else. The methodology was that a union, the CFMEU, on behalf of the residents approached Minister Carl Scully to see what could be done in terms of fitting filtration and property value guarantees. I make the point that the property value guarantee that RAPS has been seeking has been the last step in everything else that the RTA, the Government and other departments should do. It should be the safety net. If everything else that they tried does not work the property value guarantee should be put in place for those people who do not believe that any of the actions that will be undertaken will work and therefore their lives will be impacted.

The unionists took industrial action. There was no scientific measurement. Certainly that could not have been the case with the Health Department because it did not even look at these issues. As far as we can see from the evidence, it was nothing to do with the EPA. The RTA in its previous reports talked about hot spots of concentrated pollution. They could be 600, 800 or 1,200 metres away. Those hot spots of pollution would include schools, old people's homes and places beyond the valley. What the RTA has cynically chosen—and we believe it has no methodology in choosing it—is a radius of 400 metres from the stack site. That is all well and good because 70 per cent of the land is exemption based—whether it be parkland, railway property or private enterprise buildings. As an

outcome of that methodology only 270 houses are placed in the property value guarantee area. To add insult to injury, the property value guarantee offered through the 1997 process for those people living at the portals or living above the tunnelling is dramatically different from the property value guarantee elsewhere. In those cases all costs were reimbursed. In those cases the property value guarantee was opened for a period of six years. Ours is almost two. In those cases valuations were allowed and independent valuations will be reimbursed. In this case it is not.

I point you to our submission. There is no comparison. For every resident that sits within the 400 metres zone it will cost between $15,000 and $25,000 out of their own pocket to act on the property value guarantee, whereas that did not happen in the previous case. The whole point is that the property value guarantees cynically proposes the bare minimum. Part of the fundamental process of the whole issue of why the RTA and DUAP and the whole Government has been stonewalling is that if there is filtration and all the issues are solved properly on the M5 East they will have to do the same with the cross-city tunnel, Lane Cove and all the other tunnels that urban consolidation requires because land is running out.

We are happy to answer questions on all those things. We would also like the inquiry to take to task the RTA, DUAP, the EPA, Health and all those people who gave evidence on Tuesday as to why for four years all that effort was exerted in stonewalling. If this energy was reconfigured so that it benefited the community we would have had an answer long ago. The amount of money spent trying to avoid a decision is certainly more than required to do the right thing in the first place. The point has been made that it is very cynical for the RTA to suggest that 400 metres is adequate. It would be cynical also for Paul Forward to admit—and he is the final approver of this—that he has not adopted in previous existences a view that dealing with point sources of pollution helps. That is what helped clean up waterways. What we are saying today is that Paul Forward should now adopt the same policy to clean up airways. We are happy to elaborate on those issues.

CHAIR: Are there any further submissions?

Mr CURRAN: We would like to play a video to give you some background to the decision-making process.

(A video was played.)

CHAIR: Are there any other statements that people wish to make?

Ms MAWER: I would like to make a statement and to use the overhead. You might remember that when I spoke to you 18 months ago at the previous inquiry we used this pamphlet, which is part of the RTA pamphlet, which was distributed not around Earlwood and not around Turella. It was a limited edition pamphlet—I think because it was just so blatantly deceptive. We feel that now here we are three years later and we are still getting crosses and not ticks next to each one of those.

Mr Forward in his address to you on Tuesday spoke a great deal about the evidence for international best practice that unfiltered stacks represented at least current practice, if not good practice, if not best practice. When we had the inquiry in 1999, just after the hearings, the RTA had commissioned a report by Mr Arnold Dix that was submitted to you. Mr Dix was a barrister who acted for Transfield in relation to the Melbourne Citylink project, which you may remember at the time was also hailed as world's best practice, but at the moment is evidently not so and seems to be working half the time that it should be.

Mr Dix appeared, quite successfully apparently, for Transfield when the community down there were also upset about stacks and also argued for filtration. I have the letter here, if you wish to see it, from Jay Stricker commissioning Mr Dix to do a report. The report finishes up by saying: "The design philosophies for the M5 East reflect world's best practice in tunnel management."

After the inquiry and your unanimous recommendation that the RTA should go out and call for expressions of interest, the RTA came back and said, "No, we will have a workshop instead," and Mr Dix was appointed as a facilitator. In justifying the decision to the RTA, he was described as having technical qualifications and experience in science and successfully representing Transurban in

the Administrative Appeals Tribunal inquiry in the Melbourne city link project. On the basis of that, his employment with the RTA was approved.

When the invitation came out to community members on 16 May 2000, Mr Dix was transformed into somebody who was described as being

> ….a noted lawyer, a scientist and an advocate for community groups on a broad range of environmental issues, and as a founder of the Environmental Defenders Office in Victoria—

a claim that the Environmental Defenders Office in Victoria was not happy to own.

At the time, according to RTA documents that were released through a motion passed in the Upper House, the purpose of the workshop was intended to:

> … provide access to the collective experience of tunnel ventilation experts from around the world and to have the key elements of this experience conveyed to the community through a controlled question and answer session with invited community representatives…

They deemed it appropriate to invite two community representatives, one from the Lane Cove Tunnel Action Group and one from the M5 East. We would be allowed to present a question to an organising committee established within the RTA, and those questions—in some documents it says "a question"; in others it says "questions"—would be allowed to be submitted after the approval of the organising committee to the panel of experts, and that was the extent of community consultation.

You may remember our submissions to you, and to other people in the crossbench and to the Minister, to say that we did not think that was really a good way of conducting business, and that it was not in the spirit of implementing your recommendation. At the same time, I think the Hon. J. F. Ryan last Tuesday tabled another email, which I have here. People were being invited to come to this workshop. The invitations started with things like, "In Sydney we are having problems with community acceptance of ventilation stacks on our tunnels. The community are insistent that we either eliminate stacks or at least clean and filter the air before the emission from the stacks." It then went on to say that it was indicated that Australians would support various things, and continued, "In this context we would like you to come and put your views."

CHAIR: Who wrote that document and what is the date of it?

Ms MAWER: The document comes from Garry Humphrey, who is a senior manager within the RTA who is responsible for tunnel ventilation and, I believe, gave evidence before the inquiry in 1999.

The Hon. J. H. JOBLING: I move that the document be tabled and incorporated into evidence.

Ms MAWER: I am happy to table all these documents later, if that is appropriate. They are all documents that were released through the motion.

As we tried to illustrate last time, you may remember that in the pamphlet circulated by the RTA that said "no stacks in residential areas", the areas that were shown as being the industrial area were outlined. At the time we said to you, "Yes, but we live here. We live all around this industrial area." I think systematically it has been shown to be the case that the RTA, instead of filtering the emissions, has very carefully filtered the information, both to the Minister and other departments, and has continued to do so. It seems to be their intention to continue to do it and to revisit the same flawed process, on the Cross-city tunnel and on the Lane Cove tunnel. We say enough is enough.

If you will allow me, I will now go into a fair bit of detail, but I think it is worth doing because I would like to lead to the advice that went to the Minister and the advice that went to other departments from the RTA, to show that there has been absolutely systematic misinformation and systematic deception. I would appeal to you that you put a stop to it, for the sake of the whole community—not just for the Lane Cove community that is about to have the same process revisited on them; not just for the Turella community that has had to put up with an awful lot of stress and heartache for the past four years; not for the people of Ultimo and Pyrmont who are running around

getting lung function tests done because they are already aware that air quality is bad—but for all the people who are affected by bad RTA decisions.

It is the exactly same principle that applied with that poor little girl who was killed at Bulli, because the RTA did not deem it necessary to put in a school crossing because a fatality had not occurred. We are saying that this is a disaster waiting to happen. Just like the Staysafe committee showed last week, when there were hundreds of P and Cs. When my kids were at primary school, their P and C was certainly one of them that would write to the RTA and say, "Please can you take some preventative action. We know it is unsafe." The answer would come back, "I'm sorry, but it is not high enough on the priority list."

I will come back to the emails. When the letter was written to justify the employment of Arnold Dix by Jay Stricker, the advice that went to the Minister for Roads was that, "Mr Arnold Dix, a Melbourne barrister, is proposed as facilitator at the workshop and to prepare a report on the workshop. Mr Dix's resume is attachment B. Mr Dix incorporates scientific expertise in his legal practice and has represented community and environmental groups during his career. The appointment of an interstate person as facilitator is seen as preferable to that of a Sydney person who has been exposed to the public debate on this issue." She goes on to say, "Mr Arnold Dix will meet with each of the speakers prior to the workshop to ensure that they have sufficient and appropriate information about the Sydney projects and to fully participate in the workshop."

Indeed he did, he met with every international expert at a cost to the taxpayer of $10,000. At a time when international communications happen in a matter of seconds, for some reason it was necessary for him to fly overseas, meet with each person, find out what their views were and hand deliver them a CD. At the time we were so incensed that we refused to meet with him, but the cross-city people—who were a bit more wide-eyed and naïve, as we were four years ago—thought that they would to talk to him. I will quote from a letter written by Lalita Lakshmi who is a community development worker and a representative of the cross-city group. She said:

> When we met with him we expressed our concerns regarding Mr Dix's ability to impartially facilitate this workshop. He repeatedly said he could not recall what he had written in the report,—

this is the international perspective's report that I quoted from earlier. This was in May, about a report he had written in November—

> … had not kept a copy of it, nor was he aware of the critique of the report by RAPS. Mr Dix did not agree that it could be seen as a conflict of interest to facilitate the workshop, given that he had written the report …

The letter goes on to say that they pointed out to him that he had omitted to reveal in his CV any mention of the fact that he had written the report for the Roads and Traffic Authority; or that he had represented TransUrban at the Administrative Appeals Tribunal in Melbourne, and was that not another potential conflict of interest?

> ….When we recommended to him that the information should be included, he said it was not relevant information.
>
> During the meeting Mr Dix continually voiced his belief that he was coming from Melbourne without any knowledge of the politics of the situation here. We feel it was highly unlikely that a man with his credentials would not see the conflict of interest posed by his appointment as a facilitator. We were also concerned that, as he stated he was not aware of Sydney issues and given his previously indicated poor memory, he did not make any notes during our three-hour meeting…

My understanding is that he did not make notes of any of the meetings with the international experts, either. Then we come to the actual letters that went out to people when they were invited.

The Hon. R. D. DYER: Pardon me, Ms Mawer. Mr Chairman, I am sorry to interrupt but I seek some guidance and clarity regarding this matter. The Committee was due to commence this hearing at 9.00 a. m. We in fact commenced at 9.20 a.m., despite the fact that four Committee members were in their places, ready and waiting to hear evidence. We have a substantial list of witnesses to hear from this morning—four additional sets of witnesses, concluding at 1.00 p.m. At this point we have been hearing oral presentations for 40 minutes and we have one half an hour to go for the questioning period. Could I have any indication as to when the present speaker, Ms Mawer, anticipates concluding, because we are going to have a severe time problem later on unless we can keep within the allotted times.

CHAIR: I suggest that we eliminate the 10-minute break. In that way we can claw back 10 minutes. However, the witness should be aware that both Government and Opposition members of the Committee will no doubt want to ask a number of questions. That will take the best part of 15 or 20 minutes. Please be aware of that.

Ms MAWER: Could I speak for another two minutes? All I was trying to illustrate was that what we were told and what was happening within the walls of the RTA were very different things. Certainly, the advice that went to the Minister did not in any way reflect the process that was happening. As a community we found ourselves in the invidious position of having to decide whether or not to get involved in this process. What could we do to actually try to work with the Government for a solution that will work for us? I went into so much detail because, when you read the findings of the workshop it is important to read them in that context. We think it is absolutely remarkable that the international experts, who were hand-picked by the RTA, made the comments that they did. Every one of them said they would not put a stack in the valley. It was obvious that politics interfered with engineering on this issue and the people have been sold short.

Mr Forward spoke quite favourably of the Bongiorno report. It is important to remember that the Bongiorno report, by its own admission, was neither technical nor comprehensive. He did not even go to Japan, which is the other major country using filtration equipment. Mr Dix recommended that, immediately, information should be sought from the Japanese authorities. Here we are, nine months later, and it has not happened. It has not happened, even though not only was it recommended by Mr Dix, but it was also recommended later in the Connell Wagner report, which was supposed to be a review of international practice. All it did was highlight the fact that there was a handful of tunnels that would have had filtration installed for environmental reasons, three of them in Japan. Still, no-one has bothered to write to Japan.

We note the fact that that has not happened and that, in approving the project, the Department of Urban Affairs and Planning [DUAP] stated the fact that the report seemed to be a regurgitation of previous reports and that, really, someone should talk to Japan at some time, but as long as the RTA did it in the July 2001 report, that would be acceptable. A little bit late, because by then the stack may well be up and running. The Bongiorno report, for some strange reason, also did not take into account a lot of fairly damning criticism of the stacks down there. For example, Dr Graeme Lorimer, who was the designer of the modelling that was used for the Burnley tunnel, came out and said:

> …Our assessment of the risk posed by tunnel emissions must be based on the best information at hand. The best indications are that the people that the people regularly exposed in close proximity to the Burnley vent stack, the emissions from the stack are not merely a tiny increment on a much larger background problem, but a substantial incremental risk on an already significant problem. On that basis the expected efficiency of electrostatic precipitators could definitely make a material difference to air quality in the vicinity of the Burnley vent stack….

Mr CURRAN: Because of the time constraints that I seek leave to have the documents tabled so that the Committee will have the advantage of having the documents available.

Documents tabled.

Mrs ROSSI: I would like to make a brief statement. There are three main points that I would like to talk to. The Department of Health, we believe, has been negligent in its duty of care to the people of the Wolli Creek valley. I will clarify some points from the evidence presented on Tuesday that will support that assertion. We believe that political involvement has compromised the achievement of environmental and health goals, and that in fact a lot of those decisions were very much based on inaccurate and misleading information from the RTA. The recommendations of the 1999 parliamentary inquiry offered a lifeline to the residents of the valley. It was quite obvious at that stage that there was a major problem with this stack, with its siting, and the work of the different departments, where often times the left-hand did not know what the right hand was doing.

Alarm bells should have been ringing at the very beginning when the single stack was first proposed, and I believe they were. Previously, in 1994, the RTA had suggested or proposed two options for this tunnel through the Wolli Creek valley. This was to be under the road reservation. One tunnel was to have a stack on high ground. That was to be at the Hartill-Law Avenue car park in Earlwood. Then, when they proposed an additional length to the roadway that would make it perhaps

4.1 kilometres long, they would have a stack sited near Henderson Street, Turrella. That stack would be 35 metres high. Interestingly, when they did the air quality study and combined the background levels of something like the particulate matter [PM] 10s with what they expected to come out of that stack, which was basically operating to eject the emissions for just two kilometres of roadway, they had a contribution of 54 or higher micrograms per cubic metre.

That was the 24-hour average. That was the contribution to the local airshed. Three years later, when we have another proposal for a stack for a roadway that was double the length—the single stack is now in the valley. Previously it was going to be two stacks, one on high ground and one in the valley—suddenly we have more stringent air quality controls, and the previous figures for the single stack would already have been outside of the controls and the goals be applied to the new stack. Alarm bells must have been ringing in the ears of the RTA people. They knew. They knew from the earlier assessments that they would have difficulty meeting the air quality goals and standards.

Might I suggest that that is why the health department was kept out of the very early deliberations, before approval—any deliberations to do with the single stack proposal. I will clarify now some points raised in Tuesday's evidence that was presented by health department officials. When Mr Jones asked Dr Vicki Sheppeard what involvement the Department of Health has in assessing the air quality impacts of the M5 East stack before the roadway's approval, she chose her words very carefully. I will read from the transcript. She answered:

> The representative of the environmental health branch reviewed the impact statements from the M5 East—

I do not question that. They had. They had actually reviewed the tunnel propose all when you had the three stacks on high ground—

> … and provided the advice to the RTA and DUAP about the implications of the roadway.

no doubt when they had three stacks and there was an EIS—

> This included a device as to the emerging NEPM [national environment protection measures]goals

Well, we do have evidence that they did mention that, and that was in the time before approval. There was a meeting between DUAP officers and health officials. At that meeting representatives of the health department questioned the appropriateness of the goals and standards being applied to the single stack proposal. We also had the officer from the Department of Urban Affairs and Planning making notations in the minutes of the meeting that the RTA informed her that, due to ministerial directives, there were to be no documents to deal with the post-exhibition changes released to government departments and agencies.

Basically what this DUAP official was saying, and I have that document here to table, is that the Minister, having been warned by the RTA that it may have difficulty achieving air quality standards, was saying, "Be careful. We are not to leave documentation available for these government departments to work on." That is confirmed by the documents from the department of health. They did not give any written advice to the RTA or to DUAP before approval of a single stack proposal and that roadway; they only offered verbal advice.

The first involvement of the Department of Health in terms of assessing the air quality impacts came in January or February 1998. The approval was granted in December 1997. We are now working on a proposal that has already been approved. Where does that leave the Department of Health? Basically, it seems that the RTA did not, at the time when the alarm bells were ringing, convey to the Minister the correct advice. That was the time when they were instructed to go and seek out the best practices in international tunnel ventilation. One of the comments in the very first report of the first parliamentary inquiry says that that it is at that point that that the RTA did not do its job. That is when it did the desk top search to find out just what treatment systems were available.

There is no evidence that it contacted manufacturers or that it did a thorough investigation of what the options were to protect the health of the residents. If I go further, to the advice that was offered on Tuesday, we have the health department speaking about a submission to the first parliamentary inquiry in November 1999. A document was tabled, I believe on Tuesday, which notes that representations were made to the health department, one asking for a health risk assessment to be

made so that the residents of the Wolli Creek valley would have some indication of the impacts of these emissions on their health. A fax was also sent to the health department, as well as a phone call, asking that they be involved in supplying in a formal submission to that parliamentary inquiry.

The response by phone was that it would be a political decision; yes, the issue of a health risk assessment had in fact been taken up with the Minister and there was not going to be one and that in fact, yes, the issue about having a submission to the parliamentary inquiry would be raised with the Minister, but it would be a political decision as to whether a submission was made. I gather that none was ever received.

I will finish by quickly saying it seems that the people who were in a position actually to say to the Ministers, "We do have a problem. Let's get the best solution" were the ones who chose at that time to instead just dig in and go with the way they had done things in the past. They have not advised the Minister well and they have caused a lot of public servants to be placed in the invidious position of supporting and actively complying and colluding to have a proposal go through that many of them may well not support.

CHAIR: Today being World Asthma Day, can anyone tell me what proportion of children and adults in your area have asthma now, and what has been the trend in the last 20 years?

Ms MAWER: Perhaps as a parent of an asthmatic I can reply that we do not really know. But all I can say is that just about every second or third house has somebody who has some sort of respiratory problem. My understanding is that one in three children in Sydney have asthma at the moment. Amongst our group that meets every Tuesday I would say there are about three or four families who have asthma.

CHAIR: Obviously, it would be anecdotal, but in the last 20 or 30 years are you aware of what the trend has been?

Ms MAWER: In the local area?

CHAIR: In your local area?

Ms MAWER: I do not think it is getting better. With air quality, especially from the airport and urban consolidation, we have more traffic going through our streets. It is certainly not getting better.

Mrs ROSSI: It is in fact something the health department could have identified through studies, but have chosen to not do. Given this proposal, I would have thought they were negligent in their duty that they have not proceeded with a proposal such as that. I am sorry, I had finished the submission, but this is relevant to your question. This morning there has been a lot of publicity about a court action and the success of a woman, a barmaid in a club in Port Kembla. She has won an action because she has contracted lung cancer as a result of passive smoking. I would like to know why the health department has not investigated the equivalent impact on individuals of diesel emissions and the contributions from the general air quality in the airshed, what they are in terms of, say, passive smoking. We know we have no smoking legislation in New South Wales. I know that there is thinking that perhaps diesel emissions have 30 times the toxicity of cigarette smoke and particulates from cigarette smoke. Has the New South Wales Government Department of Health done any study into that?

CHAIR: It occurred to me this morning talking to a colleague of mind that there may well be a class action against either car or diesel vehicle manufacturers or the RTA from parents in Sydney on the question of asthma in children.

The Hon. R. D. DYER: I would like to put to you, largely for reasons of fairness, some matters raised during the Committee hearing two days ago. When Mr Forward, the chief witness for the RTA, was asked by me:

> Do you believe the M5 East in operation will meet the air quality goals set by the regulatory authority?

He responded in part:

> If you look at the modelling that was done on the Eastern Distributor and the Harbour Tunnel and the similar modelling that was done on the Domain tunnel in Melbourne and the Burnley tunnel, you will see that they clearly all meet their goals. The modelling is done on a very conservative basis—in other words, looking at a worst-case scenario—and in all of those cases the air quality is much better than in the modelling.

I then asked him:

> Are the goals that have been set strict enough? How do they compare with the air quality goals in other jurisdictions?

He responded in part:

> My understanding is that they are very strict—some of the strictest in the world. They are based on World Health Organisation standards and not only have been set by the EPA but are part of an Australian standard.

Could I have your response?

Mr CURRAN: There are a number of parts in that question. One of the things I attempted to point out to you was that as far as the community is concerned, we do not accept that those are appropriate goals. It is true to say that those other tunnels have apparently complied with at least some of their goals. However, one of the things Mr Dix actually got right and made very strongly, he said, "This tunnel and this ventilation system can be distinguished from any other in the world." This was what I thought was the point and the gist of what Dr Manins told us on Tuesday afternoon when he showed us the difficulty that they had with the modelling of that particular set of circumstances, that particular problem in the Sydney air shed stuck in the bottom of the valley; the techniques that might be appropriate for relatively flat, as the Melbourne ones. I drove down to Melbourne, I had a look at them. It is pretty flat. I know where the Sydney Harbour Tunnel is. It is very open. It is completely different from our one and this is the basis of the problem. It might work and the simple algorithms they use to do these predictions work real well on open flat fields, but not in valleys. That was what Dr Manins was telling us and I believe that is what Dr Best will tell you later in the day. You might like to ask him the same question when he is finished because he could answer it more expertly than I.

The Hon. R. D. DYER: I put another matter to you. I asked Mr Woodward, who appeared on behalf of the Environment Protection Authority [EPA]:

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

Mr Woodward responded, again in part:

> The Sydney Harbour Tunnel has been in operation now since the early 1990s and during that entire period to our knowledge there has only been one exceedence of the goal,

He went on to say:

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

Could you comment?

Mr CURRAN: I will deal with some of the more technical aspects of that. I do not believe the Sydney Harbour Tunnel has a goal for PM10s. It has a goal for carbon monoxide and that is what happens inside, and I believe that was what he was referring to. The goal is an internal goal and that is easily coped with by racking up the fans. The exceedence that he referred to was an exceedence inside the tunnel. I actually have the printout of how it happened when the traffic stopped. Presumably that is what he is talking about. I do not believe there is any goal for PM10s. That is what we are talking about. Also, the Sydney Harbour Tunnel the last time I looked at it did not carry almost 20 per cent of diesel vehicles including heavy semitrailers. I do not see a lot of heavy semitrailers going across there. This is a different tunnel with a different vehicle load, different length and all of these things. The Eastern Distributor does not carry a heavy load of these great enormous double semitrailers that you see going along Forest Road. That is going to be what is going in the tunnel. It is completely different.

Mrs ROSSI: Could I raise a couple of issues? We have always said as well that each tunnel is individual and you have to look at whatever the combination is of factors appropriate to that tunnel. We know in the instance of the Sydney Harbour Tunnel that it is perhaps 2½ kilometres long as well as having a different vehicle fleet. Dr Andrew Wilson told us on Tuesday that there have been no studies of the impact of the emissions from that tunnel and that single stack on the residents who are around that area. No studies have been done by the health department. Any assertions as to meeting the goals is based on in-tunnel goals as well. We also believe that there was a conference convened in 1996. New South Wales Health and New South Wales EPA were both there. We have not been able to find anyone who is able to give us papers that were presented at that conference on the emissions from the stack of the Sydney Harbour Tunnel. We cannot find a copy in the State Library, which is meant to have a copy of all the papers of those proceedings. I think it could be worth the Committee's while to actually request a copy of the actual paper on the emissions from the Sydney Harbour Tunnel because it is mighty difficult to ever get a copy of that report, yet it was presented at a professional conference. Another point, with the Eastern Distributor, it is running well below its capacity. When the M5 East tunnel is completed, a lot of the traffic that is flowing from the M5 East through General Holmes Drive is then meant to come through on the Eastern Distributor. So, those stacks at the moment are not the coping with the total capacity for emissions.

The Hon. R. D. DYER: I shall put one other matter to you. My colleague the Hon. J. R. Johnson will ask you some other questions on behalf of the Government a little later. I am dealing now with the evidence of Dr Manins, Chief Research Scientist for the CSIRO. My colleague the Hon. M. I. Jones asked him:

> At this stage the whole report is revolving around whether we should or should not introduce electrostatic precipitators into the stack. In your opinion should we introduce this equipment into the stack?

Dr Manins replied in part:

> I feel that treatment of the emissions, the particle emissions, is feasible, but that it is rather poor value scientifically because of the local contribution to ambient levels from the stack, but it is feasible.

I then asked him:

> Why do you say it is poor value scientifically?

He responded in part:

> Because of the low contribution of the stack for the vast majority of the time to the ambient PM concentrations, you have this precipitator running all the time, absorbing an enormous amount of electricity, along with the humungously large electricity demand for the fans to get the pollutants up the stack, all of the time.

Could I have your response?

Mr CURRAN: Yes. We were disappointed in the way in which he put that. It does not address the point I tried to make earlier, and Dr Manins did the same sort of assumption that the rest of the experts have done, that the goals were appropriate. So far as I am concerned, something that increases an impact by 5 per cent or 10 per cent is significant. We all complain bitterly when our taxes go up by 5 per cent. So, we are complaining if our pollution goes up by 5 per cent or 10 per cent when it is avoidable. The other thing about the energy costs, he said two interesting terms and now we will be able to define those. He said "enormous" for the cost of the electrostatic precipitator, and it would be if you are paying it out of your own pocket, and I believe he said it was "humungous" for the cost of running the tunnel. I can now define those for you. Enormous is about one to 1½ gigawatt hours per year, which is the maximum amount of energy electrostatic precipitators would use. "Humungous" is actually 32½ gigawatt hours per year because that is what the tunnel ventilation system will actually consume. Now, 32½ gigawatt hours per year is 32,000 tonnes of greenhouse gas. It is nearly $3 million. We believe that by the proper use of precipitators, working on overseas experience, if you went back and designed it from the beginning, you could reduce that 32½ gigawatt hours per year to about five, including the cost to run the precipitators. This is what the Japanese tell us. And even now there are options which could significantly reduce that enormous energy cost. It absolutely amazes us that the Government is not worried about a project where its running costs are going to be $3 million when they could be $500,000.

Ms MAWER: That answer was within the context that it was inevitable that there were going to be exceedences; exceedences will occur. The pollution coming out of the stack will lead to at least a 1 per cent increase in deaths in the valley and in surrounding valleys up to a 5 kilometre grid. That is also the cost of the present system. While he was saying it might have poor scientific value, he was putting that in the context of a very poor value project design that put one huge stack in a valley when three stacks on hills would have been much better. He did say that and he also said that the other solution would have been to put two stacks at either end of the tunnel, do away with the stack at all at Turella.

I have not got the transcript but I remember him saying that we would have paid for it by the savings in energy that might come about. We need to look at it in terms of what we need to fix up a botchy design.

The Hon. M. I. JONES: Mr Curran, I seek your comments on a dialogue which took place on Tuesday afternoon between the Chair and Dr Manins from the CSIRO. This discussion occurred:

> **CHAIR:** Could you tell us whether the air that comes out of the vent is of similar composition to the ambient air? Is it a similar percentage of nitrogen dioxide, nitrogen oxide, carbon monoxide and so on? How does it do that from the ambient air?
>
> **Dr MANINS:** It has lower concentrations of ozone or it has no concentration of ozone. The ambient air has a concentrated ozone but the vent air has not, that is one thing.
>
> **CHAIR:** What about oxygen, for example?
>
> **Dr MANINS:** The oxygen is a little bit depleted, probably 1 per cent or less depleted, because of the combustion of motor vehicles in the tunnel.
>
> **CHAIR:** Benzene?
>
> **Dr MANINS:** The ratios would be similar because ambient air in the region is greatly affected by motor vehicles and it is the same benzene coming out of motor vehicles, whether they are in the tunnel or not, that is not much different.
>
> **CHAIR:** The composition is just about the same?
>
> **Dr MANINS:** The toxic air pollutants and for the criteria pollutants, such as particles and nitrogen dioxides, the ratio at about the same, yes.
>
> **CHAIR:** There is no sort of fingerprint for the air coming out of the vent?
>
> **Dr MANINS:** There is not an obvious fingerprint, exceeding speeds and wind direction—

That is why I mentioned that earlier. Would you comment on that?

Mr CURRAN: I think that you are reading that by saying that the quantities are the same. What you were asking was the composition, and as a scientist he answered as I would have as a scientist, that the composition is similar. In other words the proportions are similar. There was a slight increase in carbon monoxide, a slight decrease in oxygen and things like that in proportions, but he was not asked about the concentration of that which is enormously greater. I am trying to find an analogy but I can not find a good one. It is almost like if red wine is put in water, the concentration is going to change but all of those components are still there. It is more concentrated in the wine glass than it is diluted in the water.

I have been told that there is actually a way of telling between the contributions from wood fires to petrol smoke and that is quite interesting because if you look at the proportion of carbon 14, if the major proportion comes from wood smoke then it will contain a higher proportion of carbon 14 than of course oil which contains no carbon 14 because it has all broken down in the enormous time that the oil was under the ground. So it is possible to fraction it that way but this is getting into very arcane sort of things. He is talking about proportions of what actually comes out of the tunnel. Of course, the amount of air stays the same but the pollutants that are in it enormously increase—the concentration of the pollutants are the same but the ratio of, say, particulate matters to nitrogen oxide and things like that as they come out will remain the constant. As soon as they come out the nitrogen oxide starts to change. That was the gist of what he was saying about the ozone. There is no ozone there, although ozone may have gone into the tunnel, any ozone that went in immediately—I am getting too technical. I am sorry.

The Hon. M. I. JONES: No, please continue because we will analyse the transcript after the hearing.

Mr CURRAN: I am not an expert but I am getting pretty good at air quality, but my understanding is this: Oxides of nitrogen are a major concern but the thing that is harmful is nitrogen dioxide which is one of the many oxides of nitrogen. What comes out of a vehicle, as it comes out of a vehicle, is almost all oxides of nitrogen, not nitrogen dioxide. NO is actually the formula for most of it. That will react with ozone in the air to form nitrogen dioxide. Any ozone that was in the tunnel has immediately combined with the oxide of nitrogen and has disappeared. So ozone is not in tunnel exhaust and is not a problem. When the tunnel exhaust comes out on the actual stack then the oxides of nitrogen will then start to combine with any ozone that is present in the air which is diluting it. What is formed then is nitrogen dioxide. Actually a lot of what impacts on people is the nitrogen dioxide that is formed in that time when it is moving from the top of the stack to the recipient. That is a very simple explanation of what actually happens. I am completely incapable of giving a full exposition. There is this complicated relationship between oxides of nitrogen, ozone and benzene but we have real experts that you can ask later on.

The Hon. J. F. RYAN: Mrs Rossi mentioned that there was a document she wanted to table. Have you tabled that document? They are in addition to the ones tabled by Ms Mawer.

Mrs ROSSI: The minutes of a meeting between DUAP in some of the other agencies was tabled on Tuesday.

The Hon. J. F. RYAN: It is the one to which you referred that said that people had been instructed—

Mrs ROSSI: Yes, the ministerial directive.

The Hon. J. F. RYAN: That needs to be tabled during the formal hearing.

The Hon. J. F. RYAN: I was not here earlier today but I do not think anybody has discussed the Flagstaff report which the RTA said was a definitive contribution in terms of how much this would cost. I notice in it that $10 million relates to cabling. There seems to be a fair level of agreement between your suggestion and their suggestion about the costs of the actual electrostatic precipitators. Would you comment because cost is relevant? Has the Flagstaff report accurately assessed the cost of electrostatic precipitators?

Mr CURRAN: We do not believe it has even gone close to it. You will be able to ask the two technical experts who will appear later on about that. When I looked at the designs and things they had drawn up and I compared them with designs that I knew overseas that were actually working, they were enormously bigger and enormously more complex. In the actual listing of the price components there were things included in fact that I knew were actually included in the price that had been quoted from CTA which is where they supposedly got the figures. I knew that things like the waste water treatment or things like that were actually included in that $8 million price that Mr Anderl quoted. He will be able to confirm this later on. This was the basis upon which I said that this thing is much too big. It is bigger than anything that I can find any information about. The drawing with little men walking around the gantries and things like that is bizarre.

The Hon. J. F. RYAN: The Flagstaff report states:

> It is relevant to note that the M5 East requirement is for an 850 cubic metre per second system which is three times the size of the Chimbu system—

I think that is the one in Korea—

> and 4.7 times the size of the Laerdal tunnel system. As such the M5 East installation represents a very significant increase in the scale and associated infrastructure compared to the largest installed current systems.

Mr CURRAN: That is absolute nonsense when you look at the Japanese tunnel's layout treating more than 1,000 cubic metres per second. They may split them up into bits. There is a 4½

kilometre tunnel in Norway, which has four cleaning stations along, which would total nearly 1,000 cubic metres per second. The design is just wrong and it is based on the wrong basis. However, you will have the experts here later on who can clarify this for you. The Tenozan tunnel has about 1,200 cubic metres per second that it is treating. (*actually the total volume treated is 630m^3/s eastbound and 1643 m^3/s westbound)*

The Hon. J. F. RYAN: To the best of my knowledge we have not heard from you about the property value guarantee.

The Hon. R. D. DYER: Quite a bit was said concerning property guarantee by Mrs Mawer in particular.

The Hon. J. F. RYAN: I apologise. I arrived late. I will examine the transcript. The stack has been constructed so no stack does not appear to be an option.

Mr ROSSI: Why not?

The Hon. J. F. RYAN: Simply because it is in existence.

Mr ROSSI: It was an option three years ago.

The Hon. J. F. RYAN: I agree. Notwithstanding, in good faith I want to put a proposition on which I would appreciate your comment because it occurs to me that it might be a recommendation that this Committee might make. The property value guarantee has been estimated by the RTA to be in the order of $10 million. At least one of the manufacturers has suggested that electrostatic precipitators can be installed into the stack or the tunnel in some way in the order of $10 million as well. Given that the property value guarantee was given as an act of goodwill by the Government—whilst I recognise that this is not an optimal suggestion by any stretch of the imagination—is there any opportunity for progress in suggesting that the residents of Turrella would willingly forgo the property value guarantee if it were to be used as an instalment to largely pay for the installation of electrostatic precipitators into the existing tunnel or stack?

Mr SIAPOS: You were not here previously but I will give a quick snapshot on our view of the property value guarantee. There was no methodology. The option to look at that we will consider. We have always said as a community what we would like to do is to find a solution to the M5 East unfiltered stack that allows us to live there. We do not want to move. We do not want to profit by taking from the Government and doing anything else. We will consider that seriously. That is why we have spent time, energy and effort in terms of coming up with at least three operational engineering solutions that the RTA would never consider in the past three or four years. We will consider that as a request. We have to take that back obviously to the people we represent in that area. It is unfortunate that we have to consider these sorts of things at the last minute when a whole value managed approach from day one in terms of the exercise would not have got us down this particular path. We will consider that and put it back to our community members on that basis because at the end of the day we are not going anywhere. We want to live there in health and safety.

Mr CURRAN: If we are to use the basic infrastructure as it stands, and not do a major reconstruction, you would still have the problem of nitrogen dioxide and that would preclude any simple solution of blowing at the end of the tunnel, the so-called portal emissions. I believe that is not an option. I believe we would probably be able to develop a solution which did show an energy saving and still cope with the nitrogen dioxide, but we would require a lot of technical help and a creative approach. It is not really our job to do that.

The Hon. J. F. RYAN: I recognise the solution that I have suggested does nothing about nitrogen dioxide, but I thought that the CSIRO might have provided a proposition. However, it would be nice to get some assurance from the RTA that the fans would be kept at a level to ensure that nitrogen dioxide at night-time was dispersed.

Mr CURRAN: Yes.

Mr SIAPOS: We are always keen.

Mr CURRAN: We have written to the RTA asking them to commit themselves to do that. We were told it was a complex question and they would have to examine the implications on the wear of the fans and the running expenses of the fans. This is in a letter from Reba Meagher and it is in our submission.

CHAIR: I seek a motion from a Committee member to allow video recording of the proceedings.

The Hon. J. F. RYAN: I so move.

CHAIR: I advise RAPS that they need to consult with the Committee clerk for details of the broadcasting and advice about the proposed use of the recording.

The Hon. J. H. JOBLING: I was going to deal with the question of the Hon. J. F. Ryan in more detail but the witnesses have indicated that they are quite prepared to deal with it. I would like to put on the record that I understand there are 270 potential properties within the 400-metre zone. If one was to do an economical calculation of the value of the properties at about $500,000 each—and in today's market that is extraordinarily low—you get the figure of $135 million. If the Government bought them and resold them, even if they only dropped $100,000, that is some $27 million. Therefore, the prospect of $10 million from the property buyback, if it was accepted, plus what they are likely to have to pay, which they have not budgeted, would be more than well recovered in getting some filtration into the stack.

The Hon. R. D. DYER: Are you aware of any system in full operation today that uses ESPs to improve air quality outside a road tunnel?

Mr CURRAN: Yes.

The Hon. R. D. DYER: Is this system operational at present? If not, why not? Are you aware of any data being made available by Norway regarding the effectiveness of the system?

Mr CURRAN: Yes, I am. The Tenozan tunnel in Japan was, I believe, specifically designed so as to protect the area immediately around it. There was a national shrine near to it. This is the place the RTA has never gone to. There is no mention of the Japanese tunnels at all and they, of course, started them and they have the biggest number of them, so it is rather strange that we do not have any information about them. There was one other.

The Hon. R. D. DYER: You say there was one other. What are you referring to?

Mr CURRAN: There was one other in Japan—I cannot remember the name of it at that moment—that was specifically done for environmental protection. The initial installation into the Oslo tunnel was specifically for environmental protection. There is a real obfuscation, is the best word I can put, towards the way in which the RTA presents this tunnel. The reason why you ventilate a tunnel is that largely so you can see through it. All ventilation in modern day is so that you can see. If you do not ventilate it, you cannot see through it and, of course, you will actually die from carbon monoxide too, unless you are very quick.

All ventilation is for visibility purposes. I am told by the experts that the thing that actually determines the rate of the ventilation system, the number of cubic metres per second in the tunnel, the M5 East, will be determined by the visibility problem. It is not carbon monoxide or anything like that; it is the visibility problem so that you can maintain that 300 or 400 metres of visibility that you require.

You have electrostatic precipitator technologies being used to cope with this visibility problem, yes, but the reason why they use them is because the communities under which they go—and I believe this is the case in Norway—have refused to accept ventilation stacks and emissions, so that is a given. You start out at that point. I have to build a tunnel but I cannot put a stack in it. Yes, technically the electrostatic precipitators are used for visibility problems but you could not build the tunnel unless you did it that way.

Basically, the whole driving force behind it is because you have to protect the outside atmosphere. Few people would say, except in those special cases, that the only reason they are using this technology is because they are going to protect the environment. An intelligent engineer says, "I have to protect the environment so I have to use this sort of thing. Let's see how I can use it economically and if I am clever I can start saving myself money by doing it the right way, by progressively filtering it along the tunnel." The Japanese drawings and diagrams give you a graph of the visibility. The concentration goes up, it comes to the cleaning station and drops down, goes up and comes down. They are maintaining along the tunnel the appropriate visibility conditions without having to introduce any extra air. It is moving the air that costs the money.

The Hon. R. D. DYER: What has been RAPS' main source of information on the use of electrostatic precipitators? What documentation do you have to support your quotes about the cost of installing an ESP?

Mr CURRAN: We have got information from where ever we have been able. We started off by getting information from people involved with the Melbourne tunnel. We then searched the Internet. We then got in contact with Mr O'Dell from CTA and he provided us with a considerable amount of information. We then realised there were other tunnel systems that were working. We have seen the papers but we could not actually get much information from them. We had great difficulty getting information. Some of the information has actually come from the RTA. I do not know exactly how it arrived but it was in an RTA document. This was about some of the Japanese tunnels, and also from DUAP. DUAP wrote a very good report on this and it is in the document. DUAP did an excellent report on the availability of the technologies, so actually a lot of the initial information came from DUAP.

Mrs ROSSI: That was in 1996. If only someone had listened.

The Hon. R. D. DYER: What documentation do you have to support your statement about the cost of it?

Mr CURRAN: We actually tabled a whole raft of documents at the last inquiry that related directly to that. I gave you the complete record of all of the emails that I had exchanged with CTA. You have them. I have seen them reproduced in places that were completely inappropriate and out of context from the RTA but I will not go into that because I cannot remember exactly when I could lay my hand on it, but it certainly did happen.

Mr ROSSI: You can take proceedings.

Mr CURRAN: Yes, we could, but I do not think it is appropriate to do that. We have got what ever information we could and we have had an assiduous search. We do not want to be seen and we are not to be seen as being associated with any particular manufacturer. This is why we introduced the Wandlung system. We became aware of it and it looked liked it might work so we said, "Go and talk to him." We found the Karl Dickels system, we contacted them, got as much information as we could from them and said, "Here is another one you should be looking at." Does that answer your question?

The Hon. R. D. DYER: I am not asking about methodology. I am asking about cost.

Mr CURRAN: The cost was mainly from CTA because the RTA appears to have identified the CTA as their preferred supplier.

Mr ROSSI: Your key recommendation in the first inquiry was for somebody to do that and that is the one that was not done. You would have all the figures on the table if that recommendation had been done properly, to get it from the people who actually manufacture it, to give you what guarantees their systems work to and what it would cost directly.

Ms MAWER: With regard to the Connell Wagner report that the Hon. J. F. Ryan referred to, $10,000 was paid to produce 10 pages, but I continue to stress the fact that no-one has sought information from particular companies and while there may be a handful of tunnels where a filtration

has been put in for environmental reasons because of unique conditions and circumstances that needed the installation of these things, the RTA commissioned report has not sought that information. All it does is identify the fact that it exists, and that is it.

Mr CURRAN: Remember Mr Dix identified that this tunnel and this ventilation system could be distinguished from any other in the world. This is one of the most special situations you could ever come across.

The Hon. J. F. RYAN: Many of the other witnesses in this inquiry are public servants or people who have a commercial reason for giving evidence. What is special about this particular group of people is that they are volunteers. I am sure that regardless of what opinion members might have about their submission, we have to at least acknowledge the sterling efforts they have made it as lay people and volunteers.

Mr BRIERS: Thank you for your comments; they are much appreciated. These people work very hard and I assure you that whatever the outcome, we are not going away. We will be back.

Ms MAWER: We would like the problem to go away.

(The witnesses withdrew)

PETER RICHARD BEST, Environmental Scientist, Toowong Towers, Toowong, Brisbane, sworn and examined:

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

Dr BEST: I am appearing on behalf of the group Residents Against Polluting Stacks.

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

Dr BEST: Yes, I did.

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

Dr BEST: Yes, I am.

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

Dr BEST: I would like to show some slides.

CHAIR: If you decide to give in camera evidence the Parliament may override that decision and make your evidence public.

Dr BEST: It is a pleasure to be here this afternoon. Because my submission is fairly lengthy and technical I have prepared an executive summary, which is a few paragraphs, which I would like to submit for your consideration.

CHAIR: Would you like formally to tender your submission and the executive summary?

Dr BEST: I formally tender my report and the executive summary. My full report tries to address some background information, which I thought would be useful to the Committee in relation to the impact of such stacks. My report also tries to address the terms of reference for the submission. I would like, through my brief statement and presentation today, to summarise some of those points and perhaps talk a little more generally. I am particularly interested in the local air quality aspects of the M5 East ventilation stack.

I, like Dr Manins, am very much an air pollution modeller, who looks at evaluating impacts. The first thing that is obvious when you look at this installation is that it has some peculiar characteristics which have been referred to by other speakers. From my viewpoint the stack's emission of traffic pollutants is a significant source of nitrogen oxides, particulates and other compounds. It is significant both from a local point of view, from what I have seen of the local area, and also from the point of view of the Sydney region. We are talking about a nitrogen oxide emission rate of the order of a maximum of 35 grams per second, which certainly puts it up into the top echelons of sources in Australian urban areas. It is nowhere near as big as major power stations but for urban areas it is certainly a significant source.

The second thing to note is that having a single source rather than a multiple source is likely to lead to poor air quality. I would like to expand a little on that as I go along. My third point is that this stack is not in isolation. It is in an area which is very much a residential area and which has some industries. It is close to major airports. It is not that far from a major industrial area and it is actually embedded within larger urban areas. So being able to isolate local air quality is likely to be difficult. It will be difficult to ascribe what is happening at that location to different sources either locally in the wider subregional area or in the overall Sydney airshed.

My fourth general point is that forecasting future air quality is quite complicated because of the variety of sources that we have. As time goes on vehicle emissions per vehicle will decrease, but I

think the experience in the Australian airshed is that that is usually counterbalanced or outweighed by the increase in vehicle usage. So we do not really see on an overall airshed basis that airshed emissions rates are going down. Another point is that it is difficult for us to look five years ahead and to say what the impact might be of, for instance, emissions coming from the greater use of local airports. There might be other industrial sources that come into the region which have to be included. I mention this because it will have an impact on your philosophy when you try to judge air quality as forecast against given health goals.

It is common practice in other locations that rather than allowing emissions to produce an impact which goes right up to an air quality goal it is usual to leave some sort of safety factor to allow for future changes in the area. Finally, I note in some of the correspondence and reports that local air quality management plans and looking at retrofitting equipment depend upon trying to find exactly what the stack contribution is. This is mentioned in this project and it is mentioned also in the Bongiorno inquiry. I liken that to looking for a needle in a haystack. It is a difficult thing to do. It is a complex thing to do from a technical viewpoint. It requires quite an extensive monitoring network and an appreciation of the local meteorology.

We have a stack in quite a narrow valley. What wind you measure 10 metres above the ground on the hillside—which is where one of the monitoring sites is—may not give you any indication as to what is happening at the top of the stack. Looking at local air quality, we do not have any similar sources so it is a case of using the best modelling tools that we can to be able to model the impact. In many ways I think the reports that I have seen have looked at local impact reaching from 300 metres onwards. I will talk a bit about local impacts, in other words, what happens within 10 stack heights of the ventilation shaft.

The model that has been used to support the project is the Industrial Source Complex model. Basically, it is 1980s or 1970s technology which has been modernised for regulatory purposes. It is not what you call a detailed model; it is a model used for screening and slightly better than screening purposes. It might not be able to deal with all the various physical processes that take place. This becomes particularly important when you get down to looking at the local impacts. When I have reviewed what is being done I have found that the model that is being used is not the latest version.

When you look at the technical manuals for that model you will find that they are likely to be inaccurate for low exit velocities—the exit velocities that are likely to occur at night-time. I believe that this has been identified by other people as well. Modelling that I have seen does not seem to have treated local conditions well. The areas close to the coast get sea breezes on frequent occasions. Sea breezes can cause poor dispersion. I refer to the influence of terrain. Terrain is dealt with in some ways but the fact that you have terrain upwind from northerly winds cannot be treated by the model that is being used.

In Sydney, as in locations in New South Wales, Queensland and Western Australian—indeed even in Victoria where the climate is not quite so nice—strong convection occurs during the day. The important thing about strong convection is that it can bring stack emissions very quickly down to the ground. So in this case you could get areas affected which might be only as far downstream as 200 or 300 metres. Convection is not dealt with properly in ISC.

So, for many reasons, the modelling is unlikely to give a good indication of local air quality impacts. The sad thing from my point of view is that there is extensive knowledge of the Sydney airshed and all sorts of studies have been carried out, but not all that knowledge seems to have been used in the assessment of this project.

There is mention in some of the correspondence about how the Bongiorno inquiry gave a tick to various assessment methods. Indeed, I think that was one of the submissions given to the Bongiorno committee in which there was this acknowledgment, "I advise that Dr Lorimer's work on this issue is important and have reproduced his entire reports as appendix G". This report has not been considered, I believe, in the assessment of this project to date. It does have some very important ramifications for what happens locally. Dr Lorimer is the author of the standard Australian regulatory tool which in many ways is an improvement on the ISC which comes from the United States. He cautions very much on the use of conventional models for near field evaluations. My emphasis here is have we actually got the near-field, that is, within two kilometres, air quality impact correct.

The problem with a vent stack is that it is actually quite a large structure itself. A vent stack of the type that I saw this morning is of the order of 8 metres by 8 metres, a pretty square building with sharp edges. What most models do not do is account properly for what is called a cavity zone, the low-pressure zone behind the stack itself. If we are not careful and if the plume has not got sufficient temperature and sufficient velocity, it is quite possible for that plume to get caught into that cavity. That cavity length is typically of the order of three to five stack heights. That can be brought down to ground and the plume can appear on the ground well before it should do and give rise to larger concentrations.

In a submission to the Bongiorno inquiry, Dr Lorimer points out the inadequacies of Ausplume and indeed those of some of the other models, including the Industrial Source Complex [ISC], for a particular situation such as a ventilation stack. He sort of recommend that the only way to deal with it is not to use models such as have been used to date or models such as the ones that Dr Manins talked about yesterday, but models which look down very much at the microscope. We are looking here at just the first 100 metres or so, downwind of the Burnley stack. In this particular case, the simulation shows that everything is going quite well. We can see that there are contours of concentrations within the plume and that the plume seems to be well projected. It is mainly reaching a height here, in this particular case, in the order of maybe 60 metres above ground level and everything is looking sweet. There are some situations that can occur, depending on the ratio of the stack exit velocity—

CHAIR: Dr Best, can we have copies of these overhead projections?

Dr BEST: Certainly. I apologise for the quality of these, by the way. I do not know whether you can see from there but this is a particular sort of case for the Burnley stack, so the wind is along the long side because it is a rectangular building rather than a square building. You can see here that what has happened is that the plume has become caught in the cavity zone directly behind the stack. The plume has been brought down to ground and the concentrations within the first 200 metres are significantly greater than what would be forecast by conventional models. My point here is that when you are getting around to looking at the very local area air quality impact, standard regulatory models do not give you a reliable result.

CHAIR: If you could superimpose the cliff in the appropriate place there, would that change that significantly?

Dr BEST: That would lead to even more of a complication. Indeed, if you really wanted us to have a look at this situation, you would put that cliff in and you would look at the flow over the hills. That could lead to some increased effects on the hillside. The other thing that you would like to do, too, is actually put the wind the other way and see what happens as the wind comes over the terrain before it hits the stack. In that case, that terrain itself can set up the same sort of cavity structure and then the dear old stack finds itself actually caught within a very turbulent zone where the plume is likely to come down to the ground very quickly. That would be for north, north-easterly, and north-westerly winds and that, again, is a situation which is just not dealt with in the standard regulatory model.

The Hon. R. D. DYER: Doctor Best, could I ask you what assumptions underlie the diagram that you are showing at the moment? Is this intended to indicate what happens on a typical day?

Dr BEST: This is using a computational fluid dynamics model, so it is something that is quite time consuming to do. The conditions that were used here were for a wind speed of 5 metres per second and a stack flow of 880 cubic metres per second, which is very similar to this particular situation, and it will be apt for the case where we actually have a neutral wind flow, so it is an atmosphere which does not have any strong thermal effects or any unstable conditions. It is very much just similar to the sort of things that you can simulate in a wind tunnel very readily.

The Hon. R. D. DYER: But you are making some hypothetical assumptions to produce this result?

Dr BEST: This is the best that you can do to actually look at the near field effects, because what you are doing here is you are taking the standard equations for fluid motion, as Dr Manins would have done yesterday. He solves his on a very large spatial scale. This is trying to look at things on a very small spatial scale. You are trying to get the turbulence as well as you possibly can which is something that none of the standard models can do. This is the numerical equivalent of a wind tunnel, but it is better. Yes, it has been set up for particular conditions. You will find other conditions where the stack tip down wash, as we call it, might be much worse than is actually shown here.

The Hon. J. R. JOHNSON: You are saying 60 metres per second?

Dr BEST: I am sorry, the volume flow for this was 880 cubic metres per second. Is that the question? It is the same flow rate as for the M5 East stack, roughly.

CHAIR: We have only 20 minutes left, so please proceed as fast as you can.

Dr BEST: That is local air quality, and local air quality might not have been dealt with very well. There are other aspects in terms of some issues that I would normally expect to see addressed which I think will be important from the local community impact point of view. There is very little mention made about odour annoyance. Briefly, odour annoyance is important because it is something which can occur on a transitory basis and can have different effects on different people. Some people are particularly sensitised to some odours because they have a particular sense of smell and a community can also have a much greater response of annoyance because of various other factors.

Studies I have undertaken elsewhere have shown that nitrogen oxide, which is a key consideration for this Committee, unlike the normal approach to it in most literature actually does have an odour and can cause significant concerns. I know of only one measurement of odour levels in a tunnel in Sydney and I have some great doubts as to whether I could put my hand on my heart and say that there will not be odour nuisance occurring for such situations as we have here.

The second factor is that ozone impacts on days with strong photochemical activity have not been looked at. Again, this is important from the health point of view. I notice from some of the correspondence in relation to the Cross-City Tunnel that the EPA has actually asked for a much better consideration of this issue. Ultra fine impacts from ultra fine particles are of particular interest because of the fact that motor vehicle emissions mostly consist of ultrafines. A huge amount of work has been done in Australia on ultrafines. In fact the main roads section of the Queensland Department of Transport has commissioned studies around roadways particularly looking at ultrafines because they can travel much further without the same dilutions that happen for other particulates.

In addition, the plume can be negatively buoyant and despite what has been said in the environmental impact study [EIS], the methods used do not treat a negatively buoyant plume. If you look in the code and in the manuals, you will see that it specifically states that it cannot deal with that. Negatively buoyant plumes can come down to ground rather than rising as normal plumes do. This can actually enhance building downwash and thereby make the local impact worse.

Finally the question that I think I dealt with before is: How relevant are one or two years' data to actually assess the future? My conclusions have been that there is significant uncertainty that has been recognised by many people in the particulate levels and the resulting exceedances of air quality goals.

The areas away from the terrain or the areas away from the identified zone, 400 metres from the stack, can be adversely affected during daytime conditions. It is not just night-time conditions that are important. I see very little detailed treatment of those local receptor groups whom one would expect to be more sensitive to air pollution, such as schools, child care centres and elderly people. It would be very nice to see an explicit treatment of what risks there are.

The health risk assessment package as originally envisaged would be very useful and not just because it is an important thing to know but also because it gets you to go back and look at all the uncertainties that there are in your assessment process so that one can very much weigh up the impacts in a much better way. You can actually look at what the impact will be on the health of a population over a whole year and not just concentrate on meeting air quality goals which are a very

specific measure. I think it would also aid in some of the deliberations we have had about what might be the best way forward with different methods of control or change in design. The monitoring of stack contribution, as a way of deciding whether you need to go ahead and put in more control equipment, I think is fraught with problems. The plume is likely to be only 150 metres wide or so by the time it gets a kilometre downwind. If you are only using three monitoring stations, you would have to wait a fair time before you can really say that you have been there enough times under the right conditions to be able to say whether there is a significant impact.

If you have anything like an urban area where you have many other sources of similar pollutants, it becomes quite difficult to determine what the stack's contribution is. I would have thought that the main thing you should be going for, if you are going to have three monitoring stations, is at least to have three monitoring stations at the other side of the stack so that you actually know what the air quality will be as it hits the stack. Even with that, I think it will be a very difficult thing to actually determine the stack's contribution. I refer you to the many judicial inquiries and court cases around the country where, when it comes around to arguing about particular episodes of air pollution, it is quite easy to burn up many, many days in court because of all the uncertainties involved. Finally, how long do you actually go on for before you have statistical evidence on the impact to be able to decide what you should do about it.

CHAIR: At this stage, we will not have any time for questions. How many more of these slides do you have?

Dr BEST: I will stop now. My summary is that I think local air quality deserves better modelling and assessment. I think that the CSIRO report identifies many other key areas deserving of attention. I do not view that report as being academic; I view it as being fundamentally important. The health risk assessment is advisable. I think there are difficulties in actually making the proposed reactive management approach a reality.

The Hon. J. R. JOHNSON: Doctor, what is your discipline?

Dr BEST: I have degrees in mathematics and physics. I was part of an old crew who actually came through environmental science before it became a discipline. I worked as an air quality scientist for an electricity commission for about eight years. I have worked as an academic. I have given courses on air pollution. I have worked as an air pollution consultant for the last 10 years. I probably assess of the order of about 250 industries.

CHAIR: In your submission on page 6 you appear to indicate that the maximum PM10 contribution will be way outside the 400 metre zone that is proposed for buying out homes. Would you care to comment on that?

Dr BEST: That was just looking at the predictions within the reports themselves where they looked at the maximum total concentration—that is, the background plus the stack contributions—and the maximum 24-hour average which is shown to occur between 1 and 1.5 kilometres to the east of the stack.

CHAIR: So the actual impact of the stack actually goes way beyond the 400 metres zone, then?

Dr BEST: Yes, it does, yes.

The Hon. J. F. RYAN: Do you have any comment to make on the monitoring procedures which have been established by the Department of Urban Affairs and Planning [DUAP] approval? The question of numeric modelling has in fact been canvassed in the Bongiorno report and also before this Committee. The answer of the Bongiorno report and others is that there is not much point worrying about what is theoretical but what we need is an accurate after-monitoring program. DUAP has in actual fact provided for additional monitoring than would otherwise have been the case. Is the monitoring that has been established around the stack going to the adequate to capture all the necessary data to ensure that we get an accurate picture of the impact of the stack?

Dr BEST: Over a long time period, it might give you a good indication if all other things remain the same. I think in terms of the short term and looking over a year period as it is at the moment, no, I do not think it will do a good job. I do not be believe that monitoring only will ever do a sufficient job. I think you have to actually use all the tools. Just because it is actually difficult to do the modelling is no reason to throw up your hands in horror. I think if you actually do some more modelling together with the monitoring and if you keep assessing things by having regular reviews, then at a given site the important processes will come out as being much better understood.

There are various things that one would like to do to find out actually what the stack's top winds are. We are looking here at a stack which is 45 metres high and we have no indication of how the surface stations will give any indication of even what the wind direction is at the stack top. So we have all those sorts of problems. I believe you had a video shown yesterday by Dr Manins. You would have seen the complex nature of what can happen in a valley like this.

The Hon. J. F. RYAN: Are you familiar with what arrangements are made for monitoring of the stack after it is in operation?

Dr BEST: I have seen the conditions for the in-stack monitoring and I have seen discussions on the external monitoring, yes.

The Hon. J. F. RYAN: Do you have any comment to make on what should happen as opposed to what is proposed to happen? What improvements would you make to the current proposals to improve the outcome of the monitoring?

Dr BEST: I think the in-stack monitoring generally is quite adequate. What I would be concentrating on is looking at exactly what you are trying to achieve by your ambient monitoring. Ambient monitoring is all very well to just say that we will have a look and make sure that we cover the nearest communities. That is a very important thing to do.

If you are also trying to find the stack contribution you have to do significant extra work as well. In the actual design of the monitoring in terms of, say, the meteorology, there are tools that you could use right now that would help you with that.

The Hon. J. F. RYAN: In your paper you discuss ultrafine particulates. The theory that underlines the current arrangements for monitoring is that it is very difficult to monitor for ultrafine particulates and there is some correlation between PM10 and PM2.5, so if you measure PM10 particulates you can then make a prediction as to what the level of PM2.5 particulates is. Is that an assumption which you would support or would you challenge that?

Dr BEST: If you are looking at general urban air quality that is a reasonable assumption. If you are looking close to a source, that is not a good assumption. I would also say that the assumption that you cannot monitor for ultrafines is not true. In fact right now studies are going on looking at ambient monitoring of ultrafines in other cities. It is an unusual sort of case. You have some of the community very close by. It would be quite possible to look at the contribution of ultrafines within the stack and also at the nearest locations.

The Hon. R. D. DYER: Dr Best, would it be true to say that you are here as a consultant to RAPS?

Dr BEST: I was asked to come down here by RAPS but, as I would do for any other legal-type inquiry, I am giving my evidence as an expert witness to help the inquiry.

The Hon. R. D. DYER: Are you being paid a fee for doing that?

Dr BEST: I have been paid a fee for it, yes.

The Hon. R. D. DYER: Why is your submission so late and why has it been distributed here only this morning?

Dr BEST: My submission came in on Thursday. I have no idea why it did not appear before this.

The Hon. R. D. DYER: You seem to attach considerable importance—I do not quarrel with you at all in this respect—to the CSIRO report and the evidence given by Dr Manins. I take it you were not here when Dr Manins gave evidence to the Committee two days ago.

Dr BEST: No, but I have read the transcript.

The Hon. R. D. DYER: If you read the transcript you would be aware that one of my colleagues on the committee put to Dr Manins that the whole of this Committee's report revolves around whether we should or should not introduce ESPs into the stack. He was asked for his opinion in that regard and he said, "I feel that treatment of the emissions, the particle emissions, is feasible, but that it is rather poor value scientifically because of the local contribution to and in levels from the stack. But it is feasible." I then asked him why he said that it was poor value scientifically and he then said, "Because of the low contribution of the stack for the vast majority of the time to the ambient PM concentrations" and then he went on to make remarks about the large amounts of electricity used, which I probably do not need to recite to you. Given that you have expressed some admiration for or confidence in the CSIRO study, could you comment on the comments that Dr Manins made in that regard?

Dr BEST: I would interpret his comments being very much in terms of looking in this environment where you are trying to achieve an air quality goal. If you have a large background the stack contribution is small. But I think that if he were asked a different question such as: Looking at the health of the local community, would you expect that a reduction in the stack contribution would be significant? he might give a different answer because that is what a health risk assessment would really be doing. It is not just looking at the worst episodes; it is looking at what happens over the whole year. If it were to come down by a microgram or two F & R a maximum 24-hour average of a certain amount or a maximum one-hour average of a certain amount you can make some sort of assessment as to what you would expect for a given community structure. I would like to hear his answer to that question.

The Hon. J. F. RYAN: Would you have the same view as a gentleman from the CSIRO that the contribution from the stack is marginal by comparison with the background levels?

Dr BEST: It depends very much on what the conditions are. Do not quote me on these numbers but, for instance, the background concentration for one day might be 24 or 25 and the stack might be five, six or seven. You might get some days when the background concentration is that much higher. So it is all very much relative. But that is all trying to have the framework of saying: I have to achieve that 50. There have been lots of studies around to say that there is no threshold below which you get no health effects. That has shown up in the work that has been done here in Sydney and in other locations. It has been confirmed worldwide very much in the last five years. There is no threshold for PM10. There is unlikely to be any threshold for PM2.5. There may well be no threshold for nitrogen dioxide. So looking at achieving goals might not guarantee the health of the local community.

The Hon. M. I. JONES: Dr Best, you make a comment in your executive summary about low exit velocities at night-time. How high would the plume have to be projected at night-time to make the best of a bad job out of this situation? We have to thrust it.

Dr BEST: That is a fairly complex question to answer. You would certainly like to have the effective height being significantly greater than the height of the terrain around. The height of the terrain around is of the order of 45 metres. I think you would be looking at trying to achieve a plume height of the order of about 75 metres. But there again, you do not really know what is going on up above the top of that valley. You should really know much more about the meteorology of what happens in the next 30 metres above the ridge before you could make that sort of assumption. You might find situations in which, once you get that plume up there, it will find conditions that will not be good for its dispersion anyway. A rule of thumb would be that you would want always to have the exit velocity about twice the velocity at the stack top.

The Hon. M. I. JONES: So we can take it from your answer that insufficient testing and research have been done?

Dr BEST: As far as I can make out there has been very little done on the local meteorology for this valley.

(The witness withdrew)

JUNE MARY HEFFERAN, freelance writer, 33 Parklands Avenue, Lane Cove, sworn and examined:

RAYMOND KEARNEY, senior academic, University of Sydney, affirmed and examined:

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

Ms HEFFERAN: As deputy chair of the Lane Cove Tunnel Action Group.

Professor KEARNEY: I am appearing as Chairman of the Lane Cove Tunnel Action Group and as an informed person on matters of health.

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

Ms HEFFERAN: Yes, I have.

Professor KEARNEY: Yes, I have.

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

Ms HEFFERAN: Yes, I am.

Professor KEARNEY: 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 assent to such a request, but I warn that the Parliament may override that decision. Do you wish to briefly elaborate on your submission or make a short statement?

Ms HEFFERAN: Yes, Mr Chairman, I would like to make a short statement. The term of reference that I particularly wish to address is the International Tunnel Ventilation Conference. But before I do that I would like to express my disappointment that rational discussion of health and filtration issues has frequently been overtaken by what really appears to be a contest of wills between competing experts. I am a layperson. I have no scientific qualifications. I am just an ordinary citizen who is affected by road congestion and by its consequent pollution. But, unfortunately, it is we ordinary citizens whose voices are so rarely heard whose health and well-being are the prize in this battle between government agencies, community groups and their various expert gladiators. I have been a community representative for RTA consultation processes since the mid-1980s. I have participated in all of the seminars, meetings and debates involving road tunnel building in our area—that includes the Sydney Harbour Tunnel and the Gore Hill Freeway—up to and including the EIS for the Lane Cove Tunnel. I have also read fairly widely and I think I have a reasonable layperson's understanding of the issues involved.

The Lane Cove Tunnel Action Group, which I represent, is vitally interested in the outcome of what happens to the M5 East because the RTA's current proposal for Lane Cove is a 3.7 kilometre continuous twin-lane tunnel. There is to be a single, unfiltered vent stack situated in a valley. We are being offered a carbon copy of the M5 East. When a tunnel ventilation workshop was announced I thought it would be a unique opportunity to examine these new technologies and to explore ways that they could be adapted to the M5 East and, of course, ultimately to the cross-city and Lane Cove tunnels. It soon became clear that the RTA had a very different agenda. As Giselle has already said, the chosen facilitator had already expressed in writing a view that the world's best practice in tunnel ventilation, design and operation utilises ventilation stacks—a happy coincidence for the RTA I might say.

The RTA's first workshop agenda included discussion of air quality modelling and current ventilation systems and practice. But it did not include a single speaker with expertise in the new technologies. As Giselle has said, community representatives were virtually excluded. We were

permitted to submit written questions and we were allowed to listen to the answers if they got up. As you all know, it took an awful lot of private and public agitation for us to become full participants and to have some speakers there who did have expertise in these new technologies. Unfortunately, our objections to Mr Dix as a facilitator proved well founded. Some sessions ran so long that tea and lunch breaks were curtailed or omitted. That inhibits the informal discussions that are really important in gatherings of that nature. But when it came to those people and those sessions about filtration technology Mr Dix did not encourage protracted discussions. Those sessions either kept strictly to time or were curtailed.

Almost every one of the discussion periods was omitted. The result was that the workshop did not genuinely explore filtration options. It did not explore their potential application to the M5 East or to Australian conditions. It was left to community representatives to elicit a direct opinion on the effectiveness of electrostatic precipitators and gas cleaning. Even then, the facilitator allowed so many diversionary interruptions that the flow of the discussion was almost lost. Nevertheless, the transcript shows that every expert agreed that electrostatic precipitators work effectively. Those who did not have any experience of gas-cleaning technology could not comment knowledgeably, so the result there was inconclusive. But there might have been a different outcome if the technology proponents had been given the same time as the other speakers and if the properly scheduled discussion sessions had been held.

In conclusion, the workshop was not an adequate means of addressing recommendation 8 of the 1999 findings of this Committee. It did not permit adequate explanation or meaningful comparison and evaluation of the competing technologies. Furthermore, there is no evidence that the RTA has ever sought expressions of interest from any provider of filtration technology. This means that they cannot properly assess the efficacy, cost, benefit or drawbacks of the new technology against their own proposals for the M5 East or any other tunnel.

Instead of approaching these developments with an open mind, the RTA has engaged in an adversarial process that they call community consultation. Many people who have participated regret the mistrust that this process generates. What we hope is that this Committee can remove the veil from the eyes of government, so that our communities are not denied the health and environmental benefits that we believe these technologies could deliver.

CHAIR: Do you wish to make a statement, Professor Kearney?

Professor KEARNEY: I would like to very briefly address the submission, but first I would like to ask the Committee to accept two changes to pages 15 and 100, and I have submitted the replacements to the senior officer. I should also ask that a further submission be given to each of the members of the Committee. It simply has on the front page a diagram of the cumulative amount of retained particulate matter equivalent to that inhaled from the M5 East tunnel ventilation stack only.

We are here dealing with eight kilometres of tunnel. We are told that each day about 80,000 vehicles will be travelling in that tunnel. On the assumption that there will be about a quarter of a litre combusted per vehicle, 20,000 litres of fuel are going to be combusted each day, every day.

What we have here (*reference to an overhead diagram)* is the amount of pollutant in the form of particulates that will be retained in the lungs of persons in the local vicinity who breathe in an amount equivalent to, as we have been told, 10 micrograms per cubic metre coming out of the stack. We also know—and so does the Health Department know—that an average adult breathes 18 cubic metres of air over 24 hours. Eighteen multiplied by 10 is 180 micrograms of particulates from a concentration of 10 micrograms per cubic metre average per day. We are also told—and it is known to the Health Department—that 43 per cent of that which is inhaled is retained, and it is retained for the life of the person.

We are very concerned about the cumulative effects. We are dealing here not with the impact of the background but with the addition of the emission content to that background. That is what is illustrated here. At the end of one year—and assuming that persons are going to be active during peak-hour periods—the absolute minimum retained in the lungs of individuals in that area from the stack alone will be about 25 milligrams. But that is not all. The Health Department will know that the fine particulates are the carriers of the most toxic products in fuel combustion, namely the carcinogens.

The fine particulates are carrying into the lungs, carcinogens. One of the tables presented in the brief documents presented to you now, on the second last and the last page, lists the carcinogens. They are taken in with the particulates and are retained in the lung. Actions by cells strip off those carcinogens and are absorbed into the body.

The most important pathological effect on the lung initially is one of irritation; damage to tissue. The response of tissue to injury is inflammation. Inflammation, in all of its forms, is linked in with clotting, and hence the risk of forming clots in the heart. It is linked in with increased production of mucous in the airways. But equally—and ignored by the Health Department—it is the most potent accelerator of tumour growth.

Twenty years ago it was shown experimentally that inflammation is the most potent accelerator of tumour growth. This year, the publication which has been attached to our submission confirms that inflammation will accelerate tumour growth. So we are now asking a community in the Turrella area to accept an increased risk not only to an impairment of respiratory function and the accompanying side-effects—whether it be bronchitis, asthma or chronic obstructive pulmonary diseases—but also an increased risk of cancer.

I believe that there is only one solution, and that is to remove the particulates that are captured in a tunnel from the combustion of over 100,000 litres of fuel per week. The Health Department refuses to accept that there is a cumulative effect. In fact, they do not even take an interest in the cumulative effect, as recorded in the transcript of the workshop last year and what was also confirmed yet again by Dr Wilson.

One of the main flaws in the whole argument is that the regulatory authorities are relying upon air quality standards that are set according to a different set of parameters. Yes, there is a 10 microgram per cubic metre average at the end of the day. But you know as well as I know that during the a.m. and p.m. peak periods there will be exceedances which do not come into the air quality standards. People who are outside during those peak periods, as most working people are, can, in a matter of two hours, retain in their lungs, on average, as much as 10 micrograms per cubic metre over 24 hours.

There is a lot of sleight of hand in this process, and it does not take medically qualified people to assess, on the grounds of sheer logic and commonsense, that the figures that are currently available spell a health risk and an impact on the wellbeing and welfare of individuals.

CHAIR: In your submission you speak about $PM_{2.5s}$. It seems that the Health Department does not seem to be aware of that same information. You say that the vast proportion of emissions from motor vehicles will be 2.5 or less, not PM_{10s}. Why is this important?

Professor KEARNEY: When we are looking at health impacts we are looking at the respirable particles. The particles which are measured under the so-called PM_{10s} include 2.5s. Perhaps upwards of 75 per cent of them, depending upon the source, can be 2.5. But in reality, the most important ones that get right down into the alveoli, the far distant points of the lung, are the smaller particles, of one micron or .1 micron.

The evidence is that the use of the PM_{10} standards is not applicable to quantify the products of combustion. They are applicable to quantifying road dust and also some of the urban background particulate matter, which comes from many, many sources. As the author Morawska has indicated, the PM10 is not applicable to monitoring the emissions of a combustion engine. PM_1, yes, but we do not have PM1. The EPA does not even monitor PM1. What we have here is information that cannot be interpreted in terms of the health impact.

If I may draw an analogy here. Consider outside of a fruit shop you have two bins. One bin is full of pumpkins; the other bin is full of grapes and cherries. They both weigh the same. In one bin we have the equivalent to a PM_{10}, with a few grapes and oranges in there as well. But in one bin the PM10 is not equivalent to what you have in the other bin, and that is the bin that comes from combustion processes.

The Hon. R. D. DYER: When you were introduced earlier you gave us your academic qualifications. What is your specialty of academic study?

Professor KEARNEY: My background has been in the practice of the science of medicine. I teach right across the spectrum of subjects, immunology, respiratory medicine. I teach also sexual health, which is not relevant here. I am required also, and am committed, to teaching graduates in medicine and in environmental medicine—for those registrants who are sitting exams in the Australian College of Nnutrition and Environmental Medicine. I am part of that teaching process. I am also well aware of the pathological processes because in infectious diseases we need to understand processes involved in tumorigenesis because many of the agents cause cancer, eg like papilloma viruses. I am very familiar with that. Whilst I have not drawn a scalpel across the abdomen of a person, I can in a very informed way explain the mediators involved in wound healing and tissue repair. And that is what we are talking about here, the processes of inflammation.

The Hon. R. D. DYER: As I understand it, you are the chairman of the Lane Cove Tunnel Action Group?

Professor KEARNEY: Correct.

The Hon. R. D. DYER: Are you a resident of Lane Cove?

Professor KEARNEY: Correct. I am here also as a voluntary person. I have never, ever received one cent from any source, including the Lane Cove Tunnel Action Group.

The Hon. R. D. DYER: I am advised that you have been involved in what might be described generically perhaps as a stoush or battle with New South Wales Health. Could you tell the Committee what that is about, in a nutshell?

CHAIR: Point of order. This is not relevant to our discussions.

The Hon. R. D. DYER: I believe it is relevant because two days ago evidence was taken from New South Wales Health regarding this matter, as you well know, Mr Chairman. I understand that Professor Kearney is questioning the views they have expressed.

Professor KEARNEY: Mr Chairman, there is a point of order here. I assume Mr Dyer is referring to the outcomes of the other parliamentary inquiry at which evidence was put before the Committee on oath. I gave that evidence in the full knowledge that the health department was totally and absolutely remiss. I rebutted every assertion in the Chief Health Officer's report on the basis of independent evidence. Is that a stoush with the health department? My friend, evil persists when good men remain silent.

The Hon. J. H. JOBLING: To the point of order.

The Hon. R. D. DYER: On the point of order: Are you going to allow this sort of demonstration to occur at what is a fair hearing of this matter?

CHAIR: I would ask you please not to make such an enthusiastic demonstration next time because this is a parliamentary hearing.

The Hon. J. H. JOBLING: To the point of order Mr Dyer has raised.

The Hon. R. D. DYER: Mr Chairman—

The Hon. J. H. JOBLING: You have raised it.

The Hon. R. D. DYER: No, I did not raise a point of order at all. I asked Professor Kearney a question—

The Hon. J. H. JOBLING: I am sorry, you did take a point of order.

The Hon. J. R. JOHNSON: No, the Chairman did.

The Hon. R. D. DYER: —and I asked him whether there was a battle or stoush with New South Wales Health. In his response, Professor Kearney has said New South Wales Health is remiss. So, in effect, he has answered my question in the affirmative.

The Hon. J. H. JOBLING: Mr Chairman, if you raised the point of order, which you are entitled to do, the point is that the Hon. R. D. Dyer asked a specific question relating to the M5 East Tunnel. He may deal with that particular question. Unless the previous discussion the witness may or may not have had with the Department of Health can be shown to relate directly to this, it is of no relevance.

The Hon. R. D. DYER: So far as I am concerned, the question has been answered.

The Hon. J. F. RYAN: It was the same Committee.

The Hon. R. D. DYER: Mr Chairman—

CHAIR: The Hon. J. F. Ryan has the call.

The Hon. R. D. DYER: Mr Chairman, I wish to ask one further question. Professor Kearney, it is the view of the RTA that the development and implementation of the regional air quality management plan is the most effective way of addressing air quality in the area in question. Could I have your comment?

Professor KEARNEY: Are you talking about how to assess air quality or how air quality impacts on health?

The Hon. R. D. DYER: I am talking about the air quality management plan advanced by various State agencies—for example, as part of that, to depress contributors to poor air quality such as motor vehicle and diesel exhaust and so on.

Professor KEARNEY: I have no doubt that many of the matters which are being considered, some of which have already been implemented, such as making it unlawful to burn fires in the backyard, is a positive step towards reducing the serious impacts of air pollution. I believe also that certain improvements in motor car design can assist in that direction. But I say also that by reducing the lead in petrol and at the same time increasing the polyaromatic hydrocarbons is not in the interests of improving air quality. When the polyaromatic hydrocarbons are known to be carried by the small particulates into the lower respiratory tract, that is not a positive step yet the people at Turella are asked to take it. There are other issues such as changes in fuel that are positive steps forward, but on balance I have not seen any compelling evidence from the RTA in this particular situation that is going to make life longer for the residents of Turella.

The Hon. M. I. JONES: You went to some lengths to demonstrate to us the polluting effects of what is going to come out of the stack. Could you give us an idea of the ambient air quality and the effect that would have?

Professor KEARNEY: I understand that on average the background level is 3½ times higher than that. (*Reference to an overhead diagram of cumulative effects of exposure to 10ug/m^3 of PM_{10})* About 35 micrograms per cubic metre on average per day. So, we are looking at an impact which is 3½ times minimum over and above that. We need to consider here that the modellers have criticised the sensitivities of some of the methods that are employed to the degree that those figures may be underestimated two to threefold. This is the absolute minimum. These people in Turella are already at the upper limit of the current threshold that is prescribed by the current regulations. They cannot tolerate more and yet still comply with those regulations. Again I make the point that those averages do not disclose the exceedences which occur in the a.m. and p.m. I understand that the exceedences can be as high as 200 micrograms per cubic metre in the a.m. and p.m. periods in the ambient area—twenty times more than that—and if you can quickly estimate a person out there for two hours breathing in about two cubic metres they will have at least 200 micrograms of that toxic material

already retained in the lungs, and we are only talking here about a very small, relatively small amount. But in the overall totality it is an adverse impact.

The Hon. M. I. JONES: Would the toxic retention be uniform across the populous or would that be a worst-case scenario or average-case scenario?

Professor KEARNEY: Again it needs to be qualified because the evidence indicates that the PM2.5s enter into all households. That depends upon access to the household. Those who live in the households are going to be exposed to a different degree of risk to those outside.

The Hon. M. I. JONES: Could we just focus on the external populous for the time being. Will this be average across the board, worst-case scenario, best-case scenario?

Professor KEARNEY: Again, that needs to be qualified. Looking at Dr Manins drifting of the plume, there are some people who are going to be positively disadvantaged.

The Hon. J. F. RYAN: The handout you gave the Committee earlier, which contains what I might describe as the smudged diagram, is based on a measurement of PM10s of 10 micrograms per cubic metre on a 24-hour average.

Professor KEARNEY: Yes.

The Hon. J. F. RYAN: One of the pieces of material received today is a submission from Dr Best who—I must say, to be perfectly honest, it has been remiss of me to work out the actual production of the stack—says the PM_{10} 24-hour average due to the stack is therefore expected to be approximately 3.5 micrograms per cubic metre on days when the maximum hourly values occur. On other days the 24-hour PM_{10} contribution from the stack may reach six to seven micrograms per cubic metre. I suppose my point from that is that Dr Best might be suggesting—and I have not checked the RTA estimates because today we have largely talked about a goal rather than the actual emission—and if you have worked out this calculation on the basis of 10 cubic micrograms over a 24-hour period, this appears to be worked out on a much greater level of emission than the stack might actually produce.

Professor KEARNEY: Dr Manins the other day quoted 15 micrograms per cubic metre.

The Hon. J. F. RYAN: He did concede it was a guess.

Professor KEARNEY: And other figures have about eight. What I have done is simply illustrate somewhere using 10 micrograms per cubic metre because the publications show that every increase of 10 micrograms per cubic metre has a quantifiable impact on mortality, respiratory function and so on. So, I have used 10 micrograms.

The Hon. J. F. RYAN: I understand it is meant to be illustrative, but I had to put that question to you.

The Hon. J. H. JOBLING: In the setting of a standard for $PM_{2.5}$ you indicate that the Americans have set a standard but delayed it for five years, but Australia does not particularly have a standard?

Professor KEARNEY: Correct.

The Hon. J. H. JOBLING: What do you suggest to this Committee in relation to levels of particulates of 2.5 or down to 1?

Professor KEARNEY: I would say $PM_{10}$and PM_1 because the PM_{10} includes some of the PM2.5s but not the PM1. I would suggest that we have a PM_{10} and a PM_1.

The Hon. J. H. JOBLING: Which should be particularly explicit in relation to stack emissions on the M5 East and/or others proposed to be built?

Professor KEARNEY: That is correct and that would be a better marker for health impact.

The Hon. J. R. JOHNSON: The regional proposal was for three stacks. After considerable representations from various groups it was determined to have one stack. Given the information you now know which was the better proposal?

Professor KEARNEY: The information I now know is that I would prefer not to have any stacks because the information which you will be given shortly, I understand, will show that there is the technology available—which may not have been well understood then—now to have cleaning systems for both particulates and for certain gases without the need for stacks. But to answer your question directly, I would say it is unquestionably, under those circumstances, better to have the three high stacks than the one low stack.

(The witnesses withdrew)

KEVIN JOHN LOWNIE, Professional Engineer, 18 Lowanna Place, Hornsby, and

PAUL KERZEL, Chemical Engineer, Berger Street 15, D-82319 Starnberg, Germany, sworn and examined:

CHAIR: In what capacity do you appear before the Committee?

Mr LOWNIE: Representing Howden Australia in association with Filtrontec from Germany.

Dr KERZEL: I am a representative of Filtrontec from Germany.

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

Mr LOWNIE: Yes I did.

Dr KERZEL: Yes.

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

Mr LOWNIE: Yes.

Dr KERZEL: Yes.

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

Dr KERZEL: Yes, I would. At first I want to thank you for the opportunity to talk to this Committee. As you know I am from Germany and a few days ago we had the same problem like you with tunnel exhaust. It was the city authority of Hamburg that decided to build the Elbe tunnel and they were forced by the Government to investigate the possibilities for cleaning tunnel air because the concentration was expected to be very high. Our company Filtrontec, together with two universities and other companies, got the order to do the investigations which have been financially supported by the German Government of research. It became quickly clear that we had to focus our investigations on particles and on the NOX concentration because these were thought to be the main and most dangerous components.

One of the first things we did was to measure the particulates size distribution from the Elbe tunnel. I will show you these measurements. These are the measurements of particulates size and these are the accumulated particulates share. As you can easily see about 95 percent of the mass are smaller than about 2.5 micrometers. That means nearly everything is smaller than $PM_{2.5}$. Another point I want to show you is that about 50 per cent of the mass are smaller than 0.1 micrometer. The concentration of the particles in the tunnel we measured was about 1 to 2 micrometers per milligrams per cubic metre.

What are these particles doing in our body? I show you the deposition rate of these particles as a function of the particle diameter. Here we have 1 micrometer. As you can see the $PM_{2.1}$ particles will be deposited in the upper respiratory track, that means in your nose, and the smaller the particles are they all the deeper they go into the lungs. Some of the particles will be deposited in the bronchioles but the most particles will be deposited in the Alveoli as we heard before. New results of investigations show that these small particles will rest in your lungs for about 500 days, that means 1.5 years, before they come out of your body again.

Another argument we often hear is that the concentration of harmful particles will decrease. This is true for NOX, CO for hydrocarbons and it might be true for particle mass. As you can see from

the red curves the concentration of these particles decreased from winter 1991 to 1999. This is only true for the mass of particles. The green curve shows the number of particles in the air and the number of particles is nearly constant. The reason is that the concentration of big particles decreased over the past 10 years but the number of very fine particles increased. That means that in future we will have even more dangerous particles in the air than we had before. These measurements have been done by the GSF institute in Munich which deals with the environment and health.

We focussed our investigations on the elimination of these small particles. The result of our investigations was an air filter system which consists of mainly two stages. The first stage is for the elimination of the particles. The second stage is designed for the elimination of the NOX concentration. We are able to eliminate the NO_2 concentration for more than 95 per cent and the NO concentration up to 30 per cent. As you can see, we are not only using the conventional electrostatic precipitators. Our investigation led to the construction of a preliminary ioniser which enables us to give very small particles an electrical load and then they can be eliminated in this collector. The effect is that we are now able to eliminate — even the very small particles 0.1, 0.01 to a higher degree than usual or conventional precipitators do.

We presented this air filter system at a conference in Sydney in October 2000 and since that time we have been in contact with the RTA. We had some discussions with them and they asked us to propose several options to install this filter system at the M5 East. I briefly want to show you these options. At first we proposed to them the installation of only electrostatic precipitators in the cross connections between the two tubes at each portal of the tunnel. This installation has two main advantages. The first advantage is that we are able to eliminate more than 50 per cent of the particles which normally would be blown out of the stack. The location of the EP is very good because it is at the end of the slope of the tunnel where the vehicles will emit the most particles. We have an elimination rate of more than 50 per cent. Another advantage is that we can, by locating the EPs at this place, reduce the costs because of the reduced air volume flow and thereby the energy costs could be decreased. The reason is that we have to introduce fresh air into the tunnel to dilute the air inside the tunnel. But if we eliminate the particle we do not have to dilute it so much and so the amount of air which has to be blown into the tunnel could be reduced.

CHAIR: Would that reduce the energy used?

Dr KERZEL: Yes, because to blow the air into the tunnel costs a lot of energy and thereby money. By reducing the volume of air, the energy costs will be reduced as well.

CHAIR: Do you know by how much through the stack? Have you worked out the reduction in energy usage?

Dr KERZEL: No, we did not work it out because we do not know exactly the values of the CO concentration which may come out of the tunnel and the concentration of the particles but if you can reduce air flow down to 50 per cent, the energy costs will be reduced to one eighth because power consumption is proportional to the value of air flow to the power of three.

The Hon. J. F. RYAN: By referring to energy, you are referring to the energy required to drive the electrostatic precipitator, not the energy required to drive the fans for the main shaft? Is that right?

Mr LOWNIE: He is referring to the power for the fans.

The Hon. J. F. RYAN: The fans for the ventilation shaft?

Mr LOWNIE: Yes.

CHAIR: It is a huge reduction in energy which currently costs $3 million a year.

Dr KERZEL: Yes. The second option we presented to the RTA is the installation of the ESP at the exhausts points of the two tubes. This location has the advantage that we are able to filtrate 100 per cent of the air volume which has to be blown out normally at the stack. Another option is to install a gas filter directly before the stack to eliminate the NOX concentration. If it is not possible to install

these ESPs at the exhaust outlets—we do not have drawings of this—we propose to install an ESP and a gas filter directly in front of the stack.

I want to show you budget estimates for the air filters. We have been asked by the RTA to give estimates. These costs include the delivery of the filter system and the cost for upgrading the ventilator and for the energy supply. Option A is that where we located the particle filter in the cross-connection, it would be in the range of $13 million. Option B is the location of only the ESP at the exhaust outlets which would cost about $7.50 million and to locate an additional filter for the NOX elimination would cost some $27 million. Option C will cost about $8.50 million only for the installation of EP—both installation of ESP and NOX filter will be about $20.5 million. That is my statement and I would be glad to answer your questions.

CHAIR: Do those costs include everything? Are there any other additional costs?

Dr KERZEL: Yes. As I mentioned before, we do not need any other works at the cross-sectional area because we have enough space. With options B1 and B2 maybe there are additional costs for some space which has to be built to install the filter.

CHAIR: Is there any estimate of that extra cost?

Dr KERZEL: No.

CHAIR: What about C1 and C2?

Dr KERZEL: That is the same. It is directly in front of the stack and I do not know the cost for the construction of one cubic metre of area.

CHAIR: How interested is the RTA in these various options?

Dr KERZEL: At this moment I do not know. We sent it to them but we have not had an answer until now. Maybe they will answer in the future.

CHAIR: Do you have any opinion on the question of the $PM_{2.5s}$ and below as to how the proportion of those in the vehicle emissions from the tunnel varies from those in the ambient air. We heard on Tuesday that it was about the same. Do you have any views on whether the $PM_{2.5s}$ are about the same proportion as in the tunnel air?

Dr KERZEL: I think it should be the same proportion but the concentration is, of course, much higher.

The Hon. M. I. JONES: How long is the Elbe tunnel?

Dr KERZEL: It has a length of about 3.1 kilometres. It is the longest tunnel in Germany.

The Hon. M. I. JONES: What stage has it reached at the moment?

Dr KERZEL: The three tubes have existed for 20 years and the fourth tube is under construction now and it will be opened in 2002.

The Hon. M. I. JONES: And the filtration system you have designed is for this final tube, is it?

Dr KERZEL: No. It will not be installed into the fourth tube because that has only a longitudinal ventilation system. That means the air comes in at one portal and exits the other portal. The south portal where the air exits is in a harbour region where nearly nobody is living. The filter system we investigated was not developed for the fourth tube but the three existing tubes will be renovated because they are more than 20 years old and they are thinking about installation of this filter system for the three existing tubes.

The Hon. M. I. JONES: You say they are thinking about it.

Dr KERZEL: Yes.

The Hon. M. I. JONES: They have not actually commissioned it?

Dr KERZEL: No, they have not.

CHAIR: Are there any other tunnels in Europe also interested in the same system?

Dr KERZEL: Yes, of course, many tunnels in Germany. We have in Berlin the Tiergarten tunnel. I expect there will be a decision in the next few weeks whether to install such a filter system or not. I am not sure at this time. We have the Petuelreng tunnel in Germany. We gave them some prices and they will decide whether to install the filter or not but they made some spaces to be able to install the filter after the tunnel is open and to measure for one year the concentration of particles and other components and if the concentration is exceeded, they will introduce the filter system.

The Hon. M. I. JONES: How would you describe the RTA's attitude towards your presentations. Have they been helpful or somewhat hostile?

Mr LOWNIE: No, they have not been hostile. We have not specifically made presentations to them. We have simply responded to their requests for information. They have requested information in terms of budget prices and those sorts of details and we have provided that to them.

The Hon. R. D. DYER: With gas treatment, which I understand to be part of your system, given Australia's higher ozone levels and stronger sunlight—and I am making a comparison inferentially with Germany—how would that affect conversions of oxides of nitrogen emitted by the stack in the atmosphere? Do you understand what I am asking?

Mr LOWNIE: I am not competent to answer that question.

The Hon. R. D. DYER: Is Dr Kerzel?

Dr KERZEL: Usually in the tunnel air we have about 10 per cent NO_2 and about 90 per cent of NO. The ozone concentration inside the tunnel would be nearly zero because the ozone oxidises the NO to NO_2.

The Hon. R. D. DYER: How long would that process of conversion take?

Dr KERZEL: It goes very fast. It is only a few seconds but it takes a little longer if the air comes out the tunnel and the NO will be oxidised under the influence of sunlight to NO_2 as well, but this takes a longer time, several minutes to hours. I am not sure about this.

The Hon. R. D. DYER: I realise you have made some reference already to a tunnel in Germany. Could you advise in which operating tunnel a full-scale Filtrontec system has been installed to date?

Dr KERZEL: At this stage there is no tunnel in Germany which has a filter system. There are several filter systems in Japan, Korea and Norway, which have electrostatic precipitators. The Laerdal tunnel in Norway is to install the filter system for particles and NOX as well but in Germany and the rest of Europe there is not one. They are thinking about installation at the Mont Blanc tunnel in France. They want to install an electrostatic precipitator in front of the outlet of the air to protect the environment in a little village, where lots of tourists are living. They decided first to open the Mont Blanc tunnel again because they have the cost of a half a million deutsche marks per day and when the Mont Blanc tunnel is open again they want to introduce an ESP.

The Hon. R. D. DYER: Would you agree that the design of the ventilation of each tunnel is unique and the design must be undertaken for the particular constraints of each particular project?

Mr LOWNIE: Yes, that would be correct.

The Hon. R. D. DYER: Are you aware that with the ventilation system for the M5 East motorway, carbon monoxide is the critical pollutant for in-tunnel design? Does your Filtrontec system remove that critical pollutant?

Dr KERZEL: No. The CO cannot be eliminated by the filter system. To my knowledge worldwide there is no technology to eliminate CO at this low level of temperature. It is not possible at this time. Usually the CO concentration is not the limiting factor. For example, at the Elbe tunnel we have about 20 to 40 PPM and the maximum level is 100. I know at the M5 East you have about 87 as the maximum level, but I think CO is normally not the limiting factor inside the tunnel. Most times it is the visibility.

The Hon. J. F. RYAN: I would like to read you a sentence or two from evidence we received on Tuesday from the chief executive officer of the RTA, who said with regard to quotes for filtration equipment:

> Clearly, this only includes equipment costs, not necessarily the costs of full filtration. In fact, we have to be very careful with these figures. Often they are quoted totally out of context and not even with half the story. The electrical work, mechanical work and civil works to accommodate the equipment are often conveniently left out of the picture. You have to quote the whole story.

Are you giving us a full quote for the installation of your equipment or are there other things you have not mentioned that will necessarily be part of the picture? Can you give us some idea of the cost of maintenance of the equipment after installation?

Mr LOWNIE: We have attempted to cover all costs but we do not have drawings of the current installation, the tunnel construction. We believe that for the cross-passage installations there will be no additional civil works there. In some other parts there may be a requirement to put cabling in for power supplies and things like that, but we do not have the information as to what is available on site so we have made a rough guess at that.

The Hon. J. F. RYAN: The RTA has given us a document referred to as the Flagstaff report. It quotes cabling at $10 million. Does that sound like a realistic estimation of what might be required for cabling?

Mr LOWNIE: It depends on how far they have to run the cable. It is as simple as that. If it is one kilometre it sounds incredibly high. We are not talking about enormous power supplies. The Filtrontec precipitator is a modular design and each module uses roughly 220 watts of power, which is 2½ light bulbs. Now we will have how many modules?

Dr KERZEL: We will have in one cross-connection about 25 kilowatts of power consumption at each site.

The Hon. J. F. RYAN: Your system requires a fairly modest amount of electricity and yet it might potentially save the RTA a significant cost with what it expects to have in electricity in the future with just running the unfiltered ventilation?

Dr KERZEL: Yes.

The Hon. J. F. RYAN: An issue about the filter is its effectiveness to change the ambient air quality after the air has passed through the equipment. The point was made that if we spend $10 million, $15 million or $20 million on the equipment, it will not make a significant difference to the ambient air quality because the contribution that a stack might make to the overall air quality is marginal. Would you care to comment on that?

Dr KERZEL: Yes. I think it is not necessary to install a filter system to enhance air quality in the environment. It is not possible. It does not make sense, but it makes sense to enhance the air quality next to the portals of the tunnel and in the environment of the stack but if you have a filter system in the M5 East in Sydney, the air quality inside of Sydney would not be better.

CHAIR: If the Roads and Traffic Authority had to install ESP equipment, let us say, for example, in the portals, and it had to do that within six months, could you supply the equipment in six months?

Mr LOWNIE: No. We estimate that it would take about 10 months to supply and install.

The Hon. J. R. JOHNSON: From whoa to go?

Mr LOWNIE: Yes.

The Hon. J. F. RYAN: With the portal equipment do you require any expulsion of air from the portals themselves? Emissions come from the portals themselves but at the moment the road has a constraint and no emissions can come from the portal areas. Would that be a necessary part of your scheme for the fitting of electrostatic precipitators at the portals?

Mr LOWNIE: I question the term "no emissions from the portals". If the word "no" means nothing, no ventilation system will guarantee nothing. We would have to look at the entire ventilation system before we could really give any definitive answer on that point. But, basically, they combat portal emissions by using jet fans along the roof of the tunnel. Vehicles travelling at 70 or 80 kilometres an hour are generating quite a high pressure gradient and the vehicles are shielding the lower regions of the tunnel from the effects of the jet fans. So to say that you were not getting any portal emissions would probably be more a reflection on the way you measured portal emissions rather than on whether or not you were getting portal emissions.

The Hon. J. F. RYAN: If your equipment is located at the portals how will it capture the emissions that are made by cars deeper in the tunnel?

Mr LOWNIE: We did not specifically look at a portal system. We looked at cross passages.

The Hon. J. F. RYAN: The diagram that you suggested seemed to have them located fairly close to the two entries.

CHAIR: That is your first option; your $13 million option.

Mr LOWNIE: The $13 million option has the precipitators mounted in the cross passages at the end of each tunnel.

CHAIR: That is what we mean.

Mr LOWNIE: There should not be any additional civil works there.

The Hon. J. F. RYAN: How do they catch emissions made by vehicles deep inside the tunnel if they are located close to the entrance?

Mr LOWNIE: The air is being circulated down the tunnels and it is being drawn off by fans through the cross passages. The precipitators will be in the cross passages. With the M5 system basically air will be recirculated down one tube and it will cross over into the other tube and back again. We would be cleaning the gas at each end of those crossover passages. There are existing fans to pull the air through those cross passages.

Dr KERZEL: The total ventilation system of the M5 East tunnel will not be changed with the introduction of a filter system. It is the same system as the system that was designed by the consultant of the Roads and Traffic Authority.

The Hon. J. F. RYAN: That probably answers my next questions. I take it that fans would still be located in the ventilation shaft for NOX purposes?

Dr KERZEL: There would have to be, yes.

The Hon. J. R. JOHNSON: The M5 East conditions of approval do not permit, as far as practical, emissions from the portals. Is that consistent with overseas practice?

Mr LOWNIE: Yes. It is as practical as can be achieved. You cannot say that one molecule of polluted gas will not escape the portal. They are just saying that it will be kept to a practical minimum.

The Hon. J. R. JOHNSON: As vehicle emissions continue to fall with improved engine design rules, do you think that opportunities to emit pollutants from the tunnel portals should be investigated?

Mr LOWNIE: Yes. I cannot really give a simple answer to that. Bear in mind that, as vehicle pollution measures improve, the size of the particles that are being emitted will fall. So, basically, it is a double-edged sword.

CHAIR: Are you familiar with the current system? Obviously you have studied the current M5 East system. If precipitators are not put into the tunnel under your option one, how much particulate matter would be coming out of the portals now as compared to what it would be if ESPs were inserted? How would people at either end of the portals be affected?

Mr LOWNIE: I really cannot answer that question. There is no real practical method of measuring how much is coming out. They will set up monitoring stations at some distance from the portals. It gets back to what I said earlier about the statement, "There shall be no emissions." I believe that that is not possible to achieve, not with tubes running full of vehicles travelling at 80 kilometres an hour.

CHAIR: It is not possible or practical. You cannot possibly suck back all that air.

Mr LOWNIE: No, you cannot. As I said earlier, they are using jet fans to create a reverse gradient. The operation of those jet fans will be inhibited by motor vehicles passing underneath them because they are mounted on the ceiling of the tunnel, which is five or six metres above the roadway. So if you have all the laneways full of vehicles moving at 80 kilometres an hour they will shield probably two-thirds of the tunnel from the effect of the jet fans. So vehicles will be pouring out pollutants at the roadway level.

CHAIR: So your option one presumably would also improve the air quality for people who live around the portals?

Mr LOWNIE: Yes.

CHAIR: By what proportion? Do you have any idea?

Mr LOWNIE: I could not quantify that.

CHAIR: Would you establish what would be the total energy saving with your option one so that we can work out the dollar savings for the Roads and Traffic Authority?

Mr LOWNIE: Yes. You have to bear in mind that we are talking about a particulate filter and a gas filter. There are different energy requirements for the two. The particulate filter has the lowest energy requirement. A gas filter would require about four times the amount of energy required by the particulate filter. The pressure loss on the precipitator is about 100 pascals, whereas for a precipitator and a gas filter it is about 800 pascals. So a significant increase in energy is needed to draw the air through, but that can be offset by quite a substantial reduction in the actual mass flow rate of air required for the tunnel, because you have in the cleaning system.

The Hon. M. I. JONES: You briefly described how the electronic precipitator worked. How does the gas filter work?

Dr KERZEL: The gas filter works through another option. We have some kind of activated carbon. Air is passed through carbon filter and the particle have a diameter of about three or four

millimetres. NOX, NO_2 and some hydrocarbons will be absorbed in this inner surface of the carbon particles.

The Hon. M. I. JONES: What power is needed then?

Dr KERZEL: As Mr Lownie mentioned earlier, we have about 800 pascals to push the air through.

The Hon. M. I. JONES: With just the fans?

Dr KERZEL: With the fans, yes. But compared to the total energy consumption, it is very small. As we heard from the Roads and Traffic Authority, the total pressure drop is about 2,800 pascals for the tunnel. If you use ESPs we will have an additional 100 pascals. If you use an NOX filter we will have an additional 800 pascals. But that is compared to a total pressure drop of about 2,800 small pascals

(The witnesses withdrew.)

HANS ANDERL, Managing Director, CTA International, Vienna, Austria, sworn and examined:

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

Dr ANDERL: I am appearing because of the requirement of the M5.

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

Dr ANDERL: Yes.

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

Dr ANDERL: Yes.

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

Dr ANDERL: Yes. I wish to demonstrate a small smoke unit. We have talked several times and I have made many speeches about particles. I believe that the truth can be ascertained only by what you can see with your eyes. Everyone is aware of the effects of cigarette smoke. Most countries have no smoking policies. I wish to tell you something about cigarette smoke. Cigarette smoke has a particle size from three microns down to 0.01 microns. That means that the particles in a cigarette are exactly the same as the particles we are talking about in relation to diesel and gas emissions and the pollution from tunnels. By demonstrating my smoke unit you will see cigarette smoke being treated by an electrostatic precipitator. That will give you an indication of how precipitators work. In order to be able to demonstrate this unit I will light up a cigarette.

Fortunately, it is the unit that is smoking now, not me. As you can now see, this is cigarette smoke which means that it is a wisp of smoke. The problem with the small particles that we are talking about in emission problems from tunnels is that unfortunately you cannot see them with your own eyes because of size and also because of their density. In this application, you can see the smoke. As I said before, it is leaking a little bit because it gets damaged sometimes through travelling on air planes. The other thing that I will do now is add some voltage to the filter inside that small cabinet. There is no ventilator working here. There is one installed but I have never used it. I just want to prove what voltage can do according to the particles. When I push this button now, I will put the voltage on. You can see the reaction of what the voltage is doing with the particles.

I know the question that will come now very well: That is just a little unit and how many of those will you have to have for the M5? There is no difference whether the electrostatic filter is small or big. The efficiencies and the way it works are exactly the same. This is somewhat the same as the presentation I made last year in Sydney. This is only to show you what kind of situation can happen in a tunnel. This is a situation we had in the Ekeberg tunnel in 1996 where a total bus went to fire. Along the fault line of the tunnel, a precipitator is installed. This was a situation that could have been very bad. There were approximately 100 people behind the bus; there were 25 ordinary persons in vehicles; and there were six heavy trucks behind the fire.

On behalf of the ventilation system, which means the expelling fans in the bypass, the electrostatic precipitator started approximately two minutes after the fire was detected by the visibility sensor. The unit started working and kept the smoke going in one direction, which was away from the fire and up the tunnel. No people who were behind the fire suffered any damage or in any way came in connection with the smoke. That again is a small example to prove what an electrostatic filter can also do besides saying that an electrostatic precipitator can also take particles according to visibility detectors and environmental outside protection of the tunnel.

There have been discussions about stacks and no stacks and what we are supposed to do to protect visibility in the tunnel or whether we are supposed to protect the environment outside the tunnel. This is a project in the city of Bergen and hopefully everyone present knows where that is. It is a well-known city. We have a musical concert going on there now, *The King is Divine*, and it has never rained on that concert in Norway since that concert has been on. Bergen is a particular city because it lies between seven mountains which means that the city is very close and very compact. The project called the Laerdal tunnel was built to get the heavy traffic out from running around in the city or local area because we have had stopped traffic for several hours every day in the morning and every day in the evening.

We built the tunnel under the university area and also you can see the park which is marked in blue. The black line of the tunnel shows that the tunnel goes under the park, under the university and out to the other side of the city, crosses a bridge and then moves further out to other parts of the city. This slide that I show you now shows the main reason why the decision was made that a precipitator was going to be installed in this tunnel. This slide shows the other side of the tunnel and you can see that we have a harbour on the left side where there is not a large amount of activity but on the right side you can see that there are a lot of apartments. This was an area in Bergen when I was living there, from 1957 until 1978, that was more or less a site where it was decided that it should be taken down and rebuilt with new houses.

Fortunately and thankfully, the government changed its mind and political people try now to take care of the old city and have tried to keep it like that. Now this is one of the most famous places in which to live in the city for many reasons. You do not need a car. You can walk through the city and it will take 25 minutes in all directions. Because of that, we had to consider the pollution that would come from the tunnel because of the up-front concentration we already had which was too high compared to what our regulations allowed.

The tunnel is 890 metres long and the present technology is for a 250 cubic metres per second, ceiling mounted electrostatic precipitator. The electrostatic precipitator stands approximately 300 metres away from the tunnel pocket. The filter had been tested. It was tested by SINTEF and it was tested also by Nyland, which are both institutes in Norway that carry out those types of tests. Those tests showed that for all the particles from 05 and upwards with higher than 90 per cent of 0.3, we are registering 87.7 per cent. We made some modifications so that we could reach the 90 per cent that we had guaranteed. This slide shows what is a ceiling mounted electrostatic precipitator. I think I will not say much more about the electrostatic precipitator besides the fact that speakers before me mentioned small particles. That is quite correct. Earlier you saw cigarette smoke and, if you do not already know it, cigarette smoke consists of 4,000 different kinds of subjects. Most of it is particles and some of it is gases. The particles range, as I said, from 3 microns down to 0.01.

From that unit, you can see that electrostatic precipitators are suitable to take small particles of 0.01. Three weeks ago I was in Japan to carry out a four-day total test on an electrostatic precipitator according to high speed. The reason why they wanted to go for a higher speed on an electrostatic precipitator is that we can save space and in Japan in the city tunnel, there is not a big space to build or a large area for ventilation. That means that if you can raise the speed from 7 metres, to 11 metres, 30 metres or 50 metres, you can save a lot of construction and the technology can be used in many more areas. We have proved that by applying the 50 metres, we had efficiencies of higher than 99 per cent. What we also extracted was exactly the particle below 03.

They are occurring more and more and it is quite clear that if you look at a diesel engine before 1980 and you compare it with a diesel engine of today, the diesel engine before 1980 made 30 times more smoke than do the diesel engines of today. So we believe now that the diesel engine has got a lot better. That is totally wrong. It is much worse. The only problem is that you do not see the particles because they have become so much smaller. Most of the particles from diesel engines today are below 03 and you even have a very high amount of what we call the nano particles. We have started investigations on it. We know how to handle it with the same system and we intend to carry out some more research in Austria in a university to find out exactly how to treat it.

It is no problem to take a particle below 03 but if we go back in time and look at all types of instrumentation we have been using to control particles, by particle count or by particle weight, the instrumentation has been calculating from 03 microns up to 10 microns. That means that we are not

calculating the particles below 03 and that is what we now have to consider. We are starting to count them from 0.1 and we also go down to 0.01. Normally, after saying things like that, as soon as you have the solution to one problem, you can be quite sure that you will end up with a new one. And that is what is so interesting about the whole field: You always have something to study and research.

CHAIR: Can you tell the Committee how many tunnels have your precipitation equipment in them, and how many of these are actually working at least part time and preferably full time?

Mr ANDERL: In Norway in that the Ekeberg tunnel, we have two precipitators, one in each lane. In the Granfosstunnel, we have one. In the Oslo tunnel, we have one. In the Hell tunnel we have three. At the moment we are finishing off four where we started the precipitator in the Drammen tunnel. Altogether, plus Korea, there should be 14 precipitators that have been installed. The Oslo tunnel deals with 1,000 cubic metres per second. It has been mentioned that it has never been done in a situation that can be compared with the M5 but that tunnel was already built with filtration and finished on the 14 January 1990. There was the Grandfoss tunnel and the Ekeberg tunnel and after that there is the Hell tunnel.

CHAIR: That is the M5 East, I think.

Mr ANDERL: For your information, there was a train station there and the station's name was Hell. We had to open it again because it was so popular with people who went there to buy tickets to take a train to Hell.

CHAIR: I went to Hell myself, actually.

The Hon. J. H. JOBLING: Yes, but you came back.

Mr ANDERL: After we made the Hell tunnel, we made the Pyongyang tunnel in Chimbu in Korea and we have a city outside Oslo called Drammen, which has a tunnel of 4,510 metres. There we are now installing four precipitators, ceiling mounted, and each one of them handles 160 cubic metres per second, which will give a total of 640 cubic metres per second. We will finish that in two weeks with complete installation. We are now working on several other projects in Vietnam. Together with Ausplume Australia, we are working on the M5. I am also working on a project in Korea and I will start working on a presentation and pricing for 15 tunnels in Egypt. Besides that there are three tunnels in Austria. You have the Blancheburg tunnel, but it has not yet been decided which way it will go. There is also the Strenger tunnel in Austria possibly to decide on three electrostatic precipitators, and then we have the Tauern tunnel which had the big accident last year. A second lane will now be built.

And since Mont Blanc has been mentioned here, I was involved with Mont Blanc two years before the accident. I am quite aware that there is interest in electrostatic precipitators and it is also correct to add that it is a lovely village on the French side that has very many tourists coming to it. There is a shaft going out sideways only 250 metres away from the entrance of the tunnel. They are planning to reconstruct the shaft and put the electrostatic precipitators in there. As far as I understand, that is being done not so much to take care of either one person or another. The problem was that the tourists in the winter time were complaining about the snow because it was not white. It was grey or black and they were really afraid of losing the tourists. That was the main reason. The money was there are but unfortunately the accident happened and that is the situation at the moment.

CHAIR: So there has been an explosion of interest in the last two or three years, evidently?

Mr ANDERL: The interest has been more and less. I have been working particularly with tunnels now for 12 years and there have been a great number of requests for it. As I said, when a country or a government starts thinking about tunnels, until it is realised and until they go so far as to construct it—until they start to dig, blast and drill—it can take from two years up to 10 years.

I am getting requests now that go back 10 years, and still the projects have not been done. I have seven, eight or 10 requests from Italy. Not one of the tunnels has been built to now. That is just the way it is.

The Hon. R. D. DYER: Mr Anderl, to save time could I put a question to you in three parts? What benefits are you suggesting electrostatic precipitators could make to the regional air quality of the Turrella area if they were to be installed in the M5 East ventilation stack? Are you aware of any ESPs presently running in road tunnels for the primary purpose of improving external air quality? If they are running, are they running in full operation or just occasionally?

Mr ANDERL: I would say that if I installed an electrostatic precipitator to the M5 you would do a lot about the environmental outcome from the tunnel. According to what I saw of the construction of your ventilation system I have to say that I have never seen anywhere in the world construction done like that, so you would probably get into the Guinness records book with that. I would say quite clear that if you take care of all the air and the pollution in there, yes, you could do significant good things for the environment outside from the shaft and the output air coming from that.

The Hon. R. D. DYER: Do you have qualifications in either mathematical modelling or atmospheric science?

Mr ANDERL: A lot of modelling has been made in Norway and most of the countries we have been involved in have been according to it. What I detected when I started in Korea in 1993 is that most of the time they do not consider upfront concentrations. That was also what I detected when Mr Arnold Dix a couple of years ago showed me some modelling done on the M5.

The Hon. R. D. DYER: I am sorry; I am asking about your own qualifications.

Mr ANDERL: My qualification is electrostatic precipitator and it would not be correct for me to do any modelling. I leave that to the government to give the requirements for what they want to use.

The Hon. J. F. RYAN: Your background is engineering, is it?

Mr ANDERL: Yes.

The Hon. R. D. DYER: Again to save time I will paraphrase something that Dr Peter Manins said on behalf of the CSIRO two days ago in his evidence to the inquiry. He said, in effect, that the treatment of particulates by ESPs in the M5 East scenario is poor value scientifically because of the small impact that would be made on the regional air shed. Could you comment on that view, given that he is the chief atmospheric scientist for the CSIRO?

Mr ANDERL: We have seen according to that in the Oslo area. When we started to look into precipitators there a lot of air quality studies were done. The calculations showed that by filtering the shaft air from the Oslo tunnel—that is 1,000 cubic metres per second—that would influence total air pollution in the Oslo area by 1 per cent. The Oslo package number one that we are building now—we have built approximately seven of the tunnels—will influence the quality of the total air in Oslo by 23 per cent. That it will have a health effect is quite sure.

The Hon. J. F. RYAN: Are you familiar with any of the reports that have been done with regard to your company's filtration systems for the RTA, in particular one called the Flagstaff report? I would also like your reaction to comments in something known as the Bongiorno report.

Mr ANDERL: Yes, I have read the Flagstaff report and I have also seen the Bongiorno report. I know quite clearly what you are looking for. The Flagstaff report says that the air volume in the M5 is three or four times bigger than in the Chimbu. I am wondering why he picked Chimbu. It seems that he should look at all the tunnels where precipitators have been installed. So why did he not compare it with the Oslo tunnel that is approximately 150 cubic metres per second more than in the M5? I spoke with Mr Henning when I was over from Singapore. We have political problems in Norway. We are clearing them up now according to our system—our tunnel and our pollution problem. He said that the problem is that people such as Flagstaff and Bongiorno do not know the background reason.

The Grandfoss tunnel had a precipitator for 200 cubic metres per second because that is what will be required according to the traffic we are going to have through the tunnel. There is no sense in

saying that we are going to put in something to handle 1,000 cubic metres per second. Everything you do has to be evaluated against what you are supposed to do. That is why the Oslo tunnel gets 1,000 cubic metres per second, because that is the heaviest traffic tunnel we have in Oslo. We started with 75,000 vehicles in 1990. Today we have approximately 110,000 to 120,000 vehicles, and the number will rise. You cannot compare Chimbu. It was calculated according to the traffic going through the Chimbu and what it would do for the next 30 years. Chimbu is not a city tunnel; Chimbu is out in the country. You cannot say what Flagstaff said and what Bongiorno said. He said that he asked people in the Oslo roads authority, the local people who are supposed to have the responsibility for maintaining service. It has been proved that they are not spending the money that the government is giving them for maintaining service.

The day before I left from Austria I received a fax. I had a meeting with Hans Dorf and with the Austrian authority. They asked me until week 20 to come up with a solution to get their filter up again and running and go into a new service contract that our company had from May 1997 till May 1999 when it was all in full operation. It is the same with the electricity precipitator as with a jet fan filter. If you do not control it and inspect it, it does not work. I believe it will be the same in due course. You buy it, you run it for 10 years, for sure you will have problems.

The Hon. J. F. RYAN: I wanted to ask you about some of the other tunnels mentioned. For example, the Bergen tunnel that you showed us photographs of in the presentation. According to Mr Bongiorno the equipment in that tunnel has never been operated or has not been operated very much. He said that the only tunnel in Bergen in which ESP equipment is installed is Nygards, which is 900 metres in length and consists of two tubes. Is that the one you are speaking of?

Mr ANDERL: Yes.

The Hon. J. F. RYAN: It is relatively new, its tubes having opened in 1998 and 1999 respectively. He said that in general the engineers of the Norwegian public roads administration in Bergen were unenthusiastic about electrostatic precipitators. They regarded the installation in the tunnel I just referred to as a waste of public money. Are you aware of that comment?

Mr ANDERL: I am quite aware of that comment.

The Hon. J. F. RYAN: Would you like to say something about it?

Mr ANDERL: I would really like to say something about it. I have been in Norwegian politics for 15 years. The main reason is that the roads authority director on the west coast of Norway is 50 per cent government and 50 per cent political. He has political rules all the time about in Bergen. They could never overcome him. When he decided to do something he forced it through one way or another. As Bergen is a city between seven mountains the political people decided once and for all that they would not accept that the roads director should get through what he wanted this time too. So they forced him to install the filtration because the pollution problem in Bergen is extreme. At a meeting it was said that if we do not put filtration we have to evacuate all the people living on the other side the tunnel. That was the quite clear answer.

Beside that, when the filter was installed in one tube it was also decided to do it in the second tube. But he got a little bit of his project through so he got through that one filter would be installed and the second would be installed after proving the first one. So in some ways I have been worked against from them. He is now on a pension and the politicians put in a new regulation in Bergen saying quite clearly that they will never be allowed to build any tunnel going in the direction of Bergen city without filtration technology installed. That is why I did not accept because I was missing 2½ per cent on only 0.3 microns to just say okay I can give you a computation for 40,000 krone and we are finished with it, because I knew that it would be ultimately said that he failed. I have been working with the university in Austria for several months and we know the answers. On 9 May I am going, together with the university, and we will make a small change and we are going to prove again that it is efficient data.

Secondly, what Bergen totally forgets and what we have seen now are the particles below 0.03. But this time we will be will be measuring and we will reach our target. The reason Bongiorno can say it is not run is quite easy: it is because of contract consequences. When a government does not

take over equipment that I have made it is not allowed to run it because that equipment belongs to me. If it takes it over and runs it and then complains that something is wrong it has to take the cost of it. So that is ordinary contract law and nothing else.

The Hon. J. F. RYAN: The Flagstaff Consulting Group's survey of the cost of your equipment comes up with a figure of approximately $36.8 million for the installation into the M5 Tunnel. Have you seen the report?

Mr ANDERL: Yes. I have seen some of it.

The Hon. J. F. RYAN: Would you care to comment on whether that is a realistic estimate of the cost of your equipment?

Mr ANDERL: First I would ask where Flagstaff got the price. I was never asked. I have given a price for the total installation for the M5 of electrostatic precipitators with a high-voltage powerpack, electric cabinet, automatic control system, cabling, blending, water treatment system, tanks and everything—I gave the price a couple of years ago already—of $8.5 million Australian.

The Hon. J. F. RYAN: The report explains where the figure comes from. It says the supply of ESP and air handling systems is based on cost information supplied by Alstrom Australia, who have agreement with CTA to market and support their products on the Australian market. Would that have been an appropriate place to get that information?

Mr ANDERL: For several months I have asked Alstrom Power to get a copy of the offer it gave to Altair. I have not got it. I was going into co-operation with Alstrom, and I did not go into a co-operation with Alstrom because of Australia; I did it because of the Vietnam project. I will hopefully have a meeting while I am in Australia with Alstrom. I met once with them in Austria. They still did not show me what they have given as a price; they just gave a figure. I told them: "If you go out with a price like that for an electrostatic precipitator I will not accept it." The only thing that is not included in my price of $8.5 million is the fan to move the air through the precipitator. You have already constructed it for the shaft so I do not need to deliver that. I am still wondering what Alstrom Power is going to have paid for. We are the ones that are going to make the job.

The Hon. J. F. RYAN: Has the RTA had direct contact with your company and requested a quote as to what it might cost to install your equipment in the M5 tunnel?

Mr ANDERL: The RTA has never been in contact with me. The first time I had a contact from Australia was according to the Melbourne project. There was a person called Winston Shiel working on the project. He contacted me approximately four years ago because it was still when we were on the excavation of the Tunnel. I have never had any direct contact before I was over the last year. I was told that I had been in contact with them. In June 1999 there was a conference in the Oslo Plaza hotel. Mr Sacbos from Germany was there and he was living by me so I drove him to the conference. That is probably where I met the person from the RTA.

The Hon. J. F. RYAN: I will read you a sentence from the evidence of Mr Forward, the chairman of the RTA, last Tuesday. With regard to figures quoted for equipment he said, "Often they are quoted totally out of context and not even with half the story. The electrical work, mechanical work and civil works to accommodate the equipment are often conveniently left out of the picture. You have to quote the full story." Have you given us the full story?

Mr ANDERL: In all the years I have been working with CTA with electrostatic precipitators—now 22 years that I have personally work with them—when I make a job I always make a turnkey job. That means that if you want a house and you do not want to be involved with anything you ask your architect and your constructor to build a house and when it is finished to give you the key to move in. That is what I am doing with electrostatic precipitators. When I give a price I hold that price and if I do a bad job or have to pay more and it costs me more that is my problem, not the customer's problem.

The Hon. J. F. RYAN: Only a day or so ago the Minister for Roads said in the media that the cost of installing electrostatic precipitators in the M5 tunnel would be in the order of $35 million. Is it possible that the Minister is basing his quote on mistaken information?

Mr ANDERL: I cannot say on which statement he is doing that and I do not know where he is getting his price from. I just hope that he did not calculate it himself. Normally, when I make a job, when we are installing electrostatic precipitators anywhere in the world, we are making the casting, drawings, the technical things, the water treatment and drainage and the builder is making it. It is a complete system that we are prepared to deliver. That is all included in it.

Motion by the Hon. J. H. Jobling agreed to:

That tabled documents and the transcript of evidence be made public.

(The witness withdrew)

(The Committee adjourned at 1.31 p.m.)